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REPORT ON TROPICAL FORESTS AND BIOLOGICAL DIVERSITY

USAID/COLOMBIA
COUNTRY STRATEGY STATEMENT
FY 2006 TO 2010

August 8, 2006

This publication was produced for review by Bruce S. Kernan, César Augusto Monie Carrillo and Patricio von Hildebrand Mulcahy.

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AUGUST 8, 2006
BOGOTÁ D.C., COLOMBIA

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ACRONYMS

ABCI	Amazon Basin Conservation Initiative
CBD	Convention on Biological Diversity
CDC	Center for Conservation Data
CI	Conservation International
CIAT	International Tropical Agriculture Center
CITES	Convention on the International Trade of Endangered Species
CORPOICA	Colombian Corporation for Agricultural Research
Dbh	diameter breast height
EA	Environmental Assessment
FAA	Foreign Assistance Act
FAN	National Environmental Fund
FAO	Food and Agriculture Organization
FY	Fiscal Year
GEF	Global Environmental Facility
GO	Governmental Organization
GOC	Government of Colombia
GTZ	German Technical Assistance
IAvH	Instituto Alexander von Humboldt
IDB	Inter-American Development Bank
IDEAM	Instituto de Hidrología, Metereología y Estudios Ambientales
IDP	Internally Displaced People
IEE	Initial Environmental Evaluation
IUCN/UICN	World Conservation Union
LAC	Latin America and the Caribbean
MA	Ministry of Environment
MEO	Mission Environmental Officer
NGO	Non-Governmental Organization
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
OCTA	Amazon Cooperative Treaty Organization
PEA	Programmatic Environmental Assessment
PiP	Parks in Peril Program
POT	Territorial Land Use Plans
RAMSAR	International Treaty on Wetlands
REDCAM	Red de Vigilancia para la Protección y Conservación de la Calidad de las Aguas Marinas y Costeras
SNPN	National System of Natural Parks
SO	Strategic Objective
TNC	The Nature Conservancy
UNCGCC	United Nations Convention on Global Climate Change
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
USAID/Colombia	United States Agency for International Development in Colombia
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

PURPOSE OF THE REPORT

USAID/Colombia issued a Purchase Order for the preparation of the report on biodiversity and tropical forests that is required by Sections 118 and 119 of the Foreign Assistance Act. Colombia is one of the world's five countries with the most genetic species, and ecosystem diversity. It has the second largest number of plant species of any country in the world, the third largest number of mammal species and the fourth largest number of reptile species (IAvH, 1997). One hundred and fifty species of vertebrates, many of them amphibians, are considered to be in a threatened or critical status. Colombia, moreover has 556,130 km2 of tropical forests, one of the world's most extensive areas of intact tropical forests. USAID/Colombia's program thus is extremely important for reaching the overall USAID goal of conservation of global biodiversity and tropical forests.

METHODS

The report was prepared between June and September 2006 by a team of three specialists, two of them Colombian experts in biodiversity and tropical forests and one U.S. forester with experience in Colombia and in the preparation of this type of report.

The Colombian National Diversity Policy and the National Forestry Development Plan were used to define the actions necessary to achieve sustainable management of tropical forests and conservation of biodiversity. The actions that USAID/Colombia proposes to support were identified in its Strategic Plan and in the Work Plans for the five programs that it is financing for the implementation of that plan. The two were then compared to identify the extent to which USAID/Colombia Strategic Plan meets the actions necessary for conservation and tropical forest management. On that basis, other recommendations to USAID/Colombia for conservation of biodiversity and tropical forest management were formulated.

USAID/Colombia organized a meeting with its partner Colombian organizations and with the recepients of USAID contracts or grants for the implementation of its Strategic Plan. At that meeting the team presented its proposed methodology and defined some principal issues concerning the conservation of biodiversity and tropical forests in Colombia.

USAID/Colombia reviewed a draft report and gave comments and recommendations to the team for incorporation into the final report.

USAID/COLOMBIA DEVELOPMENT STRATEGY AND ACTIVITIES, 2006-2010

The USAID/Colombia Strategic Plan for 2006 to 2010 has four Strategic Objectives (SO):

- Democratic Governance;

- Alternatives to Illicit Crops;
- Reintegration of Internally Displaced Persons;
- Improved Environment for Demobilization and Reintegration.

USAID/Colombia has issued contracts or grants for the following five programs to implement this strategy:

- Additional Investment for Sustainable Alternative Development Program (MIDAS);
- Municipal-Level Alternative Development Program (ADAM);
- Internally Displaced People Program (IDP);
- Integrated Sustainable Development of Indigenous Groups in National Park Buffer Zones (Buffer Zones);
- National Parks (NP).

THREATS TO BIODIVERSITY AND TROPICAL FORESTS

There are eight principal indirect threats to Colombia's biodiversity and tropical forests. The indirect threats include insecurity, due to violent guerrilla and paramilitary groups that makes conservation actions difficult. Demographic change, involving not so much absolute population growth as internal migrations to agricultural-forest frontiers is a main indirect cause of deforestation. Poverty limits the financial resources that public and private institutions can devote to conservation and lowers the level of public education about conservation, as well as stimulating some people to migrate to the agricultural-forest frontier. Insecure land or resource tenure, common in Colombia, discourages long-term investment in land and forests. Limited institutional capacity, due to corruption, inadequate budgets and outdated policies and regulations, indirectly threatens biodiversity and tropical forests. Road construction and improvements generally attract agricultural colonists who convert forestland to other land uses. Likewise, market demand for non-forest products stimulates the conversion of forestland to other land use. Finally forest has been cleared for coca cultivation.

The principal direct threat to Colombia's biodiversity and tropixcal forests is habitat conversion, especially the conversion of forest to pasture. Pasture occupies 400,754 km2 although only 191,814 km2 have been classified as suitable for pasture. Coca and poppy cultivation also causes habitat conversion. ONU (2003) estimates that between 1992 and 2002 coca and poppy cultivation caused the destruction of 17,000 km2 of natural forest. Over-exploitation affects a more restricted number of plants and animal species than habitat conversion. According to Leipzig (1996) there are at least 40 tree species in Colombia that are threatened by over-exploitation and IAvH (1997) reports that in 1997 there were 225 species of fauna that were being over-exploited in Colombia. Pollution is a third direct threat to biodiversity. Although there are few studies in Colombia on the effects of pollution, speculation suggests that it may affect biodiversity by means of its effects on pollinators, such as bees, insects, and birds, which are so important for the reproduction of some plant species, as well as by its effects on aquatic organisms. The introduction and spread of exotic species is sometimes a serious threat to some species of native plants and animals. Finally, although Colombia is vulnerable to the effects of climate change, particularly in its high elevation and ocean ecosystems.

CONSERVATION POLICIES AND LAWS

Colombia is a signatory to every major international environment treaty and has established policies, laws and regulations regarding habitat change, pollution, over-exploitation and climate change.

Colombia's principal forestry policy statement is the National Plan for Forestry Development (PNDF). The plan has 16 subprograms to promote forest tree plantations and natural forest management. A new forestry law, with a focus on encouraging investment in tree plantations and natural forest management, and therefore their conservation, was approved by the Colombian Congress and signed by the President in April 2006. Its regulations have not yet been written. The National Biodiversity Policy is Colombia's policy for conservation of biodiversity. It has three components (Conserve, Utilize and Understand) and 92 actions.

INSTITUTIONS

Law 99 created Colombia's principal institutional structure for the conservation of biodiversity and tropical forests in 1993. It established the National Environmental System (SINA), formed of the Ministry of Environment and 33 Regional Autonomous Corporations (CAR). The Ministry of Environment recently merged with the Ministry of Housing to form the Ministry of Environment, Housing and Territorial Development (MAVDT). MAVDT has a Directorate of Ecosystems within which there are three Working Groups: Forest Ecosystems, Biodiversity and Coastal and Wetland Ecosystems. Attached to the MAVDT are the Alexander von Humboldt Institute (IAvH), created in 1983, which promotes, coordinates, and carried out conservation research, and the SINCHI Institute, which carried out research in the Amazon Region.

Other important conservation institutions include the Ministry of Agriculture and Rural Development, responsible for promoting forest tree plantations and wood product value chains, the Colombian Institute for Rural Development, which has a department responsible for productive forest development, the Department of National Planning, the Ministries of Commerce, Industry, and Tourism, and the National Corporation for Forestry Research and Development (CONIF). Municipalities, which manage 40% of Colombia's public expenditure, are also important to conservation in Colombia.

CONSERVATION ACTIONS

Colombia's principal conservation action has been to establish the National System of Protected Areas (SNPN). The SNPN encompasses 10,082,779 hectares, or about 10% of Colombia. Its components protect many, although not all, of Colombia's ecosystems. In addition, although not protected areas, indigenous reserves (r*esguardos indigenous*) include 28,200,000 hectares and Afro-Colombian communal territories (*territorios comunales*) include 5,128,829 hectares. A second important Colombian conservation has been to ratify and abide by all of the major international environmental and natural resource treaties and conventions. A third Colombian conservation action has been the preparation of land use plans, called Territorial Land Use Plans (POT), for almost all of Colombia's municipalities.

Out of a total of 54 donor conservation actions, involving such organizations as the World Bank and Inter American Development Bank, 21 involve planning, 12 involve pollution control, 7 involve biodiversity conservation, 3 involve carbon sequestration, and 1 involves protection of marine resources. No donor finances research. The Global Environmental Facility (GEF) finances the greatest number of different activities (24).

International environmental NGOs finance a wide variety of projects in Colombia. The Nature Conservancy concentrates on the purchase of land for protected areas, the World Wildlife Fund (WWF) on the development of conservation strategies and policies, environmental education and financing for conservation and Conservation International concentrates its efforts on the management of conservation corridors and protected areas.

A principal conservation action of USAID/Colombia has been the establishment of established an Environmental Review process for all of the activities that it finances in Colombia. Through that process, it identifies potential negative effects of actions that it finances on tropical forests and biodiversity and then formulates, implements and monitors avoidance or mitigation measures. USAID/Colombia also provided the seed money for the national environmental fund that continues to function in support of conservation.

RECOMMENDED USAID/COLOMBIA CONSERVATION ACTIONS

This report recommends three actions for USAID/Colombia to take to help Colombia conserve its biodiversity and tropical forests: (1) Implement Strategic Objective Conservation Actions; (2) Finance a Strategic Objective for the Conservation of Biodiversity and Tropical Forests; and (3) Avoid, Mitigate or Compensate for Negative Environmental Impacts.

IMPLEMENT STRATEGIC OBJECTIVE CONSERVATION ACTIONS

A principal recommendation of this report is that the activities that USAID/Colombia finances support the actions of the actions of the National Biodiversity Policy and the National Forestry Development Plan. The report identifies 259 ways in which these activities could suppor the National Biodiversity Strateigy and 130 ways in which they could suppor the National Forestry Development Plan. The report recommends that USAID/Colombia give its support to the implementation of these actions by: (1) meeting with each grantee and contractor to review the specific measures identified in the present report; (2) giving formal, written instructions to its contractors and grantees to implement these actions; (3) requiring that quarterly and annual reports from contractors and grantees report on the degree of compliance with these actions.

FINANCE A BIODIVERSITY AND TROPICAL FOREST STRATEGIC OBJECTIVE

This report recommends that USAID/Colombia add a new Strategic Objective to the USAID/Colombia Strategic Plan for 2006 to 2010. On the one hand, Colombia is one of the world's most important countries for the conservation of biodiversity and its Strategic Plan for 2006 to 2010 has a budget of over US$ 450 million. Yet, the budget for biodiversity and tropical

forests is less than US$ 4 million, or less than 1% of the overall budget. If USAID does not adequately support biodiversity conservation in Colombia, it will be unlikely to achieve its global biodiversity conservation goals. On the other hand conservation forms an integral, essential part of efforts to achieve USAID/Colombia's goal of peace and reduction of illicit crops.

AVOID, MITIGATE AND COMPENSATE POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS

The third recommendation of the report is that USAID/Colombia continue to apply its Environmental Review process to the activities to be financed under its Strategic Plan. The report describes USAID/Colombia's Environmental Review Process (ER), which was designed to identify and avoid, mitigate or compensate for potential negative environmental impacts of proposed actions taken to achieve USAID/Colombia's Strategic Objectives. USAID/Colombia should ensure that the Environmental Review process continues to function effectively during the new Strategic Objective period.

INTRODUCTION

PURPOSE

This report meets the congressionally mandated legal requirement, stated in Sections 118 and 119 of the Foreign Assistance Act (FAA), that USAID/Colombia's country development strategy statement should include analyses of (1) the actions necessary to achieve conservation and sustainable management of tropical forests and biodiversity, and the extent to which the actions proposed meet these needs and (2) the actions necessary in each country to conserve biological diversity and the extent to which the actions proposed for support by the Agency, meet the needs thus identified.

The report is not, therefore, a program evaluation, design or environmental assessment document. It does not discuss all of Colombia's environmental issues nor does it evaluate USAID/Colombia's past or current conservation activities. Rather, the report focuses on the relationship between USAID/Colombia's Country Strategy Statement for Fiscal Years 2006 to 2010 and the conservation of Colombia's tropical forests and biodiversity.

SOURCES OF DATA

The data for this report comes from two sources the Alexander von Humboldt Institute (IAvH, 1997) and IDEAM (2004). There are no other organizations that produce maps and documents on forests and biodiversity on a national scale. The 1997 IAvH document includes a comprehensive, even though umbalanced, analyis of biodiversity in Colombia. It is the base line for the implementation of the National Biodiversity Policy. IAvH is preparing a new version of the document but it will only be available in 2007. IAvH (2002) establishes the extension and degree of transformation of ecosystems, within the country´s protected areas. No more current information exists on a national scale. The report relies on IDEAM (2004) for its description of the change in forest cover in Colombia and no more current description of changes in forest cover at a national level exists. As part of the implementation of the National Biodiversity Policy, IAvH has been leading the preparation of Regional Plans for the Conservation of Biodiversity. As of September 2006, such a plan has been completed only for the Orinoco Region. The regional plan for the Amazon Region will be available in early 2007. No other regional plan has been completed.

The National Council for Forestry Research (*Consejo Nacional de Investigación Forestal*, CONIF) and the National Forestry Agency (*Agencia Nacional Forestal*) have compiled some additional information on specific forest types in specific areas. Such information is useful at a regional or local scale, but not for an overall country analysis. The reports of both organizations, moreover, emphasize forest plantations more than natural forests.

On a regional scale, every Regional Environmental Corporation (CAR) has produced Environmental Plans (*Planes de Gestion Ambiental*). The informatioin on forest cover and biodiversity in these plans, however, is not orginal but comes from the IAvH and IDEAM documents mentioned previously. Some of the CARs have produced maps on a regional scale for

their area of responsibility. Each one, however, has used its own system of mapping and nomenclature, so the maps usually cannot be usefully compared with each other, much less combined to produce a national scale map or used for an analysis on a national scale. In any case, the review of the regional plans of the CARs, some of which occupy various volumes, was beyond the Scope of Work for the preparation of the present report.

Some municipal governments have included information on forests and biodiversity in their Land Use Plans (*Planes de Ordenamiento Territorial*). The information in these plans, however, comes from the IAvH and IDEAM reports. The municipal plans, moreover, are not comparable in their content, text or maps so they could not be used for a national scale analysis. In any case, it was beyond the scope of the present report to review municipal land use plans.

No Colombian non-governmental environmental organization operates at a national level. Some, such as the Fundacion Natura, Fundación Prosierra and Fundacion Puerto Rastrojo do give attention to biodiversity and forests. They, however, also use information provided by IAvH and IDEAM, except for some data from specific and localized projects with little use for a national scale analysis.

In conclusion, one of the main reasons for the creation of IAvH and IDEAM was to generate official, comprehensive and coherent information on Colombia's biodiversity, ecosystems and forest coverage and land-use changes, at a national scale. The information from IAvH and IDEAM utilized in the present report is the information that is currently accepted and widely used by government and non government organizations throughout Colombia.

METHODS

Sections 118 and 119 of the Foreign Assistance Act require a comparison between the conservation actions that are necessary in a country and the conservation actions that the USAID mission proposes to support. In order to define the required conservation actions in Colombia, this report uses two existing, official Colombian documents: the National Policy for Biodiversity (Department of Planning, 1996) and the National Forestry Plan (Ministry of Environment, 1998). The former has three goals (Conserve, Understand and Utilize) and 72 actions and the later three goals (Planning, Conservation and Restoration of Forest Ecosystems, Development of Productive Forestry Chains, and Institutional Development) and 52 actions.

In order to define the conservation actions that USAID/Colombia proposes, this report utilizes USAID/Colombia's Strategic Plan, 2006 to 2010. The report also uses the Work Plans of five institutions and organizations, which have been contracted or have received a grant from USAID/Colombia, to implement SOs 2 and 3 of the Strategic Plan.[1] These contracts are the following:

MIDAS (Additional Investment for Sustainable Alternative Development Program)

- ADAM Municipal-Level Alternative Development Program;

[1] This report does not address the Democracy and Demobilization and Reintegration Strategic Objectives. The former has little or no relation to the issue of biodiversity and tropical forests. The latter, which has only recently been developed, will carry out actions that are almost identical to those of the Internally Displaced People Strategic Objective.

- Internally Displaced People Program (FUPAD);
- Buffer Zones (Integrated Sustainable Development of Indigenous Groups in National Park Buffer Zones);
- National Parks (CORPACOT).

By comparing the actions proposed in the National Biodiversity Strategy and the National Forestry Development Plan with the actions proposed under the five programs, it was possible to compare the necessary conservation activities with the actions proposed by USAID/Colombia.

Both the National Biodiversity Strategy and National Forestry Development Plan were prepared with ample stakeholder participation. It was beyond the scope of the present study to review the validity, and much less to suggest revisions to either document. This study, therefore, accepts the actions that these two documents recommend as a valid reflection of Colombian stakeholder conservation priorities.

USAID/Colombia, however, did invite about 25 stakeholders to a consultative meeting with the FAA team. Ten stakeholders attended the meeting and expressed their agreement with the methodology for the preparation of the report and the principal issues that it should analyze. In addition, the FAA team consulted extensively with the staff of the five projects.

VALUES OF COLOMBIA'S FORESTS AND BIODIVERSITY

The values of Colombia's biodiversity are direct and indirect. Direct values of biodiversity in Colombia involve important, well-known benefits to humans. Domesticated plant and animal species provide Colombians with most of their food. The genetic variety of these species provides the means to increase their productivity, quality and resistance to pests, through breeding and genetic manipulation. Some of the most important of these species, such as potatoes and tomatoes, originated in the Andes. Their wild relatives in Colombia continue to provide gene and sub-gene material, to improve their productivity, quality and resistance to pests.

Although wild plants and animals, such as berries and game, provide less food for Colombians than domestic plants and animals, they are still important to the diets of many rural people. Some of Colombia's Amazonian indigenous peoples, for example, depend on wild game for protein and the Chocó Afro-Colombians gather wild mussels in the mangroves and catch fish in the estuaries and ocean. Likewise, fresh water fish from the Magdalena, Cauca, Putumayo, Meta, Ariporo, Caquetá and Atrato Rivers, and their numerous tributaries, provide over 5,000 tons per year of fish for human consumption per year. Fish from Colombia's Pacific and Atlantic Ocean territories provide over 100,000 tones per year. Over 350 tree species provide Colombians with wood for commercial and non-commercial uses. Many rural Colombians, for example, construct their own houses with materials they collect themselves, such as wood and thatch. In Colombia, firewood and charcoal consume approximately 16 million cubic meters of wood a year, while industry uses another 4 million cubic meters. About 177 species of Colombian plants, especially in the orchid, anturios and bromeliad families, have commercial value for ornamental use and many rural Colombians continue to treat sicknesses with medicinal plants. During World War II Colombia was an important source of quinine, derived from the bark of the cinchona tree used as

a remedy for malaria (Kernan, H., 2006). In sum, although often ignored in official statistics, and depreciated in development planning, Colombia's biodiversity underlies not only its economic potential but also the welfare of its people.

The indirect values of Colombian biodiversity, although perhaps not so widely appreciated, are equally important to humans. A variety of insect, bat, and birds pollinate both domesticated fruits and vegetables and wild plants. Without them productivity would decline drastically. Although wild insects, virus and fungi may attack and decrease the productivity or quality of domesticated plants, other wild animal species sometimes bring these infestations under control. The productivity of agriculture depends on the biological activity of fungus and soil microorganisms, which decompose and recycle organic material and fix atmospheric nitrogen. Vegetation, especially forests, regulates the water cycle, tempering the fluctuations in water levels in rivers, thus protecting economic and social infrastructure, such as roads and buildings, from flooding. Vegetation also contributes to maintaining the quality and quantity of water supplies for human consumption and for irrigation and industrial uses. It is difficult to calculate the financial or economic value of these indirect benefits of biodiversity for Colombians. Nonetheless, they should be an integral part of Colombian policies and plans, as well as of the efforts of USAID/Colombia to assist Colombia.

USAID/COLOMBIA DEVELOPMENT STRATEGY, 2007-2012

Figure 1 is USAID/Colombia's Strategic Framework. USAID/Colombia's Overall Goal for 2007 to 2012 is "Sustainable Reduction in the Production of Illicit Crops and the Promotion of Peace". In order to achieve that goal, USAID/Colombia has established four Strategic Objectives:

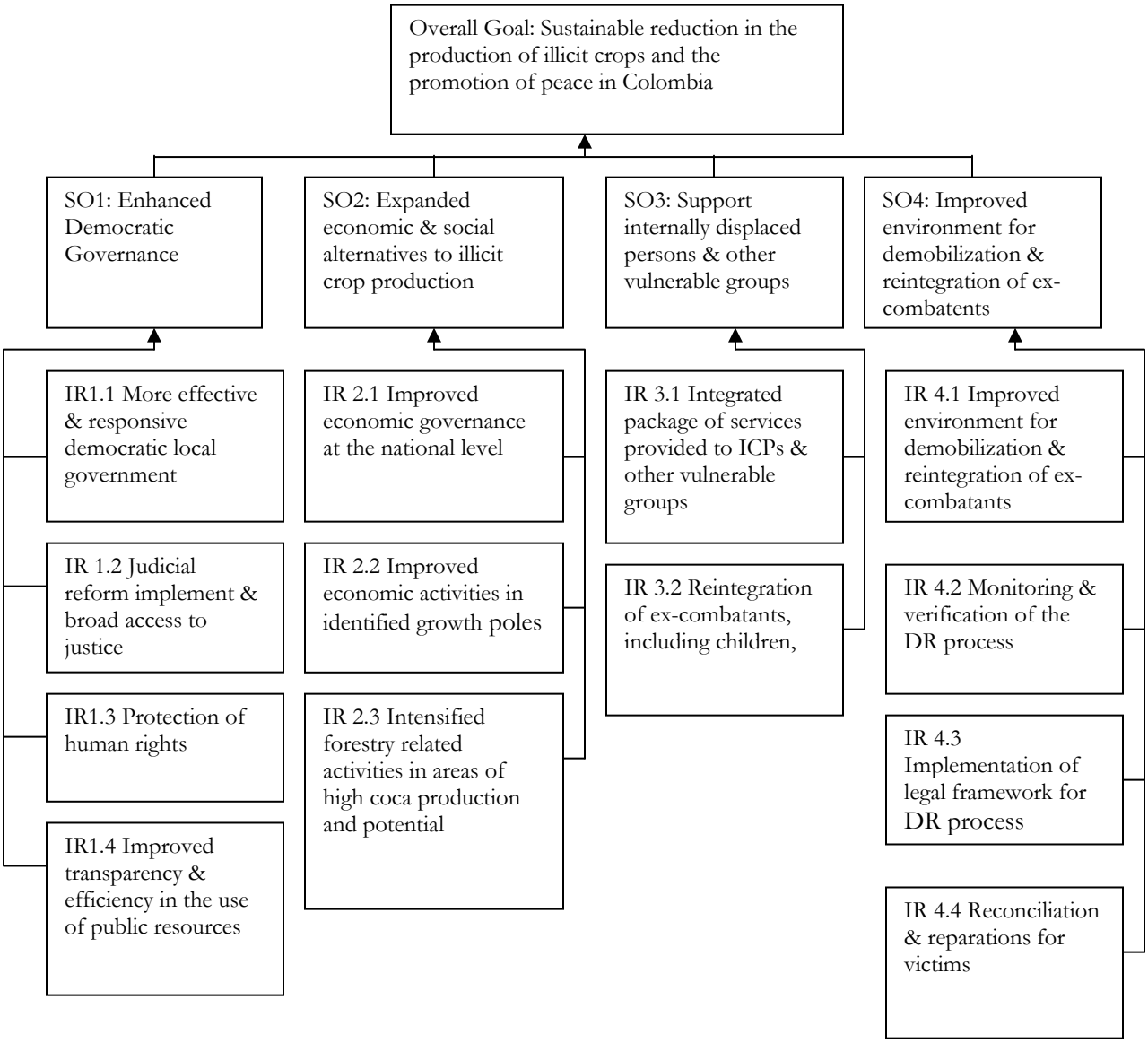
Strategic Objective 1: Democratic Governance
Strategic Objective 1 has four Intermediate Results: (1) More effective & responsive democratic local government; (2) Judicial reform implement & broad access to justice; (3) Protection of human rights; and (4) Improved transparency & efficiency in the use of public resources.

Strategic Objective 2: Alternatives to Illicit Crops
Strategic Objective 2 has three Intermediate Results: (1) Improved economic governance at the national level; (2) Improved economic activities in identified growth poles; and (3) Intensified forestry related activities in areas of high coca production and potential.

Strategic Objective 3: Reintegration of Internally Displaced Persons
Strategic Objective 3 has two Intermediate Results: (1) Integrated package of services provided to ICPs & other vulnerable groups; (2) Reintegration of ex-combatants, including children.

Strategic Objective 4: Improved Environment for Demobilization and Reintegration
Strategic Objective 4 has four Intermediate Results: (1) Improved environment for demobilization & reintegration of ex-combatants; (2) Monitoring & verification of the DR process; (3) Implementation of legal framework for DR process; (4) Reconciliation and reparations for victims.

Figure 1. USAID/Colombia Strategic Framework 2006 to 2010



USAID/COLOMBIA CONTRACTS AND GRANTS

USAID/Colombia has awarded the following five contracts and grants with the aim of achieving its Intermediate Results for Strategic Objectives two and three.

- MIDAS

USAID/Colombia has awarded Associates in Rural Development, Inc. a contract for the Additional Investment for Sustainable Alternative Development Program known by its Spanish acronym of MIDAS. MIDAS will assist Colombian small and medium-sized enterprises to overcome the information and market development barriers that limit their growth, thereby creating job alternatives to illicit activities. MIDAS will work in almost all the departments in the eastern half of Colombia. MIDAS has a total budget of US$ 160,000,000 and four components: (1) Agribusiness Partnerships (US$ 51,100,000); (2) Small and Medium Businesses (US$ 38,600,000); (3) Commercial Forestry (US$ 40,400,000) and (4) Policy Reforms (US$ 30,000,000).

- ADAM

USAID/Colombia has also awarded Associates in Rural Development, Inc. (ARD) the Areas for Municipal-Level Alternative Development Program known by its Spanish acronym of ADAM. ADAM will promote the eradication of coca and poppies and discourage their cultivation by creating sustainable value chains, based on strong links between municipal governments, markets and producers, that provide licit economic alternatives to illicit activities. ADAM will also work most of the eastern Colombian departments. ADAM has a total budget of US$ 189,998,562. Its three components are (1) Alternative Development (US$ 143,252,396); (2) Strengthened Local Governance (US$ 26,486,013); and (3) Internally Displaced Persons (US$ 20,260,562).

- IDP

USAID/Colombia has awarded the Latin America Development Foundation and the International Migration Organization (OIM) a grant to carry out the Internally Displaced People Program (IDP). IDP will work throughout Colombia where there are internal refugees. IDP has a total budget of US$ 73,600,000 and nine components.

- Buffer Zone

USAID/Colombia has awarded the Latin America Development Foundation a grant to carry out the Integrated Sustainable Development of Indigenous Groups in National Park Buffer Zones. The BZ Program will assist indigenous peoples, living within or on the borders of national parks, to increase their incomes through sustainable licit production practices. It has financed the Amazon Conservation Team, to assist indigenous communities around the Indi Wasi National Park, as well as financing the expansion of the park by 19,000 hectares. It also contributed toward the declaration of a Special Protected Area in the Predio UMIYAC (Union of Traditional Healers of the Colombian Amazon), an ancestral site of the Kofán Indians near the Guamuez River. The Buffer Zone Program has four components and a total budget of US$ 4,000,000: (1) Sustainable management practices; (2) Sustainable productive activities; (3) Indigenous Organization Strengthening (4) Biodiversity Conservation.

- National Parks

Under the National Park Program USAID/Colombia is financing activities to strengthen the presence of the Colombian National Parks Unit (UAESPNN) in protected areas and to train its staff in improved management tools. Its total budget is US$ 3,500,000.

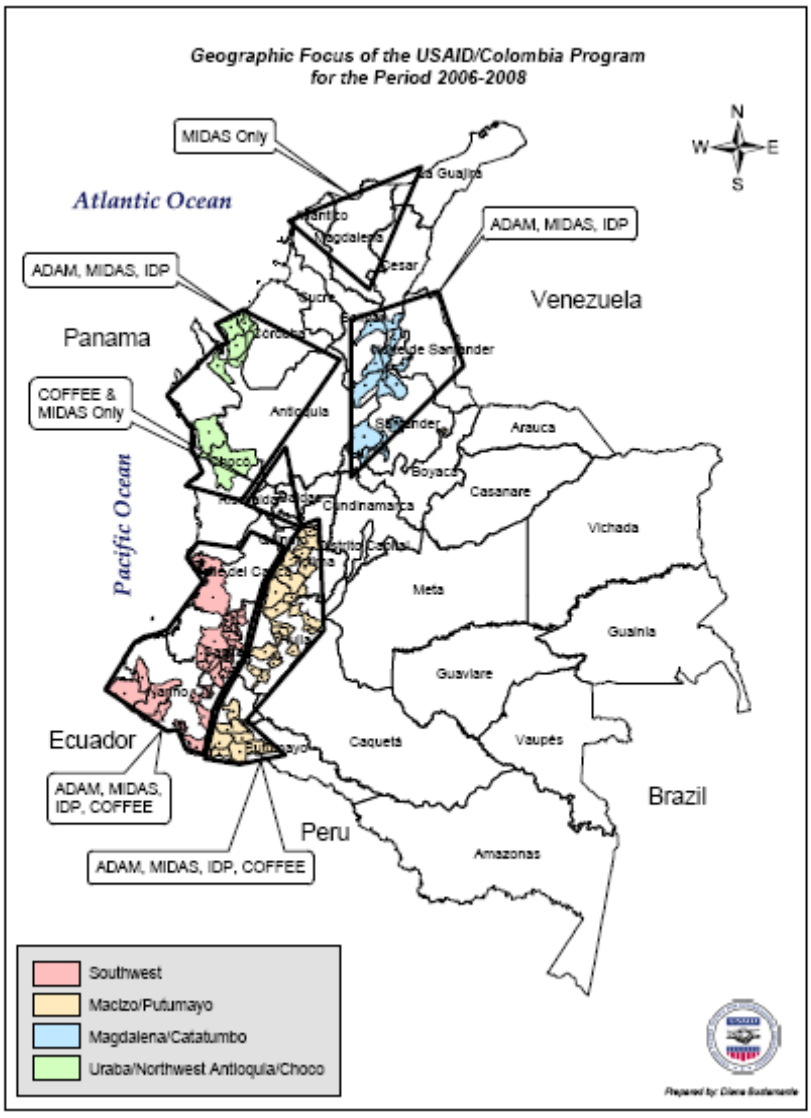
Table 1 compares these five programs. They differ in several ways. ADAM and MIDAS have large budgets (US$ 89,998,562 and US$ 160,000,000 respectively), IDP has a comparatively moderate budget (US$ 73,600,000) and BZ and NP have small budgets (US$ 4,000,000 and US$ 3,500,000). ADAM's clients are farmers and forestland owners and municipalities. MIDAS's clients are owners of established businesses. IDP helps internal refugees. The Buffer Zone Program works with indigenous peoples who live in or close to national parks, and the National Park Program assists the national park system.

Table 1. Comparison of the ADAM, MIDAS, IDP and Buffer Zone programs

	ADAM	MIDAS	IDP	BZ	NP
Strategic Objective(s)	2	2	3	2	2
Budget (US$)	189,998,562	160,000,000	73,600,000	4,000,000	3,500,000
Clients	Farmers, municipalities, forestland owners	Established businesses	Internal refugees	Indigenous Peoples	Colombian people
Location	Putumayo, Nariño, Cauca, Huila, Tolima Santander, Norte de Santander, Bolívar, Cesar, Antioquia, Córdoba, Valle, Chocó	Putumayo, Nariño, Cauca, Huila, Tolima Santander, Norte de Santander, Bolívar, Cesar, Antioquia, Córdoba, Valle, Chocó, Caldas, Risaralda, Atlántico, Magdalena.	Putumayo, Nariño, Cauca, Huila, Tolima Santander, Norte de Santander, Bolívar, Cesar, Antioquia, Córdoba, Valle, Chocó	Magdalena, Guajira, Cesar, Caquetá, Putumayo, Huila	

Source: Geographic focus of the USAID/COLOMBIA Program for the period 2006-2010.

Map 1. Location of programs financed by USAID/Colombia



CONSERVATION CONTEXT

GEOGRAPHY

Including its marine areas, Colombia occupies 2,070,408 km2 in northwest South America between latitudes of 12º north and 4º south and between the Caribbean Sea and the Pacific oceans to the north and west, the Orinoco and Amazon rivers to the east and southeast, the Panama isthmus to the northwest and Ecuador and Peru to the south. Colombia's marine areas

cover 928,660 km² including the small islands of Gorgona and Malpelo in the Pacific Ocean and San Andrés, Providencia, Santa Catalina, Roncador, Quitasueño and Cayos de los Monjes in the Caribbean Sea. Likewise, its Caribbean Sea territories stretch across 3 degrees of latitude.

IDEAM (2004) divides the Colombian terrestrial area, which occupies 1,141,748 km2, into the Amazon, Orinoco, Andean, Caribbean, and Pacific Regions. The Andes Mountains occupy the western half. North of the Ecuadorian border, they break into the Eastern, Central and Western Cordilleras. The first two average 3,000 meters above sea level while the last averages 2,000 meters above sea level. The Magdalena and Cauca Rivers, both of which flow north to the Caribbean coast, separate the Cordilleras with deep, low elevation valleys, making travel by land between them difficult. The Pacific Region, the northern half of which is drained by the Atrato River, and averaging 50 km wide, lies between the Western Cordillera and the Pacific Ocean. The Amazon and Orinoco Regions lie to the southeast and east of the Eastern Cordillera. Their main rivers are, from south to north, the Putumayo, the Caqueta, in the Amazon Basin, and the Guaviare and the Meta, in the Orinoco Basin. On the northern Caribbean coast, the Sierra de Santa Marta rises to over 5,000 meters above sea level and the peninsula of La Guajira stretches northeast of the Gulf of Venezuela.

CLIMATE

Colombia's terrestrial climate varies considerably from region to region according to latitude, elevation and location with respect to the Atlantic and Pacific Oceans and the Andes Mountains. The Caribbean Region has between 500 and 2,000 mm of rainfall per year, with a defined gradient from north to south. The Pacific Region receives an average from 3,000 to over 10,000 mm/year depending on elevation. Rainfall in the Andean Region varies considerably. In the Eastern Cordillera and the valleys of the Alto Magdalena and Alto Cauca, average annual rainfall is less than 2,000 mm/year while in the Medio Magdalena and Medio Cauca the average annual rainfall is 3,000 to 5,000 mm/year. In the central Orinoco Region, the average annual rainfall is 2,000 to 3,000 mm/year while in the piedmont Orinoco the average is 6,000 mm/year. Most of the Amazon Region receives from 3,000 to 4,500 mm/year. The low elevations of the Caribbean Region have the highest temperatures, of up to 32 C. The lowlands of the Amazon, Orinoco, Pacific Coast and Caribbean Coast Regions frequently rise to over 30 degrees C while the temperature in the Andean Highland Region averages only 13 degrees C, although varying above and below that during the course of the day. Temperatures in all areas are quite constant throughout the year.

Colombia's marine climates differ between the Caribbean and the Pacific. In the Pacific, the Equatorial Current and the California Current, shift north and south along its Pacific coast giving rise to variable ocean temperatures and a variety of marine habitats. The Colombian Caribbean, by contrast, is uniform in its climate all year around and is rarely affected by the hurricanes that cross the Caribbean further to the north.

POLITICS

Palacios and Safford (2002) analyze Colombia's politics according to its topography. Its rugged topography, with three mountain ranges, makes communication and travel difficult, fostering

political fragmentation rather than national unity. Even before the Spanish Conquest, no single indigenous group was able to establish its control over a large area. The Spanish conquered Colombia from both the Caribbean and from what is now Ecuador, establishing two political jurisdictions and cultures that persisted even after independence. In political terms, Colombia remains relatively decentralized with cities, such as Medellín, Cali and Barranquilla asserting their political independence from Bogota whilst rural areas of the Pacific, Amazon, and Orinoco are barely under the control of the central government. Political fragmentation is one factor that has enabled the persistence of the *Fuerzas Armadas Revolucionarias de Colombia* (FARC) and of paramilitary groups, as well as spontaneous colonization of unclaimed forestland, without government control.

Colombia's history during the last half of the 20th century and the first years of the 21st has been violent. Palacios and Safford (2002) divide the violence into four periods. The first phase, which occurred throughout Colombia and established the base for future violence, lasted from 1945 to 1953, starting with the political campaigns of 1945 to 1946 and ending with the pacification programs offered by the government of Rojas Pinilla. The second phase, from 1954 to 1964, was conducted through partisan networks and factions. Having the objective of interfering with coffee markets, this was confined principally to the coffee growing regions of the Western Cordillera, mainly in the Cauca Valley and Old Caldas, although there were also armed conflicts over land in southern Tolima and the Sumapaz, that were predecessors for later guerrilla movements. The third stage, from 1961 to 1989, corresponded to the height of the Cold War and involved communist guerrilla movements inspired by Cuba. The fourth phase began at the end of the 1980's and has not ended. It involves insurrection and Mafia violence. This phase of violence focused on nine colonization frontiers (Urabá-Darien; Caribe-Sinú-San Jorge; Serranía del Perijá; Magdalena Medio; Zonas del Pacífico in Nariño y Choco; Saravena-Arauca; the Orinoco Piedmont; Ariari-Meta; and Caquetá-Putumayo). These colonization zones became conflictive, violent areas where drug dealers, guerrillas and paramilitary groups, some of them allies of politicians, ranchers, military and police, concentrated their activities.

The Fuerzas Armadas Revolucionarios de Colombia (FARC) and the Ejército de Liberación Nacional (ELN), the two guerrilla organizations that continue in 2006, were formed between 1962 and 1966. The FARC originated in peasant protests that had been organized since the 1920's in parts of the Cundinamarca and Tolima Departments. The ELN originated based on the theories of Che Guevara about how to organize a revolution based on clandestine cells and a rural military force supported by peasants. Thus both of Colombia's remaining guerrilla movements emerged from the turmoil and disorder of Colombia's deforestation frontiers (Palacios and Safford, 2002).

The 40-year conflict between government forces and anti-government insurgent groups and illegal paramilitary groups - both heavily funded by the drug trade - escalated during the 1990s. The insurgents lack the military or popular support necessary to overthrow the government and violence has been decreasing since about 2002, but insurgents continue attacks against civilians and large swaths of the countryside are under guerrilla influence. Paramilitary groups challenge the insurgents for control of territory and the drug trade. Most paramilitary members have demobilized since 2002 in an ongoing peace process, although their commitment to ceasing illicit activity is unclear. The Colombian Government has stepped up efforts to reassert

government control throughout the country, and now has a presence in every one of its municipalities. However, neighboring countries worry about the violence spilling over their borders.

Restrepo (in Orozco, 2002) describes two decades of attempts, on the part of a succession of Colombian governments, to attain a negotiated settlement with the FARC and the ELN. So far all such attempts have failed. The current government intends to establish a state presence in every municipality and improve public administration. So far it has driven the illegal armed groups out of the more populated parts of Colombia, and has extended at least a minimal level of state presence in every municipality. Most observers, however, seem to agree that it will be difficult to defeat the FARC militarily and that only a negotiated settlement will end the political violence in Colombia (Orozco, 2002).

ECONOMY

Colombia's economic history also reflects its geography. Altitudinal differences permitted pre-Hispanic indigenous populations to be almost self-sufficient. As a Spanish colony, Colombia's economic activity to the west of the Magdalena River concentrated on gold mining. Agriculture and manufacturing dominated the economic activity of the Eastern Cordillera. Commerce was the main activity of the Caribbean Coast. After independence, in 1822, regional economic differences grew, becoming tangled with political rivalries. The eastern Cordillera had rich agricultural land and a large, indigenous population, providing the base for its political dominance. Gold mines in the western Cordillera provided Colombia's only important export product during the first half of the 19th century and the basis for the growth and prosperity of Popayán and Medellín. The economy of the Caribbean Region depended on external commerce, at first dominated by Cartagena, and later by Santa Marta and Barranquilla.

An abundance of isolated, economically self-sufficient cities, towns and villages, and a high percentage of rural inhabitants, gave little incentive for the growth of internal trade or investments in roads or railways. Such economic autarky not only reinforced political rivalries and contributed to Colombian federalism during the second half of the 19th century, but also retarded the growth of its internal and export economy. Until coffee cultivation spread to Colombia from Venezuela in the late 1800's, and in contrast to Venezuela and Ecuador, which developed important agricultural exports, gold remained Colombia's only important export. Indeed, Colombia's gold production, along with colonial mercantilist economic policies, may have made it less competitive in agricultural products.

Finally, after 1910, a program of road construction began to facilitate the growth of internal markets. During the first half of the twentieth century, Colombia was still a mostly rural country, where the main agriculture activity was coffee production. The construction of important roads that connected the coastal areas with the Andean zone and the development of railways slowly contributed to the integration of isolated regions to the country's economy. During the second half of the twentieth century, agro-industrial activities, based on cotton, rice, palm oil and flowers, became important. These agricultural activities expanded in area, frequently beging the cause of extensive deforestation. Oil and gas production also became extremely importance for the country's economy. Since the 1975s, drug trafficking has become one of Colombia's main

economic activities. Together with this activity, armed paramilitary groups have become powerful. The combination of guerrilla, paramilitary and drug dealer groups has caused extreme insecurity throughout most of the country's rural areas, a situation that currently continues.

Economic growth will increase the possibilities for successfully controlling the guerrillas and reducing coca and poppy cultivation. Colombia's economy has been growing during the past three years, helped by good government economic policies, such as balanced budgets, reductions in public debt levels and export promotion, as well as strong world demand for Colombia's exports, especially its principal export, coffee. Thus in 2005 the GNP grew at a rate of 5.1%, while the inflation rate was only 5%. Unemployment, however, remains high at about 11%. Half the population lives below the poverty line, and income distribution is very skewed, with 10% of the population receiving over a third of all the income (CIA World Fact Book, http://www.cia.gov/cia/publications/factbook).

LAND TENURE

Palacios and Safford (2002) describe how land ownership patterns in Colombia have influenced its politics, economy and social structure throughout its history. The latest pattern of land ownership involves the "counter-agricultural reform." By 1998, drug dealers, including both guerrillas and paramilitaries, had accumulated over 5 million hectares of the best agricultural and pastures in Colombia, mostly in Magdalena Medio, Córdoba, Meta, Antioquia and Sucre. Such concentration of land in a few hands has permitted the establishment of semi-autonomous regions, with their own governments, security systems and economic regulation, and has displaced millions of people.

According to the Center for International Policy's Colombia Program (http://www.ciponline.org/colombia/blog/2006), estimates of the amount of land abandoned by people violently displaced by the paramilitaries, range from 2.6 million hectares (Contraloría General, the government comptroller's office) to 6.8 million hectares (Acción Social, the Presidency's Social Action agency). The process of returning land promises to be extremely difficult. 76% of the displaced persons owned land when they were forced to leave, but 69 % do not have registered land titles. The land problem has been further complicated by out-of-date government databases of landholdings. Of 3,397 parcels for which there is geographical and socioeconomic information, 67% are out-of-date. In addition, there are contradictions among maps held by different state entities, which makes it difficult to establish boundaries and ensure the protection of indigenous territories and community-held land. Of the land confiscated from drug traffickers, 110,000 hectares are earmarked for redistribution. Some analysts have proposed this use of seized assets as a potential means to resolve much of Colombia's land-tenure problems. As of December 2005, however, only 18,000 hectares have been redistributed and only 7,873 of those went to displaced families.

Table 2 indicates that an approximate area of over 330,000 km2 of forestland, or about half of the total, have been titled to indigenous or Afro-Colombian communities. The Ministry of Environment considers these territories to be a category of protected area. National parks overlap about 40% of these territories, or about 10,000 km2 (www.etniasdecolombia.org, 2006). Table 3 indicates that national parks cover over 80% of the Pacific Coast Region and over 30% of the

Amazon Region. About 37% of the total area of Colombia, or over 43 million hectares, are in some type of protected area.

Table 2. Situation and area of Afro-Colombians, indigenous peoples and national parks

Region	Area (Hectares)	Type of Protected Area & Area			Total Area (Hectares)	Percent
		Afro-Colombian	Indigenous	National Parks		
Pacific	10,600,000	5,128,829	2,506,251	580,500	8,215,518	80
Amazon	49,300,000	0	20.500.000	5,300,000	15,800,000	32
Colombia	114.174.800	5.128.829	28.200.000	10,082,779	43,411,608	37

Source: INCODER, 2006

SOCIAL

In 2002, Colombia had a population of 43,800,000. Officially 58% of the population is considered mestizo, 20% white, 14% mulatto, 4% black, 3% mixed black-Amerindian and 1% Amerindian. Palacios and Stafford (2002), however, describe how the Spanish, Indigenous, and Afro-Colombian populations have become so mixed since the Conquest that almost the entire Colombian population is now mestizo. From a growth rate of over 2% in the 1980's, the population growth rate has decreased now to 1.7%. By 2020, the population is expected to grow to 56,000,000.

As in pre-Hispanic times, Colombia's population is concentrated in the highland mountains and valleys where the climate is more temperate. Nonetheless, the greatest population growth is occurring in the Amazon departments where population growth rates have been above 2.5% per year, mostly due to the jobs offered by coca cultivation and cocaine processing. The Amazon population grew from 502,876 in 1983 to 1,230,000 in 2003. The Chocó, by contrast, until 2002 had an annual population growth rate of less than 0.42% and in 2000 its population was only 407,225. Its population is projected to grow to 446,662 inhabitants by 2020 (Contreras, 2003). The proportion of urban population continues to grow. In 2002, almost 72% of Colombia's population lived in cities and the trend for a higher urban population continues.

Continued violence forced 250,000 people to flee their homes during the course of 2005. In few other countries has the number of internally displaced people grown so regularly and at such a pace, over the past years as in Colombia. With a total of up to 3.7 million IDPs, Colombia continued to face the world's second largest internal displacement crisis (http://www.internal displacement.org, 2006), after Sudan. Many displaced people have been forced to sell or abandon their land due to violence by paramilitary and guerrillas or to escape armed conflict.

According to the Ministry of Interior and Justice, 40,879 guerrillas or paramilitaries demobilized during that period and only 28.5% have secured productive employment. But 8,390 guerrillas or paramilitaries demobilized individually between August 2002 and November 2005. As of November 2005, 109 of these individual deserters had been killed, 62 by common criminals.

Twelve were killed, by the groups to which they had belonged, and eight were killed while supporting security-forces' operations (usually as informants guiding the troops). According to statistics from the Colombian government, since the passage of the Justice and Peace Law (law 975 of 2005), 27,000 people have demobilized both as individuals and as part of group demobilization (National Budget and the National Planning Department, 2005).

There are 80 ethnic groups in Colombia. They speak more than 64 languages and 300 dialects. The indigenous population is about 702,000. In the last twenty years indigenous peoples have organized themselves, mostly in order to protect their land rights and culture. Indigenous peoples played an important role in the preparation of the 1991 Constitution, which recognizes and protects the ethnic and cultural diversity of Colombia. The Constitution provides for considerable political autonomy for indigenous peoples, recognizes indigenous languages and provides for bilingual education. Many indigenous people have been elected to political posts such as municipal governments, departmental assemblies and the national congress. Nonetheless, many indigenous peoples still do not have access to basic needs such as health, education, nutrition, and housing. In some cases they still suffer from the aggression of state institutions, paramilitary and drug dealers and large landowners (www.etniasdecolombia.org, 2006). Table 3 provides a partial list of Colombian indigenous organizations and their acronyms.

Table 3. Partial list of Colombian indigenous and Afro-Colombian organizations

Organization	Acronym
Organización Nacional Indígena de Colombia	ONIC
Coordinadora Indígena Regional Del Cauca	CRIC
Organización de Pueblos Indígenas de la Amazonia Colombiana	OPIAC
Coordinadora Regional de Indigenas del Vaupes	CRIVA
Organización Regional Embera-Wounnan	OREWA
Unión Indígena del Pueblo Awa	UNIPA
Cabildo Mayor Waounnan del Bajo San Juan	CAMAWA
Organización Indígena de Antioquia	OIA
Asociación Campesina Integral del Atrato	COCOMACIA
Proceso de Comunidades Negras	PCN
Red de Consejos Comunitarios del Pacífico Sur	RECOMPAS
Asociación de Autoridades Indígenas del Baudó	ASAIBA
Cabildo Mayor Awa de Ricaurte	CAMAWARI
Coordinadora Nacional Campesina, Negra e Indígena	CNCNI

Source: FAA TEAM

POLICIES AND LAWS

As shown in Table 4, since 1972, Colombia has signed 18 international treaties related to the environment. The fact that Colombia is a signatory to every major international environment treaty certainly indicates the sustained interest of the Colombian State in protecting the country's biodiversity and tropical forests. The international treaties fall into eight categories: General Environmental Principals (4), Amazon Basin (1), Marine Waters (3), Fresh Water (1), Indigenous Peoples (1), Atmosphere (4), Biodiversity and Forests (3) and Toxic Wastes (1). Not

all of these treaties deal directly with the protection of biodiversity and tropical forests, but they all address, at least indirectly, some aspects of the threats to terrestrial or marine biodiversity. It is striking, however, that Table 4 does not include any treaty regarding exotic species, given that the introduction and spread of exotic species is a major threat to biodiversity.

Table 4. International conservation treaties

Year	Category and Name of Treaty
	General
1972	Declaración de Estocolmo de la Conferencia de las Naciones Unidas sobre el Medio Ambiente
1974	Código Nacional de Recursos Naturales Renovables y de Protección al Medio Ambiente
1998	Convención de las Naciones Unidas de Lucha contra la Desertificación
1992	Declaración de Río sobre el Medio Ambiente y el Desarrollo. Naciones Unidas
	Amazon
1979	Tratado de Cooperación Amazónica, 1978
	Marine Waters
1987	Protocolo de Cooperación para Combatir los Derrames de Hidrocarburos
1981	Convenio Internacional para Prevenir la Contaminación por los Buques
1985	Convenio para la Protección del Medio Marino y la Zona Costera del Pacífico Sudeste
	Fresh Water
1997	Convención Relativa a los Humedales de Importancia Internacional (Ramsar)
	Indigneous Peoples
1991	Convenio 169 sobre Pueblos Indígenas y Tribales en Países Independientes
	Atmosphere
1990	Convenio de Viena para la Protección de la Capa de Ozono, 1985
1995	Convención Marco de las Naciones Unidas sobre Cambio Climático, CMNUCC, 1992
1997	Protocolo de Montreal relativo a las Sustancias que Agotan la Capa de Ozono
1997	Protocolo de Kyoto de la Convención Marco de las Naciones Unidas sobre el Cambio Climático
	Biodiversity & Forests
1991	Convención Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres (CITES)
1994	Convenio sobre la Diversidad Biológica
1998	Convenio Internacional de Maderas Tropicales (CIMT)
	Toxic Wastes
1996	Convenio de Basilea sobre el Control de los Movimientos Transfronterizos de los Desechos Peligrosos y su Eliminación

Source: FAA TEAM

Table 5 shows the categories and titles of 25 Colombian policies, laws and regulations that affect biodiversity and tropical forests. Two important points emerge from this table. First, Colombia appears to have a policy, law or regulation for all five types of threats to biodiversity and tropical forests except for the introduction of exotic species. However, it also appears that some policies lack laws and some laws do not have regulations. For example, there are two policies that deal with environmental education but no corresponding law or regulation. Likewise, there is a national policy for wetlands but no law or regulation to implement the policy. Second, the National Council of Economic and Social Policy (CONPES) has issued a number of important conservation policies. CONPES documents, however, are statements of government, not legally enforced state policy. Therefore, they do not necessarily continue beyond the term of the government.

Table 5. National conservation policies and laws

Year	Category and Name of Treaty
	General
1991	Constitución Política de Colombia (right to safe environment)
1993	Ley 99 (creates national environmental system)
	Water
2001	Política Nacional para Humedales Interiores
2002	Conpes 3164 (coastal resource management)
2002	Conpes 3177 (wastewater)
	Land Use Planning
1997	Ley 388 (municipal land use planning)
1998	Lineamientos para la Política Nacional de Ordenamiento Ambiental del Territorio
	Waste Disposal
1997	Política Nacional de Producción más Limpia
1997	Ley 373 (regulates waste disposal)
1997	Política para la Gestión Integral de Residuos
1998	Lineamientos de Política para el Manejo Integral del Agua
2003	Conpes 3246 (regulates sewage disposal)
	Biodiversity
1991	Ley 29 (stimulate ecological research)
1995	Política Nacional de Biodiversidad
1997	Política para la Gestión Ambiental para la Fauna Silvestre
2000	Ley 611 (regulates use of wild species)
	Environmental Education & Participation
1998	Lineamientos de una Política para la Participación Ciudadana en la Gestión Ambiental
2002	Política Nacional de Educación Ambiental
	Climate Change
2002	Lineamientos de Política de Cambio Climático Ministerio de Medio Ambiente
	Forests and Forestry
1994	Ley 139 (tree plantation incentives)
1996	Política de Bosques
1998	Plan Estratégico para la Restauración y el Establecimiento de Bosques en Colombia. Plan Verde.
2002	Plan Nacional de Desarrollo Forestal (Conpes 2834)
2003	Conpes 3237 (incentives for reforestation)
2006	General Forestry Law
	Environmental Services
2003	Conpes 3242 (market for environmental services)

Source: FAA TEAM

Colombia's principal forestry policy statement remains the National Plan for Forestry Development (PNDF), which was approved by the National Environmental Council in 2000 and has a time period of 25 years. In 2001, the National Council for Economic and Social Policy (CONPES) approved the Strategy for the Consolidation of the PNDF. Its Objectives, Programs and Subprograms are accepted as Colombia's forestry policy (Contreras, 2003). In April 2006, the General Forestry Law was passed by the Colombian Congress and signed by the President. The law's objective is to promote the sustainable development of the Colombian forestry sector within the framework of the National Plan for Forestry Development. The law establishes the necessary state administrative organization and regulates activities related to natural forest and forest tree plantations (Colombian Congress, 2006). The General Forestry Law declares tree plantations, natural forest management, agro-forestry, the wood industry and wood commerce as

being of national priority and strategic importance. It established a National Forestry Council with 8 representatives from public institutions and 12 representatives from private institutions, including two representatives from the indigenous peoples and the afro-Colombian peoples, respectively.

INSTITUTIONS

Colombia is a democratic republic with presidential, congressional and judiciary branches. It is divided into 32 departments and the capital district of Bogota. The departments are: Amazonas, Antioquia, Arauca, Atlantico, Bolivar, Boyacá, Caldas, Caqueta, Casanare, Cauca, Cesar, Choco, Cordoba, Cundinamarca, Guainia, Guaviare, Huila, La Guajira, Magdalena, Meta, Narino, Norte de Santander, Putumayo, Quindio, Risaralda, San Andres y Providencia, Santander, Sucre, Tolima, Valle del Cauca, Vaupes and Vichada.

Colombia has numerous institutions with responsibilities for, or involvement in the protection of biodiversity and tropical forests. In 1993, Law 99 created the National Environmental System (SINA). SINA is under the direction of the Ministry of the Environment which establishes Colombian environmental policies and regulations. Thirty-four Autonomous Regional Corporations and Regional Sustainable Development Corporations form part of SINA and are the regional environmental authorities. Other institutions that form part of SINA are five research institutions, five urban environmental authorities, and the National Natural Parks Unit (http://www.minambiente.gov.co/plantilla1.asp).

The Ministry of Environment recently merged with the Ministry of Housing to form the Ministry of Environment, Housing and Territorial Development (MAVDT). MAVDT has a Directorate of Ecosystems comprising three Working Groups: Forest Ecosystems, Biodiversity and Coastal and Wetland Ecosystems. Attached to the MAVDT are the Alexander von Humboldt Institute (IAvH), created in 1983, which promotes, coordinates and carries out conservation research, and the SINCHI Institute, which carries out research in the Amazon Region.

Other important conservation institutions include the Ministry of Agriculture and Rural Development, responsible for promoting forest tree plantations and wood product value chains, the Colombian Institute for Rural Development, which has a department that is responsible for productive forest development, the Department of National Planning, as well as the Ministries of Commerce, Industry, and Tourism. The National Corporation for Forestry Research and Development (CONIF) carries out technical support and research in forest management.

Local public institutions, such as the municipalities, which manage 40% of Colombia's public expenditure, are also important for conservation in Colombia. The Regional Development Corporations (CAR) are the regional environmental authorities, responsible for the management and administration of all natural resources in the area of their jurisdiction, including the granting of concessions, permits and authorizations for logging, wood processing and trade in forest products. At the local level, the municipal governments are responsible for preparing Territorial Management Plans (POT).

Colombian national and local NGOs play an important part in monitoring resource use and in forest development. The forestry and agricultural faculties of the National Universities of Bogotá and Medellín play important roles in forest research and development. (Table 6).

Table 6. Partial list of Colombian environmental non-governmental organizations

Organization Name	Region
Fundacion Natura	National
Fundacion Humedales	Andes
Fundacion Herencia Verde	Andes
Grupo Semillas	Andes
Fundacion Pro Sierra Nevada de Santa Marta	Caribbean
Fundacion Inguedé	Pacific
Fundacion Ecotrópico	Pacific
Fundacion Tropenbos	Amazon- Pacific
Fundacion Omacha	Orinoco-Amazonas
Fundación Puerto Rastrojo	Amazon- Orinoco
Fundacion Gaia	Amazon
Etnollano	Amazon-Orinoco

Source: Fundación Puerto Rastrojo, 2006

STATUS OF BIODIVERSITY

USAID defines biodiversity as the variety and variability of living organisms in genes, species and ecosystems. Colombia is one of the world's five "mega-diverse" countries at all these three levels of biodiversity. For that reason, measures to conserve its biodiversity have international, as well as national, importance and Colombia has disproportionate importance for achieving the intent of the U.S. Congress in passing Section 119 of the Foreign Assistance Act.

GENETIC DIVERSITY

Planning for the conservation of plants and animals requires consideration of their differing levels and patterns of genetic diversity. Genetic diversity consists of differences between individuals and species in the makeup and location on the genome of their DNA sequences. Genetic biodiversity is a resource because it (1) aids species survival and evolution in response to ecosystem fragmentation and environmental changes and (2) provides genes for transfer to other species to improve their productivity. In general, the more variation that plant and animal species have, the better the chance that they will adapt to these environmental changes, through evolution, and will produce future generations. In addition, genetic variation provides the resource for people to improve the productivity, quality and resistance to pests of useful plants and animals.

Colombia's genetic biodiversity is relatively unknown. There have been few studies on the floral and faunal genetic diversity represented by the varieties and races within species and their geographic distribution. However, the collections in Colombia's germoplasm banks and the lists of species used by indigenous peoples, indicate the enormous genetic diversity contained in Colombia's flora and fauna (IAvH, 1977). As Table 7 indicates, there are eleven germoplasm collections in Colombia, of which the Center for Tropical Agriculture Research (CIAT), the National System of Germoplasm Banks, and the Colombian Corporation for Agricultural Research (CORPOICA) are the largest, containing a total of 12,143 germoplasm samples.

Table 7. Colombian germoplasm collections

Institution	Species Group	No of Species	No of Collections
Cenicaña	Sugar cane	6	244
Coltabaco	Tobacco	4	85
CONIF	Various trees	28	45
ICA-CORPOICA	Various agricultural	73	9,912
SINCHI	Amazon plants	+10	199
U. de Antioquia	Ornamental plants	92	92
U. de Caldas	Fruit trees	5	101
U. Nacional-Bogotá	Potato	32	208
U. Nacional-Medellín	Tropical fruits	10	250
U. Nacional-Palmira	Vegetables	5	1,000
U.P.T.C.	Fruits	10	7
TOTAL			✓ 12,143

Source: IAvH, 1997 CENICAFE

Some Colombians cultivate crops that have many different genotypes. Mejia (1991), for example, identified 171 genetically different varieties of bitter and sweet yuca grown by Colombian indigenous peoples. (Table 8).

Table 8. Varieties of yuca collected in Colombian communities

Location	Culture	Varieties	
		Sweet	Bitter
Estrella fluvial del Orinoco	Curripaco, Puinave, Guahibo, Tucano, Piaroa, colonos	12	145
Planas (Meta y Vichada)	Guahibo, colono	2	18
Andes Amazónicos	Sibundoy, Kamsá, Cofan, Ingano, Siona, Huitoto, colono	62	5
Noreste Caribe Colombiano	Guajiro, Arhuaco, Yuko	12	3
Litoral Pacífico	Cunas, Emberá-Catío, Awas, negros	14	0
TOTAL		102	171

Source: Mejía, M., 1991

SPECIES DIVERSITY

No consolidated inventories of species exist at the ecoregion or ecosystem level. Colombia has the second highest number of plant species of any country in the world, the third highest number of mammal species and the fourth highest number of reptile species (IAvH, 1997). The inventory of terrestrial vertebrates is quite complete. Relatively little, however, is known about Colombia's freshwater fish species. Nonetheless, of the 3,000 fish species that have been identified in South America, probably 80 to 90% are found in Colombia. The number of known plants, however, probably represents only about 65% of all Colombian plant species. Table 9 summarizes the number of Colombian vertebrate and plant species by region.

Table 9. Number of Colombian vertebrate and plant families, genus and species by region

Group	Region					
	Amazon	**Andes**	**Caribbean**	**Orinoco**	**Pacific**	**TOTAL**
Reptiles						
Family	12	13	12	12	14	17
Genera	72	85	55	66	79	118
Species	135	271	86	103	192	464
Amphibians						
Family	10	10	7	10	10	11
Genera	38	36	17	21	29	67
Species	134	353	29	41	181	583
Birds						
Family	65	67	73	61	75	91
Genera	460	494	495	376	450	696
Species	868	974	951	644	830	1,752
Mammals						
Family	29	38	27	26	37	51
Genera	85	100	50	73	101	198
Species	116	181	59	105	167	454
Plants						
Family	277	370	246	180	271	476
Genera	1,466	1,800	1,160	2,200	1,486	3,630
Species	6,800	10,000	3,429	2,200	7,500	32,000

Source: IAvH, 1997

Some of Colombia's natural forests are very diverse in their species composition. The Pacific Region forest, for example, can have up 251 species of trees of more than 10 cm diameter breast height (dbh) per hectare (Faber et al, 1991). In the Amazon Region, as many as 262 tree species have been recorded in the area of Leticia (Rudas, 2001). In the Guyana type forest in Medio Caqueta, 243 tree species have been recorded in one hectare (Duque, 2003). In the Andes Region, in the Cordillera Oriental 160 tree species have been recorded in one hectare (Alvarez, in prep.). Palms are a particularly diverse group of tree species in Colombia. Of the 1,500 species of palms in the world, and of the 550 species in the Neotropics, 227, including 45 endemic

species, occur in Colombia. This compares with 221 species in Brazil, 126 in Ecuador and 128 in Peru.

Table 10 indicates, by region, the status of some categories of vertebrate species in Colombia. 150 species of vertebrates are in a threatened or critical status. Of all the vertebrate groups, amphibians have the highest number of threatened species.

Table 10. Number of Colombian threatened species by region

Groups/IUCN Category	Region							
	Amazon	Andes	Caribbean	Insular Caribbean	Orinoco	Pacific Coast	Pacific Islands	TOTAL
Marine Fish	0	0	3	0	0	3	0	3
Critical	0	0	6	0	0	0	0	6
Endangered	0	0	17	0	0	3	0	19
Vulnerable	0	0	1	0	0	0	0	1
Near Vulnerable	0	1	1	0	0	1	0	1
Freshwater Fish	7	4	4	0	8	1	0	11
Critical	5	15	4	0	3	1	0	20
Endangered	1	8	0	0	1	0	0	10
Vulnerable	1	11	1	0	0	2	0	14
Near Vulnerable	0	25	0	0	0	1	0	26
Amphibians	1	13	0	0	0	1	0	15
Critical	1	1	2	1	4	1	0	8
Endangered	4	0	2	1	1	1	1	10
Vulnerable	3	1	0	1	0	2	0	7
Reptiles	2	0	1	0	3	2	0	5
Critical	3	15	4	1	0	1	1	20
Endangered	2	28	12	0	0	9	0	41
Vulnerable	3	31	12	0	1	17	2	50
Near Threatened	7	21	7	0	2	23	0	41
Birds								
Critical	3	15	4	1	3	1	1	20
Endangered	2	28	12	0	0	9	0	41
Vulnerable	3	31	12	0	1	17	2	50
Near Threatened	7	21	7	0	2	23	0	41
Mammals								
Critical	2	2	1	0	3	2	0	6
Endangered	1	2	1	0	0	2	0	4
Vulnerable	20	12	19	0	16	15	0	32

Source: Mejia y Acero 2002; Mojica et al. 2002; Rueda-Almonacid et al. 2004; Castaño-Mora 2002; Renjifo et al. 2002; Rodríguez 1998

A total of 93 mammal species, 59 bird species, 39 reptile species and 25 amphibians are included in the CITES lists for Colombia (Table 11). Only one species of fish is included in these lists.

Table 11. Number of vertebrate species included in CITES in Colombia

	Appendix I	Appendix II	Appendix III
Mammals	30	50	13
Birds	10	294	20
Reptiles	11	28	0
Amphibians	0	25	0
Fish		1	

Since the mid-1990's many studies have indicated the large number of plant species used by indigenous peoples and Afro-Colombians. Sanchez et al (2001) reported that the Miraña indigenous people in Caquetá, utilize 84% of the 1,511 species of trees found in the forest where they live. Likewise, Rangel, (1998) found that out of 927 plant species, indigenous peoples made use of 902 species for housing, food, ornaments, and utensils. Caballero (1995), as Table 12 indicates, found that Afro-Colombians and indigenous peoples on the Pacific Coast also use a wide variety of plant species.

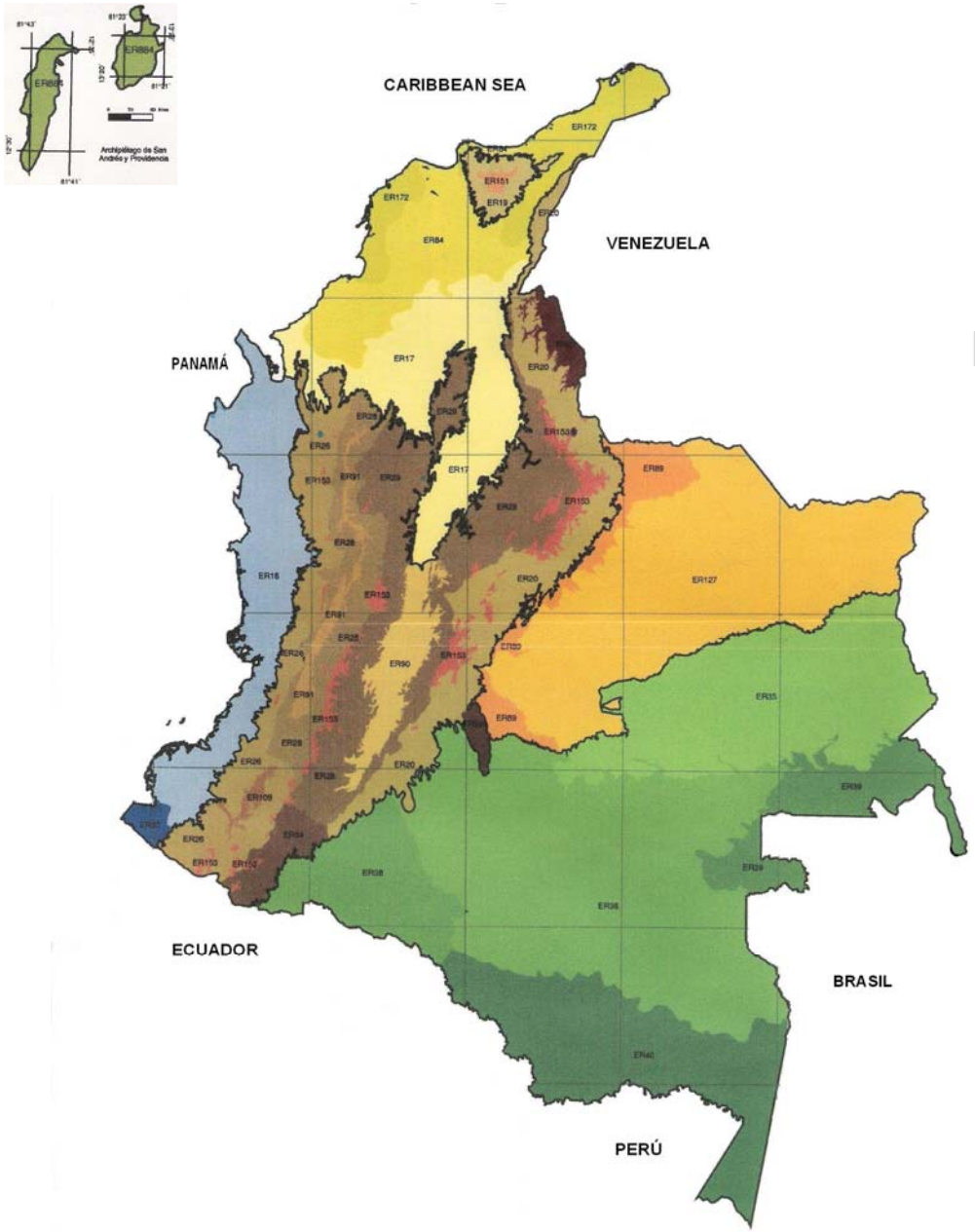
Table 12. Afro-Colombian use of plant species in the Patia River delta of Colombia

Uses	No. Species	Uses	No. of Species
Medicinal	115	Spices	6
Food	82	Fishing implements	4
House construction	30	Poisons	7
Magic and rituals	22	Coloring	4
Energy	17	Scents	4
Boats	12	Drugs	2
Bait	10	Psychotropic	2
Utensils	8	Animal forage	2
Musical instruments	7	Lubricants	1
Soil indicators	6	Baskets	6

Source: Caballero, 1995

ECOSYSTEM DIVERSITY

Ecosystem diversity consists of species populations that interact with each other and with their physical and chemical environment. There are many ways to classify ecosystems. According to the IAvH's classification, Colombia has 5 natural regions, 26 Ecoregions, 63 ecosystems and 15 types of transformed ecosystems or agro-ecosystems (IAvH, 1997). Map 2 shows the location of the five natural regions in Colombia.



REGION	ECOREGION	CODE
PACIFIC	Humid forests of the Darien Chocó	ER16
	Humid forests of the western Macizo	ER33
ANDES	Mountain forest of Sierra Nevada de Santa Marta	ER19
	Eastern mountain forests of the Cordillera Oriental	ER20
	Humid forests of the Catatumbo	ER21
	Western mountain forests of the Cordillera Occidental	ER26
	Mountain forest of Cauca Valley	ER28
	Mountain forest of Magdalena Valley	ER29
	Mountain forest of upper Caquetá-Putumayo	ER34
	Dry forest of Magdalena Valley	ER90
	Dry forest of Cauca Valley	ER91
	Dry forest of Patía Valley	ER109
	Paramos of Sierra Nevada de Santa Marta	ER151
	Paramos of the north Andes	ER153
	Mountain forest of Serranía de la Macarena	ER94
CARIBBEAN	Humid forests of Urabá-Magdalena	ER17
	Dry forests of the Caribbean	ER84
	Dry matorral of the Guajira	ER172
ORINOCO	Humid forests of the Orinoco Piedmont	ER89
	Eastern plains	ER127
AMAZONIA	Humid forests of Vichada-Inírida	ER35
	Humid forests of Caquetá	ER36
	Humid forests of Napo	ER38
	Humid forests of Guainía	ER39
	Humid forests of Caquetá-Amazonas	ER40

Map 2. Geographic regions and ecoregions in Colombia

Source: IAVH & WWF, 2003. Vacíos de conservación del SPNN desde una perspectiva ecorregional.

Table 13 indicates the different types of ecoregions included in the five natural regions of Colombia, together with their total extension, their relative area within Colombia and their degree of transformation to other uses.

Table 13. Ecoregions of Colombia by Region

Ecoregions	Area (km2)	% of Total Area	% Transformed
Pacific	**69,844**	**6.16**	**30.6**
Humid forest of the Darien Chocó	65,780	5.8	29.5
Mountain forest of the Darien	422	0.04	5.8
Humid forests of the western Macizo	3,642	0.32	52.5
Andes	**299,764**	**26.3**	**62.4**
Mountain forests of the Sierra Nevada de Santa Marta	7,885	0.69	61.8
Eastern mountain forests of the Cordillera Oriental	59,815	5.25	55.4
Humid forests of the Catatumbo	6,657	0.6	58.5
Western mountain forests of the Cordillera Occidental	48,908	4.29	47.1
Mountain forests of the Valle del Cauca	31,428	2.76	88.3
Mountain forests of the Valle del Magdalena	87,068	7.64	75.6
Mountain forests of the Alto Caquetá-Putumayo	11,033	0.97	9.6
Dry forests of the Valle del Magdalena	19,438	1.71	96.1
Dry forests of the Valle del Cauca	7,322	0.64	32.0
Dry forests of the Valle del Patía	2,267	0.20	32.0
Paramo of the Sierra Nevada de Santa Marta	1,239	0.11	0
Paramo of the Andes del Norte	13,796	1.21	0
Mountain forests of the Serranía de La Macarena	2,908	0.26	34.5
Caribbean	**144,456**	**12.6**	**76.5**
Humid forests of Urabá-Magdalena	69,803	6.1	82.3
Dry forests of the Caribe	44,527	3.9	87.7
Dry matorral of the Guajira	30,074	2.6	46.6
Orinoco	**171,398**	**15.0**	**12.6**
Humid forests of the Orinoco Piedmont	23,475	2.0	59.9
Eastern plains	147,923	13.0	5.1
Amazon	**453,639**	**39.6**	**10.2**
Humid forests of Vichada-Inírida	105,367	9.2	5.3
Humid forests of Caquetá	188,105	16.5	9.0
Humid forests of Napo	41,620	3.7	56.4
Humid forests of Guainía	35,385	3.0	0
Humid forests of Caquetá-Amazonas	83,162	7.3	0.4
GRAND TOTAL AREA	**1,140,000**	**100**	**34.0**

Source: IAvH, 1997

One third of the total area of Colombia's natural regions has been transformed. Specifically, human activities have severely affected three-quarters of the Caribbean Region's area and two thirds of the Andean Region. Similarly, one third of the natural vegetation of the Pacific Region has been eliminated. Vegetation change has not occurred so widely in the Orinoco and Amazon Regions. Over 85 % of the area of three ecoregions, the Dry Forests of the Valle del Magdalena, the Mountain forests of the Valle del Cauca and the Dry Forests of the Caribe, has been transformed to other uses.

For each of Colombia's five regions, Table 14 indicates the number of different ecosystems and the number of exclusive ecosystems (ecosystems that only exist in a specific natural region), as well as the percent of the ecosystem's exclusivity in that region. Note that the same ecosystem may occur in more than one natural region. Of Colombia's total of 63 ecosystems, 46 (73 %) occur only in one region, 10 (15.8%) occur in two regions and the remaining 7 ecosystems (11 %) occur in 3 or 4 regions. No ecosystem occurs in all five regions.

Table 14. Degree of exclusiveness of Colombian ecosystems according to natural region

Natural Region	Ecosystems		Exclusivity		Degree of Ecosystem Exclusivity	Contribution to Ecosystem Transformation	
	No.	**%**	**No.**	**%**		**Km2**	**%**
Pacific	10	15.8	7	15.2	70%	21,372	1.8
Andes	21	33.3	10	21.7	47%	187,053	16.3
Caribbean	19	30.1	9	19.5	47%	110,509	9.6
Orinoco	14	22.2	6	13.0	43%	21,596	1.9
Amazon	24	38.5	14	30.4	58%	46,271	4.0
Total	**63**	**100**	**46**	**100**	**73%**	**386,801**	**33.6**

Source: IAvH, 2003

The Amazon Region ranks first in number of different ecosystems (24), amounting to 38% of the total number of different ecosystems in Colombia (63). It also ranks first in the number of exclusive ecosystems (14), amounting to 58% of the total number of ecosystems it includes, and to 30% of the total number of exclusive ecosystems in the country. It ranks third in transformed area (46,271 km[a]) which represent 4.0% of the entire transformed area in Colombia.

The Andes Region ranks second in ecosystem richness (21) amounting to 33% of all ecosystems in the country. It also ranks second in the number of exclusive ecosystems (10), amounting to 47% of its total number of ecosystems and to 22% of all exclusive ecosystems in Colombia. However, it is the most transformed area (187,053 km[a]) with a 16.3% contribution to Colombia's overall transformed area.

The Caribbean Region ranks third in number of different ecosystems (19), amounting to 30% of the total number of Colombia's ecosystems. This includes 9 exclusive ecosystems (19.5% of all exclusive ecosystems). It ranks third, together with the Andes Region, in degree of ecosystems exclusivity (47%) and second in area transformed for other uses (110,509 km2). This represents 9.6% of the total country's transformed area.

The Orinoco Region ranks fourth in number of different ecosystems (14) with the lowest number of exclusive ecosystems (6). The transformed area (21,596 km2) is similar to the one for the Caribbean Region and contributes with 1.9% to the total transformed area in Colombia. The Llanos of the Orinoco are considered one of the most species rich savannas in the world. This ecoregion contains more than 100 species of mammals and 700 species of birds.

The Pacific Region ranks last in its number of ecosystems (10), amounting to 16% of all ecosystems in the country. Of these 7 ecosystems are exclusive to this region, defining it as having the highest degree of ecosystem exclusivity (70%). It is also the Region with the least transformed area (21,372 km[a]) with a 1.8% contribution to the country's overall transformed area.

As indicated in Table 15, within its marine territory, Colombia includes six general types of ecosystems. Although Colombia does not have extensive coral reefs, due to the abundant sediments deposited along its coasts by the major rivers, coral reefs can be found, in the Pacific, around the Gorgona and Malpelo Islands. In the Caribbean, they can be found around the San Andres, Providence and Santa Catalina archipelago, as well as around the Rosario and San Bernardo Islands. The Pacific reefs have from 10 to 21 species of coral and the Caribbean islands from 20 to 53 species of coral (IDEAM, 2004)

Table 15. Colombian marine and coastal ecosystems

Type of Ecosystem	Area (km2)		
	Caribbean	**Pacific**	**Total**
Coral reefs	2,885	15	2,900
Mangroves	879	2,927	3,806
Sandy ocean floor	n.d	n.d	889,400
Ocean vegetation	432	0	432
Coastal lakes	1,555	0	1,555
Rocky coasts	326 km	636 km	962 km

Source: IDEAM, 2004

In general, although seriously threatened in some place, the Colombian coral reefs appear to be stable. (IAvH, 1997). In both the Pacific and the Caribbean, there have been occasional reductions in the extent of coral reefs but they have generally recovered. Even in areas that suffer from contamination from human sources, such as the coral reefs of El Rosario and San Bernardo, the reefs appear to be in fairly good condition. The coastal lagoons of the Caribbean are numerous and cover more area than those of the Pacific Coast Region. The Ciénaga Grande de Santa Marta (450 km^2) and the Bay of Cartagena (82 km^2) are the largest coastal lagoons. The marine organisms of the former Cienaga Grande de Santa Marta have been severely affected by the contaminated water and reduced water flows of the Magdalena River. The Bay of Cartagena has been severely affected by contamination and drainage projects.

Colombia's two main categories of protected areas are the National System of Natural Parks (SNPN) and the Civil Society Reserves. Table 16 indicates the status of the protected areas within Colombia's National System of Natural Parks (SNPN). The SNPN includes 52 protected areas in the IUCN categories I, II y III, which are those that require strict protection (IAvH, 2003). These protected areas cover nearly 103,000 km^2, 9% of Colombia. 13% of the Amazon Region and 13 % of the Andean Region are included in a protected area. In the other three regions, the area included in the SNPN does not exceed 3.%.

Seven percent of the vegetation within the SNPN has been transformed. The general situation is similar for the Andean and for the Orinoco Regions, where between 12% and 8% of the

protected area has suffered some degree of transformation. Only 1.4% of the Caribbean Region has been protected and more than a third of this protected area has been transformed. The ecosystems of the Caribbean Region, thus, have the least degree of official protection of any ecosystems in Colombia.

Of Colombia's total of 27 ecoregions, 7 are not included in the SNPN, 9 have less than 5% of their total area within the SNPN, 7 have between 10% and 25% of their area within the SNPN, and 4 have more than 30 % of their total area within the SNPN. The transformation to non-protected area uses within the protected areas varies from 4.3% to 39.6%. The most transformed ecoregion within the SNPN is the humid forest of the Orinoco piedmont where 96.6% of the area is affected by transformation.

Table 16. Areas of the Colombia National Park System

Ecoregion/Ecosystem	Total Area	Total Protected Area		Transformed Ecosystem	
	Km2	**km2**	**%**	**km2**	**%**
Pacific	69844	2102	3.0	166	0.2
Humid forests f the Darien Chocó	65780	2102	3.2	166	7.9
Mountain forest of the Darien	422	0	0	0	0
Humid forests of the western Macizo	3642	0	0	0	0
Andes	299764	30303	10.1	3714	12.2
Mountain forests of the Sierra Nevada de Santa Marta	7885	2719	34.5	1076	39.6
Eastern mountain forests of the Cordillera Oriental	59815	7061	11.8	665	9.4
Humid forests of the Catatumbo	6657	695	10.4	109	15.6
Western mountain forests of the Cordillera Occidental	48908	5577	11.4	953	17.1
Mountain forests of the Valle del Cauca	31428	952	3.0	359	37.7
Mountain forests of the Valle del Magdalena	87068	1607	1.8	158	9.8
Mountain forests of the Alto Caquetá-Putumayo	11033	509	4.6	22	4.3
Dry forests of the Valle del Magdalena	19438	0	0	0	0
Dry forests of the Valle del Cauca	7322	0	0	0	0
Dry forests of the Valle del Patía	2267	0	0	0	0
Paramo of the Sierra Nevada de Santa Marta	1239	1207	97.5	0	0
Paramo of the Andes del Norte	13796	7749	56.2	0	0
Mountain forests of the Serranía de La Macarena	2908	2227	76.6	372	16.7
Caribbean	144456	2134	1.4	825	38.6
Humid forests of Urabá-Magdalena	69803	960	1.4	253	26.4
Dry forests of the Caribbean	44527	745	1.7	229	30.7
Dry matorral of the Guajira	30074	429	1.4	343	8.0
Orinoco	171398	6020	3.5	465	7.7
Humid forests of the Orinoco Piedmont	23475	481	0.2	465	96.6
Eastern plains	147923	5539	3.7	0	0
Amazon	453639	62321	13.7	2169	3.5
Humid forests of Vichada-Inírida	105367	2942	2.8	0	0
Humid forests of Caquetá	188105	28717	15.3	1482	5.2
Humid forests of Napo	41620	43245	10.4	594	13.7
Humid forests of Guainía	35385	7971	22.5	0	0
Humid forests of Caquetá-Amazonas	83162	18367	22.1	93	0.1
GRAND TOTAL AREA	1139101	102880	9.0	7339	7.1

Source: IAvH, 2003

Of Colombia's 63 ecosystems, 20 are not represented within the SNPN, 12 have less than 5% of their area within the SNPN, 8 have from 5% to 10% within the SNPN and 23 have more than 10% of their area within the SNPN. Various authors (World Conservation Union, 1992; WRI, 1994; Noss, 1996) have proposed that at least 10% of an ecosystem should be included within a national system of protected areas. Taking this as a standard, only 23 of Colombia's ecosystems or 36% of its total number of ecosystems are represented adequately within the SNPN.

There are 1,910 km2 of marine ecosystems within protected areas in the Colombian Caribbean and 600 km2 in the Colombian Pacific.

In addition to the SNPN, other forms of legal protection for natural ecosystems exist in Colombia, including over 3.8 million hectares. Appendix D indicates these categories. They include forest reserves (521,585 ha), productive-protective forest reserves (251,785 ha), integrated management districts (2,783,356 ha) and conservation districts (300,000 ha). Regional and local authorities can declare these types of areas and regulate their use (Contreras, 2003). In addition, Colombian law protects natural vegetation along rivers. No study similar to that for the SNPN exists to indicate what percentage of which ecosystems they include. Nonetheless, they include over 3% of terrestrial Colombia, so they probably have the potential to make an important contribution to the conservation of its biodiversity.

STATUS OF TROPICAL FORESTS

Tropical forests occur between the Tropics of Capricorn and Cancer and are an important component of global biodiversity at the ecosystem level. They also provide habitat for the evolution and reproduction or regeneration of much of the world's species and genetic biodiversity.

Colombia's forests include many forest types, protect extensive watershed areas and provide subsistence for many people. The conversion of Colombia's forestland to other uses occurs at the agricultural frontier, where there is also a concentration of illegality, social instability, guerrilla movements and illicit coca cultivation. Coca cultivation and processing, guerrilla insurgencies and displacement of rural people in Colombia largely occur within the context of tropical forests and their colonization and conversion to other uses. In sum, Colombia's tropical forests are an integral component of SAID/Colombia's overall goal of reducing cultivation of illicit crops and achieving peace in Colombia and in achieving the U.S. Congress intention of passing Section 118 of the Foreign Assistance Act.

FOREST TYPES AND AREA

Using the estimates of IDEAM (2004), Colombia's original natural forest area was 866,000 km2, or about 76 %, of Colombia's total terrestrial area and in 1986 its forest area was 569,017 km2.

According to these estimates, in 1986, 296,983 km2, or 34%, of Colombia's natural extension of forestland, had already been converted to other land uses.

The range of different recent estimates of its current total area of natural forest [496,000 km2 (FAO, 2005), 532,000 km2 (Ministry of Environment, 2002), 532,000 km2, 640,000 km2 (Colombia Forest Program, 2006), 656,000 km2 (UNEP-WCMC, 2000)] indicate that Colombia does not maintain reliable, up-to-date statistics on its natural forest areas. These estimates differ by as much as 160,000 km2, or almost 25%. IDEAM, however, estimates that, in 2001, Colombia's forest area was 556,130 km2. Thus, according to IDEAM, between 1986 and 2001, there was a net decrease in forest cover of 12,887 km2, or about 86,000 hectares per year. Contreras (2003), however, notes that Colombia is gaining about 37,000 hectares of forestland per year. If this gain also occurred at that rate between 1986 and 2001, then the net deforestation rate during that period would have been only 53,000 has/year.

IDEAM (2004), as indicated in Table 17, divides Colombia into five regions (Andean, Pacific, Caribbean, Orinoco and Amazon) and two altitude ranges (below and above 1,000 meters above sea level). By combining these two classifications, IDEAM distinguishes nine very broad forest types that are, in order of area, Amazon Piedmont (32,347 km2), Andean (32,347 km2), Pacific Piedmont (4,371 km2, Andean Fragmented (1,569 km2), Orinoco Savanna (422 km2, Caribbean Piedmont (340 km2), Orinoco Piedmont (340 km2, Pacific Mangrove (235 km2) and Caribbean Mangrove (56 km2). IDEAM also distinguishes two more forest types: Riparian (3,922 km2) and Piedmont Fragmented (3,945 km2) that occur in more than one of the five regions. Thus, Colombia's largest forest type by far is the Amazon Piedmont and its smallest forest type is the Caribbean Mangrove.

Table 17. Forest types and changes in forest cover in Colombia, 1986 to 2001

Region	Forest Type	% National Territory	1986	2001	Change 1986-2001	
			Km2	Km2	Km2	%
Andean	Andean	7.61	95,150	86,780	-8,370	-8.8
	Andean Fragmented	1.38	14,460	15,690	+1,230	+8.5
Pacific	Pacific Piedmont	3.83	45,500	43,710	-1,790	-3.9
	Pacific Mangrove	0.21	2,280	2,350	+70	+3.0
Caribbean	Caribbean Piedmont	0.03	70	340	+270	+38.6
	Caribbean Mangrove	0.05	590	560	-30	-5.1
Orinoco	Orinoco Piedmont	0.03	210	340	+130	+62.0
	Orinoco Savanna	0.37	4,182	4,212	+30	+0.7
Amazon	Amazon Piedmont	28.37	330,970	327,470	-7,500	-2.2
All	Fragmented Piedmont	3.46	36,525	39,450	+2,925	+8.0
Orinoco/Amazonia	Riparian	3.44	39,080	39,220	+140	+0.3
TOTAL		48.78	569,017	556,130	-12,887	-2.2

Source: IDEAM, 2004

Colombia's mangrove forests cover approximately 379,954 ha. Of these, 292,724 hectares are on the Pacific coast distributed in an almost continuous strip from the Mataje River on the frontier with Ecuador to the Cabo Corrientes in the Department of Chocó. Further north, the mangroves

are more discontinuous located in the Gulfs of Utría and Tribugá. Most of the mangrove areas on the Pacific Coast are intact except for some areas near Tumbaco where they have been cleared to create shrimp ponds.

On the Caribbean Coast, there are 87,230 hectares of mangroves, mostly in the deltas of the Sinú, Atrato, Magdalena Rivers and the Canal del Dique. Unlike the Pacific Coast, the situation of the mangrove ecosystem in the Caribbean Coast is critical. More than 40,000 hectares of mangroves have been severely altered or destroyed and many former mangrove sites are now deserts with highly saline soils, where almost none of the original fauna now occurs. The destruction of the mangrove ecosystem also exposes the coast to severe erosion. The principal causes of the loss of mangroves include the expansion of constructions for tourism, the expansion of agriculture and aquiculture, obstruction of natural water flows by the construction of dikes and roads, the extraction of wood and contamination (Sanchez-Páez, H. et al, 2000).

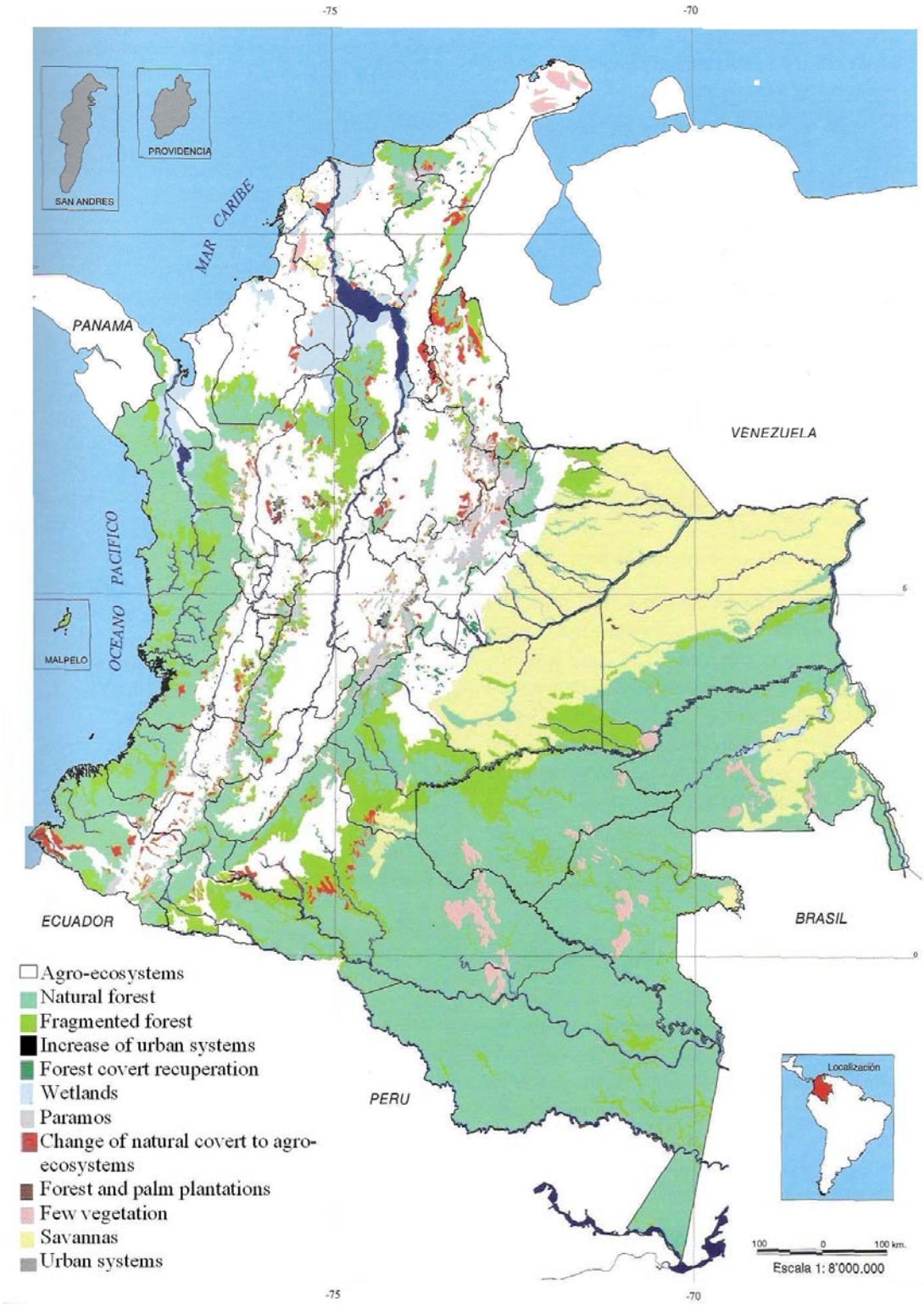
DEFORESTATION

The greatest net change in a forest type between 1986 and 2001 occurred in the Andean Forest, which decreased by 8,370 km2, or 8.8 % of its area in 1986. The Fragmented Andean Forest, however, grew in area by a net of only 1,230 km2. The difference of 7,140 km2 is the area of Andean Fragmented Forest that moved into the non-forest category plus the Andean Piedmont Forest that moved directly from Andean Forest to non-forest use, without passing through the intermediate category of Fragmented Andean Forest. The forest type that lost the least area between 1986 and 2001 was the Caribbean Mangrove Forest, which lost only 30 km2. This area, however, represents 5.1% of its total area in 1986, the second highest rate of forest loss of any forest type. Besides the Fragmented Andean Forest, five other types of forest grew in area between 1986 and 2001: Pacific Mangrove Forest (70 km2); Caribbean Piedmont Forest (270 km2); Orinoco Piedmont Forest (130 km2); Sabana Forest (30 km2) and Riparian Forest (140 km2).

Map 3 (IDEAM, 2004) indicates that forest losses occurred between 1986 and 2001, predominantly (1) along the edges of fragmented forest; (2) along the lower elevations of the east and western sides of the Eastern, Central and Western Cordilleras; (3) on the northeast and southwest slopes of the Sierra Madre de Santa Marta; (4) in the southwest Department of Nariño in the municipality of Tumaco; and (5) in the mangrove forests in Atlantico Department. The map shows no areas of deforestation in the eastern departments of Amazonas, Guaviare, Guainia, Vaupes, Casanare, Arauca or Vichada or in Chocó Department in the northwest. Parts of all those departments, however, do have areas of fragmented forest that are about three times larger than the deforested areas themselves. Speculation suggests that since 2001, some fragmented forest has been converted to non-forest land uses.

There has been forest re-growth in some areas. Excluding the growth in fragmented forest, the IDEAM figures indicate an increase in forest area of 640 km2 between 1986 and 2001, which is 0.11% of the total forest area in 1986 and 1.4% of the area covered in 1986 by the forest types that show an increase. Map 4.7 indicates patches of forest re-growth, mostly occurring close to agricultural land. The largest concentration of forest re-growth occurs in the headwaters of the Meta River in Meta Department, near the town of Villanueva, and to the south of Villavicencio.

Map 3. Change in forest cover in Colombia 1986 to 2001



Source: IDEAM, 2004

Other patches of forest re-growth occur in the upper valleys of the Magdalena and Cauca Rivers and in the lower Magdalena River valley near to the town of Pedraza. IDEAM does not explain the reasons for the growth in forest area. Speculation suggests that data on re-growth may be attributable to changes in capacity, between 1986 and 2001, to distinguish small areas of forest re-growth on images and to new definitions of forest types. Another part of the increase may be due to the inclusion of forest tree, African palm and rubber plantations as growth in forest cover.

FOREST PRODUCT MARKETS

Although forests cover almost half of Colombia, their contribution to its Gross National Product (GNP) is only about 0.2%. Aldana (2003) summarizes the factors that limit this contribution. First, widespread deforestation makes wood abundant, so that its market price remains low. Consequently, there is little price incentive for either organized natural forest management or the establishment of forest tree plantations. In a second phase, accessible wood from natural forests begins to be scarce, so the price of wood rises and there is more incentive for investments in natural forest management and forest tree plantations. In the third phase, equilibrium develops between the demand for wood and its supply from management natural forests and forest tree plantations. Colombia has been in the first phase for many years, but may be entering the second phases, since sufficient quantities of high quality wood have become scarce.

Second, Colombian forests have a low residual value. The residual value means the value of the forest after all the costs of harvesting, transporting, transforming and marketing its products have been deducted from the value of their sale. In Colombia the residual value is very low or even negative, due to low productivity, high degree of waste, limited number of commercial species, poor functioning of markets, and non-existence of markets for environmental services.

A third factor that limits the contribution of Colombia's forests to its economy concerns the institutions, policies, laws and regulations that affect the forest product sector. Forest management has not succeeded in resolving many complex social, political and technical issues and is subject to many state interventions, many of which complicate rather than provide incentives for forest management. Fourth, Colombia has not invested sufficiently in forestry research. It lacks sufficient basic knowledge about silvics and silviculture, lacks the infrastructure required for forestry research and has not developed an adequate system of forest statistics. There is no national forest inventory, so it is difficult to plan for the industrial use of natural forests. Finally, rural insecurity has held back investment in natural forest management and tree plantations.

Colombia has an internal market for four general types of forest products and services: (1) environmental services; (2) non-wood products; (3) firewood and (4) industrial wood. Environmental services include the control and regulation of water flows, reduced sedimentation, prevention of disasters, the conservation of biodiversity and carbon sequestration. Many Colombian electrical and water companies already charge their customers an extra fee for covering the cost of watershed management. Society as a whole, pays for biodiversity protection, to the extent that government agencies use taxes to establish, protect, and manage national, regional or local protected areas. Non-wood products may be either commercial or non-commercial, or both. Medicinal herbs, for example, are generally gathered and used locally but

sometimes they are sold in local markets or even packaged for more distant markets. There are few statistics available on the variety, value and production systems for non-wood products.

There are few data about the use of firewood in Colombia since its production, sale and use are completely informal. The FAO Forest Products Yearbook for 2000 says that Colombia used 11.8 million tons of firewood in 2000. Although it is government policy to provide alternative fuels to replace firewood, Conteras (2003) estimates that by 2020 the demand for firewood will rise to between 10 and 12 million cubic meters per year. Contreras (2003) says that between 1998 and 2001, all the tree plantations in Colombia produced only about 462,000 m3 per year, about 4% of the cubic meters utilized for firewood in 2000. In 2004, the forest product industry used 1,640,000 m3 or only about 14% of the cubic meters used for firewood. Firewood supplies warmth and cooking fuel, so its economic value must far outweigh its market financial value in Colombia.

Industrial wood is used in Colombia for sawn wood, plywood, particleboard and pulp. The internal market for forest products fluctuates considerably in response to the demands for wood from the construction industry. For example, the economic crisis from 1994 to 2001 caused a reduction in demand for wood products of 10.5%, whilst the economic recovery during the last few years has increased demand. Indeed, recently demand for wood has exceeded the available supply and has stretched supplies of wood products (Aldana, 2003). Contreras says that the cubic meters used of wood from natural forests probably will not rise much until 2020, especially if insecurity continues in rural, forested areas so that the current utilization of about 2 million m3 per year will continue. Tree plantations will supply a larger percentage of wood as they mature.

The Ministry of Agriculture promotes forest products based on clusters and market chains (Aldana, 2003). The former helps to reduce transportation costs, create economies of scale and reduce wastes. The latter integrate activities, take advantage of synergies and reduce transaction costs and uncertainty.

THE 2006 FORESTRY LAW

In early 2006, the Colombian Congress passed and the President signed a new forestry law. The purpose of the law is to establish a National Forestry Regime, establishing a coherent set of regulations and institucional responsibilities that will promote the sustainable dvelopment of the Colombian forestry sector within the framework of the National Forest Development Plan. In order to achieve this objective, the law establishes the required public administrative structure and regulates activities related to natural forests and forest tree plantations.

The new law separates and defines the respective responsibilities of the Ministry of Environment and the Ministry of Agricultura, assigning the former responsibility for protection and natural forests and the latter responsibility for forest tree plantations. The law also permits the utilization of plantations that originally were planted for production purposes, even though subsequently they may have been declared protection forests. It also eliminates the requirement that the owners of forest tree plantations receive government permission to harvest their plantations, thus eliminating a principal source of corruption.

The Forestry Law generated considerable controversy during the process of its drafting, consideration by the Congress and approval. There were two main objections, mostly from Colombian environmental and social organizations. The first objection was that instead of one forestry law, there should be one law concerning forest tree plantations and another law concerning natural forests. Given that the law has now been approved, this discussion has now become irrelevant. The second objection was that the law was prepared without adequate consultation with the Afro-Colombians and indigenous groups who control about half of all of Colombia's forestland. It was outside of the scope of work for the present report to evaluate the degree of consultation that occurred during the preparation of the new law. The Colombia Forestry Program, however, which USAID/Colombia contracted to Chemonics, has indicated in its reports that there was ample consultation with Afro-Colombian and indigenous groups during the drafting of the Forestry Law. In any case, Colombia's Constitutional Court is considering various suits against the new forestry law.

A full, detailed analysis of the new forest law was beyond the scope of the present report. However, it appears that the new forestry law laudibly seeks to promote investment in forest tree plantations and management of natural forests. It opens the possibility of making such investments to individuals or companies that adhere to the National Forestry Regime. The National Forestry Regime establishes standards for utilization of forest resources for the benefit of society while maintaining its productive capacity, ecosystem functions and biodiversity. The law specifically recognizes the right of Afro-Colombian, peasant and indigenous peoples to control and utilize their communal forest territories for their own economic benefit. However, it provides a means for private enterprise to provide the investment capital required to utilize these forest resources. The law also makes natural forest management, carried out according to standards for sustainability, such as certification, a land use that, at least on some sites, competes financially with agriculture and pasture, and thus reduces the rate conversion of forestland to these other land uses.

The 2006 Forestry Law thus appears to provide an excellent legal basis for the Government of Colombia to promote the long-term, sustainable management of Colombia's extensive and valuable forest resources for the benefit of its rural poor. However, questions certainly remain about how the 2006 Forestry Law will be implemented. Effective implementation of the law's provisions requires that at least five measures be well designed, financed and executed.

The most urgent of these measures concerns the half of Colombia's forests that are the property of Afro Colombians and indigenous peoples. The sustainable use of these forest resources for the benefit of their owners, as well as Colombia society more generally, requires the establishment of specially designed and implemented programs of technical and financial assistance to the Afro Colombian and indigenous peoples. Neither the Colombian government nor any international donor, however, is financing such a program. A second required measure, one that is closely related to the first measure, concerns the forests of the Chocó and Amazon Regions. The Forestry Law requires the adoption of special measures for the conservation of forests in these regions. It does not, however, define what those measures are or provide for financing them.

A third measure concerns the wide range of responsibilities for the administration of forest resource, including the granting, supervision, and monitoring of timber concessions and the promotion of forest management that the Forestry Law gives to the Ministry of Agriculture. At present, the Ministry of Agriculture does not have the technical, financial or administrative capacity to carry out these responsibilities effectively. Again, there is no government or donor program to augment its capacity. A fourth measure concerns the establishment of mechanisms to compensate forest owners financially for the environmental services that forests provide to society, such as protection of watersheds and maintenance of biodiversity. At present, although these services are important economically there is no provision for paying forestland owners for them, making forest a land use that in many situations does not compete financially with agriculture or pasture, contributing to deforestation.

Finally, Articles 48 and 49 of the Forestry Law assign responsibility to the Colombian government for promoting forestry education and training. No plan has been developed and no funds have been allocated for this purpose. In sum, in order to be made an effective instrument for implementing an effective Colombian forestry policy, the Forestry Law requires that more planning be carried out, more funding be allocated and more programs be implemented.

THREATS TO COLOMBIA'S BIODIVERSITY AND TROPICAL FORESTS

INDIRECT THREATS

Insecurity

The FARC, ELN, and paramilitaries have made the more remote areas of Colombia, where most of its forests and biodiversity are concentrated, insecure for normal travel and work. Insecurity makes it difficult to collect reliable data on tropical forests and biodiversity, demarcate property boundaries and provide land titles, implement conservation programs, enforce land use plans and regulations, establish forest management, or control deforestation. Insecurity also has driven some rural people off their land to frontier, forested areas, where they contribute to deforestation.

Demographic Change

In Colombia, population concentration in certain areas, as well as internal migration, rather than absolute population size, indirectly threaten tropical forests and biodiversity. Since pre-Hispanic times, Colombia's population has been concentrated in the highlands, where most of the natural vegetation has been eliminated, along with the biodiversity that it nurtured. At present, however, the population growth in frontier areas, due to both immigration and high birth rates, is responsible for an indirect threat to Colombian tropical forests and biodiversity. Table 18 indicates how the population of the Pacific, Amazon and Orinoco Regions has grown from 89% to 133%, between 1985 and 2005, compared to an overall growth of 48% for all of Colombia. Although still relatively few, in proportion to the area, many of these people are farmers and

create their agricultural land through deforestation. The red areas on Map 3, where vegetation change has occurred, correspond mostly to these deforestation frontiers.

Table 18. Comparison of population, 1985 and 2005 for 3 regions of Colombia

Region	1985	2005	%Change 1985-2005
Pacific	922,066	1,743,130	89
Amazon	309,256	719,873	133
Orinoco	251,341	510,111	103
TOTAL	27,853,436	41,242,948	48

Source: www.dane.gov.co, 2006

Poverty

Half of Colombians live below what has been defined as the poverty line. Speculation suggests several reasons why such a high level of poverty would have indirect, negative affects on Colombia's biodiversity and tropical forests. First, poor people contribute little to the public and private financial resources that are required to conserve biodiversity and tropical forests. Second, poorer people have less to invest in production technologies that avoid or mitigate negative impacts on biodiversity and tropical forests, such as treatment systems for household waste. Third, poor people generally lack the educational opportunities of richer people, so the general level of knowledge in Colombia about conservation of biological diversity and tropical forests, is less than it would be with a richer population. Poverty may be an indirect cause of deforestation, as poor people move to the agricultural frontier in order to occupy forestland through clearing.

Insecure Land or Resource Tenure

According to the Food and Agriculture Organization of the United Nations (FAO), the lack of secure property rights, discourages long-term investment in land and forests. This is due to the uncertainty it creates regarding continuous access to land, discouraging long-term investment, and inducing mining of the land (Alain de Janvry, Nigel Key and Elisabeth Sadoulet, 1998).

Institutional Capacity,

As described previously, Colombia has numerous public institutions with environmental responsibilities. As one of the most decentralized countries in South America, many of them are regional or local institutions, such as the Regional Development Corporations (CAR) and the municipal Technical Assistance Units (UMAT). It was beyond the scope of this report to analyze in detail, the institutional capacity of these Colombian institutions. However, three principal factors appear to limit the effectiveness of these institutions: corruption, inadequate budgets and outdated policies, laws, and regulations. Transparency International, which monitors corruption of many countries, has given Colombia a rating of 4 on a scale of 1 to 10, with 1 being the most corrupt, and 10 the least corrupt. Corruption affects the capabilities of public institutions responsible for conservation just as much as it affects other Colombian institutions. Between 1995 and 2002, environmental spending in Colombia declined by 81%. Without international aid, the Colombian National Protected Areas Unit's (CNPU) budget would be approximately

US$ 7 million. Even with more than half of the total budget coming from outside sources, the CNPU employs just 364 full-time government employees, or one for every 40,000 hectares of national park. The budgets of the Regional Autonomous Corporations vary considerably, so that some have sufficient funding and others have very little. CODECHOCO, the CAR for the Chocó, where there are large areas of biologically diverse forest, has a budget that is insufficient for meeting its responsibilities.

Roads

Although road construction in itself, does not necessarily threaten biodiversity, since roads occupy a relatively small area (a road that is 500 km long and 20 meters wide would occupy only 1,000 ha), the indirect negative effects of roads built through tropical forests are well-known. Besides potential changes to drainage patterns and increased sedimentation of water bodies, roads provide access for agricultural colonists to forested areas. The Colombian government lacks sufficient capability to control land use and prevent deforestation, with the result that conversion of forestland to other uses occurs. Map 3 clearly indicates that deforestation has occurred in Colombia where roads have been built, for example in the corridor between Mocoa, Florencia, Puerto Rico, and San Vicente de Caguán in Putumayo, between Pasto and Tumaco in Nariño, and around the Sierra Nevada de Santa Marta in Magdalena.

Market Demand

Market demand for products that require the exploitation of natural ecosystems threatens Colombia's biodiversity and tropical forests. Global demand for African palm oil, for example, is the indirect cause of the establishment of thousands of hectares of African palm oil plantations in the lower Magdalena River valley, at the cost of some areas of natural vegetation and the drainage of part of its wetlands. Demand for tropical wood and plywood stimulates the over-exploitation of some species of tropical trees. Local markets may also pose an indirect threat to biodiversity. Contreras (2003) points out that, although Colombia maintains no records of the demand for fuel wood, the use may be as much as 7 million tons/year, compared to a consumption of only 210,000 tons per year, of wood pulp. Market demand for food crops exerts indirect pressure on biodiversity, especially when soil erosion reduces productivity on existing agricultural and pasture lands, by stimulating the clearing of additional forestland and increasing the contamination of water and soil with agricultural chemicals.

Coca Cultivation

Coca cultivation to supply cocaine to markets mostly in the United States and Europe affects Colombia's biodiversity. The large market demand is from Europe and the United States. As economic theory would predict, and as is typical for almost all agricultural products, a reduction in the production of coca leaves or poppy latex, in the absence of a reduced demand for cocaine or heroin, drives up the price of coca leaves and poppy latex. This makes their production more financially attractive and provides increased incentive to put more land, including newly cleared forestland, into production.

DIRECT THREATS

Habitat Conversion

Table 19 indicates that 34% of Colombia's natural ecosystems have suffered some degree of transformation and that the main threat to biodiversity from habitat conversion is the expansion of pastureland. Pasture occupies 400,754 km2 when only 191,814 km2 are optimal for pasture, a difference of 208,940 km2. Part of the excess pastureland lies on land with potential forest use, since potential forestland is 702,176 km2, whereas the actual use is only 559,474 km2, a difference of 142,701 km2. By contrast, only 53,662 km2 of the potential 145,000 km2 agricultural land is being cultivated. Marulanda (2002) describes how drug dealers channel part of their income into cattle ranches, perhaps one reason, amongst others for the stagnation of agriculture and the expansion of pastureland.

Table 19. Colombian potential and actual land use

Land Use	Potential Land Use Km2	%	Actual Use Km2	%
Agriculture	145,000	12.7	53,662	4.7
Livestock	191,814	16.8	400,754	35.1
Forests	702,176	61.5	559,475	49.0
Other Uses	102,575	9.0	127,876	11.2
TOTAL	1,141,747	100	1,141,747	100

Source: Ministry of Environment, 2003

Coca and poppy cultivation also causes habitat conversion. The coca plant grows and produces best along the foothills of the Andes Mountains. Since Colombia has three ranges of the Andes it has six parallel lines of foothills in which coca grows well. Coca cultivation occurs mostly in the agricultural frontier areas of Alto Putumayo, Alto Caquetá, Macarena, Guaviare, Nariño, and Magdalena Medio. UN (2003) estimates that between 1992 and 2002 coca and poppy cultivation caused the destruction of 17,000 km2 of natural forest. Map 4 indicates the areas of illegal cultivation as of 2004 and Table 20 shows what type of land use and forest cover coca plantations were affected from 1998 to 2001.

Colombia, with financing from the United States, has succeeded in reducing the area of coca and poppy cultivation in some areas. However, at the same time, the area cultivated in other areas has expanded. Also, coca now tends to be grown in small production units located in populous areas and mixed with licit crops, as well as in protected areas, rather than in extensive areas. One estimate is that illicit crops are present in 68% of Colombia's national parks, although they represent only 0.4% of their area (Myers, John, 2005).

Table 20. Principal vegetation affected by coca cultivation

Type of Land Use & Forest Cover	Coca Plantations (Hectares)			
	1998	1999	2000	2001
Agricultural areas	58,763	121,208	131,099	116,247
Andean forest ecosystems	22,178	45,746	49,479	43,874
Humid tropical forests	204,096	420,981	455,331	403,750
Savanna ecosystems	7,600	15,676	16,955	15,035
Other ecosystems	163	336	364	322
Total	294,798	605,947	655,228	581,229

Source: Tavera, 2000

Over-Exploitation

Over-exploitation, through hunting or extraction, affects biodiversity and tropical forests by reducing the populations of species or subspecies of plants and animals.

According to Leipzig (1996), there are at least 40 tree species in Colombia that are threatened by over-exploitation. Tree species which produce valuable timber, and which are therefore heavily exploited, include *Aniba perutilis* (comino crespo, chachajo), *Brosimun utile* (huina), *Cariniana pyriformis* (abarco), *Cedrela odorata* (cedro), *Huberodendron patinoi* (carra), Humiriastrum *procerum* (Chanó) and *Swietenia macrophylla* (caoba). IAvH (1997) reports that in 1997 there were 225 species of fauna that were being over-exploited in Colombia. Of these, 53% were birds, 36% were mammals and 10% were reptiles. The overexploitation of fauna and floral species is closely related to the capacity of their populations to continue to be viable. In Colombia, no studies exist, which would permit the establishment of what level of the population it is possible to harvest and therefore to determine if there is over-exploitation.

In the case of plants, examples are mentioned of such species as *Cedrela odorata*, whose distribution occurs in relatively homogenous patches in the Amazon forest and that has a high commercial value, which have been exploited heavily. However, there is no study of the actual status of the populations of this or other such species. Another example is the population of the mangrove genera *Rizophor, Avicennia*, and *Laguncuria* that have been heavily cut on the Caribbean coast. Nonetheless, these same species have been exploited without any clear negative effects on their populations. That does not mean that they are not being over-exploited, but rather that the status of their populations has not been evaluated. A third example is the Andean oak (Quercus sp) whose population has diminished drastically during the last few decades. Its tendency to disappear has been attributed to over-exploitation, but it could equally be attributed to the elimination of the natural forest throughout large areas of the Colombian Andean Region.

The same situation occurs with fauna. Although examples of over-exploited species are mentioned, there is no documentation of a decline in population levels, leaving such assertions, although probable, as speculations. The decline in fish populations in the Magdalena River over the last 20 years, however, is notorious and the Colombian freshwater fishing industry has transferred its activity from the Magdalena to the Amazon River. Again, the decline in fish populations probably is due to a combination a loss of vegetation in the watershed, which has caused an enormous amount of sedimentation, the contamination of the river's waters with industrial and domestic waste from the cities of Bogota, Girardot, Ibagué, Neiva, Bucaramanga y Barranquilla. Fish populations have also declined due to the contamination from mining wastes and pesticides, as well as over-exploitation of the fish resource. In the Amazon River, of

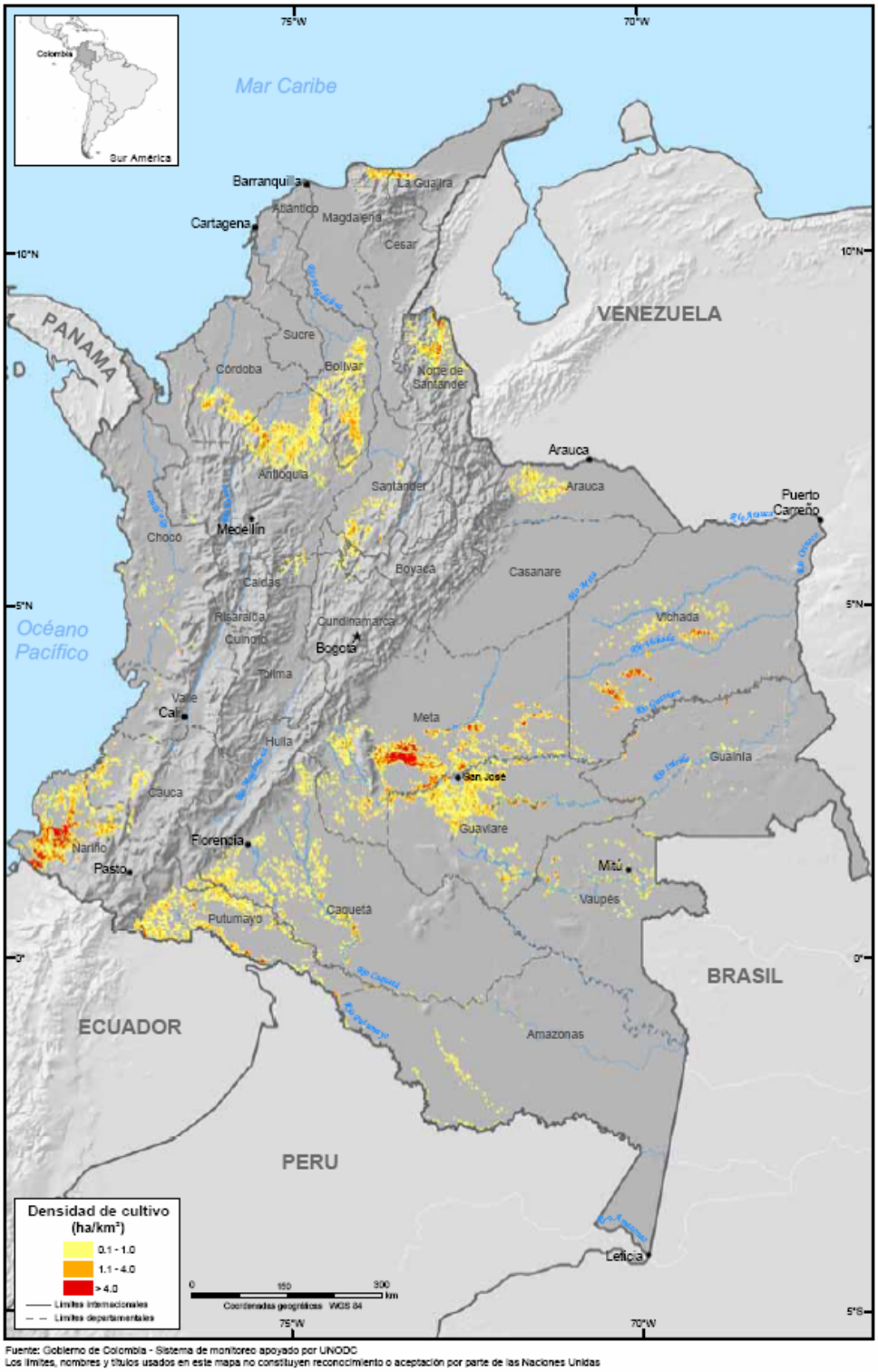
which 112 km form the frontier between Colombia and Peru, it has been reported that over 60% of the catch now consists of specimens that are below the legal size (IAvH, 1997), suggesting that mature fish populations have already been over-exploited. In other rivers of the Colombian Amazon the few available data do not suggest over-exploitation.

There are few data that clearly indicate over-exploitation of other vertebrate groups. For example, IavH (1997) data about the capture of illegally caught wildlife since 1994 indicate that 25,470 individual animals were de-commissioned. The majority of the animals (25,147) were reptiles, of which 599 were crocodiles, 6861 were snakes, 7,739 were turtles and 9948 were iguanas. It is impossible to know if these data indicate a level of over-exploitation, without knowing the actual state of the populations of these animals. Renjifo, L.M., et al (eds), 2002) say that over-exploitation affects approximately 40 Colombian bird species. In relation to the possible over-exploitation for commerce in live animals, it is clear that between 1950 and 1975, there was an intense commercialization, both legal and illegal, of animal products, especially skins, live primates, cats, mustelidos and crocodiles. However, there is no information available on the actual status of the populations of these animals.

There are no studies in Colombia that permit an accurate evaluation of the effect of subsistence hunting - including market hunting for cash income to buy necessities such as soap, tools, batteries, clothes, pots and torches - on the population of animals. There is even less information about the increase in risks to their survival as a species. Since 75% of Colombia's population of 40 million live in cities, the rural population is only about 10 million. About 9 million of this population still lives in the Inter-Andean valleys, the Magdalena and Cauca River valleys, including the Caribbean Region, and the inner Andean slopes. These are the areas of Colombia where the natural vegetation and the animal populations have been most severely affected by human activities. In the Pacific and Amazon Regions, by contrast, the total population is not more than 1 million. There are 360,000 km2 of forest in the Amazon Region that has not been cleared or fragmented and about 12,000 km2 in the Pacific Region. In the Pacific Region, the consumption of wild game is about 8 kg/year/per person in some indigenous communities and in the Amazon Region, on the Rio Mirití, it is about 100 kg/year/person. Gomez (IAvH, 1997) says that in the non-intervened areas, the consumption of wild meat is 88.3 kg/year/person, and that in zones on the agricultural frontier it is 1,679kg/year/per person, or 20 times more. According to studies carried out by Fundación Natura (IAvH 1997), the consumption of wild game in tour communities of the Pacific Region varied between 10.4 and 35 kg/year/person. The range of data on the consumption of wild game is thus rather large.

The data from the Amazon Region refer to cases in which hunting has been a food source for many years, but the number of animals has not appeared to diminish, other than in terms of the typical pattern of natural cycles of increases and decreases in wild animal populations. In these situations, the extraction of wild game almost certainly does not affect the animal population levels. No data are available about the population levels of wild game animals in these regions and much less about population dynamics of the game animals, so it is not possible to establish if over-exploitation is occurring or not. It is possible to say with a degree of certainty, however, that in Colombia's Amazon Region forests, where only indigenous peoples live, a hunting system that has continued to provide wild game, continues to function. Even if animals have become scarce around settlements that could be because the animals have moved away to other areas, rather than that they have actually been over-exploited. A study of salt licks used by indigenous peoples for hunting and for the salt itself, made in the vicinity of Leticia in Amazonas Department, found no correlation between the number of hunters visiting the salt licks and the number of tapir visits to the salt licks. There are fluctuations in the number of tapirs which visit the salt links, but that could be unrelated to hunting pressure but rather, related to such uncontrolled factors as the distance to settlements, distance to agricultural fields or the physical or chemical characteristics of the salt (Lozano, C., 2005).

Map 4. Density of coca cultivation, 2004



Fuente: Gobierno de Colombia - Sistema de monitoreo apoyado por UNODC
Los límites, nombres y títulos usados en este mapa no constituyen reconocimiento o aceptación por parte de las Naciones Unidas

Source: UN Drug Control Program, 2005

Studies made by Fundación Natura indicate that in the Pacific Region, hunting pressure can cause a decrease in the number of some types of animals, but it is not clear if this is a permanent or temporary decrease. Almost certainly, the effect of hunting would be limited to an area of about 5 km in radius from a human settlement, or about an hour of walking. Observations indicate that the population of Amazon towns, such as Leticia, Florencia and Leguizamo, depends much less on wild game as time goes by and more on rice. Wild meat in these towns is considered a delicacy, not a mainstay of the diet. Likewise, there are no studies about the possibility that some species of animals increase in population, as the habitat changes from unbroken forest to fragmented landscapes.

Pollution

There are few studies in Colombia on the level of contamination, much less its effects on biodiversity. IAvH (1997) and IDEAM (2004), only mention the obvious, that pollution comes from industrial, domestic and agricultural wastes. They make no attempt to tie pollution to a decrease in biodiversity, even in the aquatic and soil ecosystems where contamination is presumably a threat to aquatic organisms and soil invertebrates, or to its effects on pollinators, such as bees, insects and birds, that are so important for the reproduction of some species of plants. The Red de Vigilancia para la Protección y Conservación de la Calidad de las Aguas Marinas y Costeras (REDCAM), reports that the coastal waters of the Caribbean and Pacific regions have significant levels of contamination and eutrophication. The principal contaminants are hydrocarbons, pesticides, heavy metals and micro-bacteria (IDEAM, 2004). The consequences of this contamination on coastal organisms, however, have not been studied (IAVH, 1997).

Introduction and Spread of of Exotic Species

Many species have been introduced into Colombia from other countries or have been moved from one region to another within Colombia itself. The introduction of exotic species only poses a threat to biodiversity when the introduced species regenerates without human assistance, spreads rapidly and competes successfully with native species. IAvH (1999) defines the following criteria for classifying a plant species as invasive: (1) high reproductive rates and short inter-generational time; (2) long life; (3) high rate of dispersion; (4) clonal or vegetative regeneration or reproduction; (5) high genetic variability; (6) malleable phynotype; (7) natural wide distribution; (8) generalist in its habitats; and (9) generalist in its diet.

There are very few documented cases in Colombia of invasive species that have caused a clear impact on biodiversity. One case that has been documented relatively well is the crazy ant (*Paratrechina fulva*) that was purposefully introduced into the Cauca Valley, as a means to lower the populations of the local arrieras ant (Atta sp.). In coffee growing areas, the competition of the crazy ant decreased the ant species richness by 68% (IAvH, 1997). Another example is the bull frog (*Rana castebeiana*), which was also introduced into the Cauca Valley and which has invaded numerous areas in the Andean Region, between 400 and 1700 meters above sea level. Although there has been no systematic study of the effect of bull frog populations on other frog populations, speculation suggests that the growth in the bull frog populations may be a cause of

the disappearance of several native species of frog. Trout, tilapia and tucunare are fish species that have been introduced or escaped into natural ecosytems and now successfully compete with native aquatic species. Although it is known that these are aggressive species, the effect of their introduction on other species has not been clearly documented.

Many species of exotic species of plants have been introduced into Colombia. The tree species include pine, eucalyptus, cypress, and gmelina (IAvH, 1997). Agricultural species include commercial grain, vegetable, and fruit species. None of these species, however, is invasive in that they spread rapidly by themselves. They must all be planted and taken care of in order for them to survive.

Colombia makes relatively little effort to control the introduction and spread of exotic species. The efforts that it does make concern the control of insects and diseases that could affect agricultural crop species, animal species and tree plantations. No inventory of introduced species exists, much less an evaluation of the effects of exotic species on biodiversity.

Climate Change

Although Colombia emits only about 0.25 % of global carbon dioxide emissions, it is particularly vulnerable to the effects of global warming, especially in high elevations and ocean ecosystems. If the average annual temperature in Colombia were to rise by between 1°C and 2°C by 2050 and if precipitation were to decrease by 15%, then 78% of the permanent snow and ice on the Colombia's mountains and 56% of its paramos would disappear. This would cause the loss of biodiversity in the paramo and in the ecosystems that receive water from the snow and ice fields. If the sea level were to rise by 40 cm on the Caribbean Coast and 60 cm on the Pacific Coast, then 64% of the Caribbean Coast and 83% of the Pacific Coast would be flooded, with negative consequences for migrating birds and corals reefs. The fact that many of the Andean forest ecosystems have been converted to pastures and agricultural fields limits the potential for migration of Andean forests to new elevations in response to a warming climate (http://www.ideam.gov.co/inap.htm.). Protected areas that include a full altitudinal range thus play an important role in mitigating the effect of climate change on biodiversity and tropical forests (IAVH, 1997). The National Environmental Councils in 2002 approved the document National Policy for Climate Change. Its most important recommendations were to (1) improve the estimate of possible changes in air temperature, precipitation and other climate variables; (2) estimate the impacts of climate change on strategic ecosystems; (3) determine the most feasible measures Colombia can take to adapt to climate change (http://www.ideam.gov.co/inap.htm).

CONSERVATION ACTIONS

CURRENT ACTIONS

Colombian Actions

Colombia's principal conservation action has been to establish the National System of Protected Areas (SNPN). The SNPN encompasses 10,082,779 hectares, or about 10% of Colombia and its components protect many, although not all, as discussed above, of Colombia's ecosystems. In addition, indigenous reserves (r*esguardos indígenas*) include 28,200,000 hectares and Afro-Colombian communal territories (*territorios comunales*) include 5,128,829 hectares. Both categories, although not official protected areas, serve to protect large areas of natural ecosystems. Colombia's other forms of ecosystem protection, civil society reserves and forest reserves, protect additional areas while commercial natural forest management units, although generally not yet established on a firm, long-term basis, provide another means for maintaining forest cover and therefore, much of the species biodiversity for which forests provide habitat. Altogether, these different types of areas include over 44 million hectares, over one third of Colombia's terrestrial area.

A second important Colombian conservation action, as Table 4 previously indicated, has been to ratify and abide by all of the major international environmental and natural resource treaties and conventions.

A third major Colombian conservation action has been to prepare land use plans. Since 2000, Territorial Land Use Plans (POT) have been prepared for almost all of Colombia's municipalities. The POTs zone the land use in the municipalities. The zoning defines the best use for each part of the municipality and establishes restrictions on land use for ecologically fragile or important areas. They also establish municipal conservation areas. In addition, during the same period, the Regional Autonomous Corporations (CAR) have prepared Regional Environmental Management Plans. The purpose of these plans is to conserve natural environments at the regional scale. In some parts of Colombia, they include watershed management units, which protect the natural vegetation that grows on parts of the watersheds that are most subject to degradation.

The fourth, major Colombian conservation action involves the Development and Peace Projects. These are large projects, Colombian government and USAID/Colombia, the World Bank and the European Union provide grants and loans, through the department of Social Action. Development and Peace Projects occur mostly in rural areas, in all regions of Colombia and their objective is to create and assist profitable, environmentally sustainable, small and medium-sized business enterprises.

A fifth Colombian conservation action involves the work of government and mixed government-private institutions. Table 21 indicates the categories of the 90 activities that these institutions are currently implementing. The largest category of activities involves research (37 activities) and the second largest involves planning (31 activities). By contrast, these institutions are not

involved much in field projects: they have only 10 biodiversity protection, 8 marine conservation, and 2 forestry field activities. Of these institutions, the IAvH has 47 activities, of which 25 are research and 19 planning. The Sinchi has 22 activities of which 8 are research, 6 are biodiversity and 4 are planning. The IIAP has 6 activities and the Ministry of Environment seven.

Table 21. Conservation activities of Colombian government institutions

Organization	Category of Activity							TOTAL
	Research	Biodiversity	Forestry	Carbon	Marine	Planning	Pollution	
IVEM	0	0	0	0	8	0	0	8
Sinchi	8	6	2	0	0	4	2	22
IAvH	25	3	0	0	0	19	0	47
Min. Environment	3	0	0	0	0	4	0	7
IIAP	1	1	0	0	0	4	0	6
TOTAL	37	10	2	0	8	31	2	90

Source: FAA TEAM

A sixth category of Colombian conservation actions relates those implemented by Colombian environmental NGOs. Table 22 lists the principal Colombian NGOs, the region in which they work, and their representative activities.

Table 22. Principal actions of Colombian environmental NGOs

Organization Name	Region	Representative Activities
Fundación Natura	National	Conservation and management of fauna, forest use and management, Indigenous and Afro-Colombian territory conservation, environmental education and certification and Green Seal.
Fundación Humedales	Andes	Protection of Andean wetlands
Grupo Semillas	Andes	Sustainable development and agricultural improve in rural communities
Fundación Pro Sierra Nevada de Santa Marta	Caribbean	Conservation and management of the Sierra Nevada area
Fundación Inguedé	Pacific	Forest research, sustainable development and forest use.
Fundación Tropenbos	Amazon-Pacific	Forest management research
Fundación Omacha	Orinoco-Amazonas	Research, conservation and management of fisheries and aquatic mammals.
Fundación Puerto Rastrojo	Amazon-Orinoco	Forest research, Natural Parks management, Indigenous territory conservation, sustainable development and forest harvest, GIS
Fundación Gaia	Amazon	Administrative and legal strengthening of Indigenous peoples territories
Fondo para la Acción Ambiental y la Niñez	National	Grants for field projects

Source: FAA TEAM

Donor Actions

A thorough analysis of the actions that donors other than USAID/Colombia finance in order to conserve Colombia's biodiversity and tropical forests is beyond the scope of the present study. Nonetheless, Table 23 gives some indication of the scope and character of the conservation activities that the major donors to Colombia finance. These donors include the World Bank, the Inter-American Development Bank, the Global Environmental Facility (GEF), various embassies, the GTZ and the European Union. Out of 54 activities, their financing goes predominantly to planning (21), followed by pollution control (12), biodiversity (10) and forestry (7). They finance few activities related to carbon sequestration, (3), protection of marine resources (1) and research (0). GEF finances the greatest number of different activities (24) while the GTZ finances only two activities. One large activity, however, may include many smaller activities.

Table 23. Number of conservation activities financed by donors

Organization	**Category of Activity**							**TOTAL**
	Research	**Biodiversity**	**Forestry**	**Carbon**	**Marine**	**Planning**	**Pollution**	
World Bank	0	0	1	2	1	0	4	8
IADB	0	0	0	1	0	2	4	7
GEF	0	6	2	0	0	13	3	24
Embassies	0	2	0	0	0	3	1	6
GTZ	0	1	0	0	0	1	0	2
Eur. Union	0	1	4	0	0	2	0	7
TOTAL	**0**	**10**	**7**	**3**	**1**	**21**	**12**	**54**

Source: FAA TEAM

Table 24 indicates the activities in Colombia financed and implemented by the Nature Conservancy (TNC), the World Wide Fund for Nature (WWF) and Conservation International (CI).

Table 24. Principal International Environmental NGOS in Colombia

Organization	Regions	Activity
TNC	Andean, Orinoco	Purchase of 10,000 ha for Reserva de la Parque Nacional Serranía de los Yarigüies & Tuparro indigenous peoples, Regional planning, Establish 25,000 protected area in Casanare Department; Conservation of Orinoco habitat used by migrating birds; Increase number of private reserves
WWF		Conservation and use of natural resources; Development of conservation strategies & policies; Environmental education; Geographic information systems; Financial sustainability of conservation
Conservation International		Wide range of projects all over Colombia: Malpelo Flora & Faunal Sanctuary; Yarigues' Wetlands of the Sabana of Bogota; PNN Tuparro.

Source: web pages of TNC, CI, and WWF

USAID/Colombia Actions

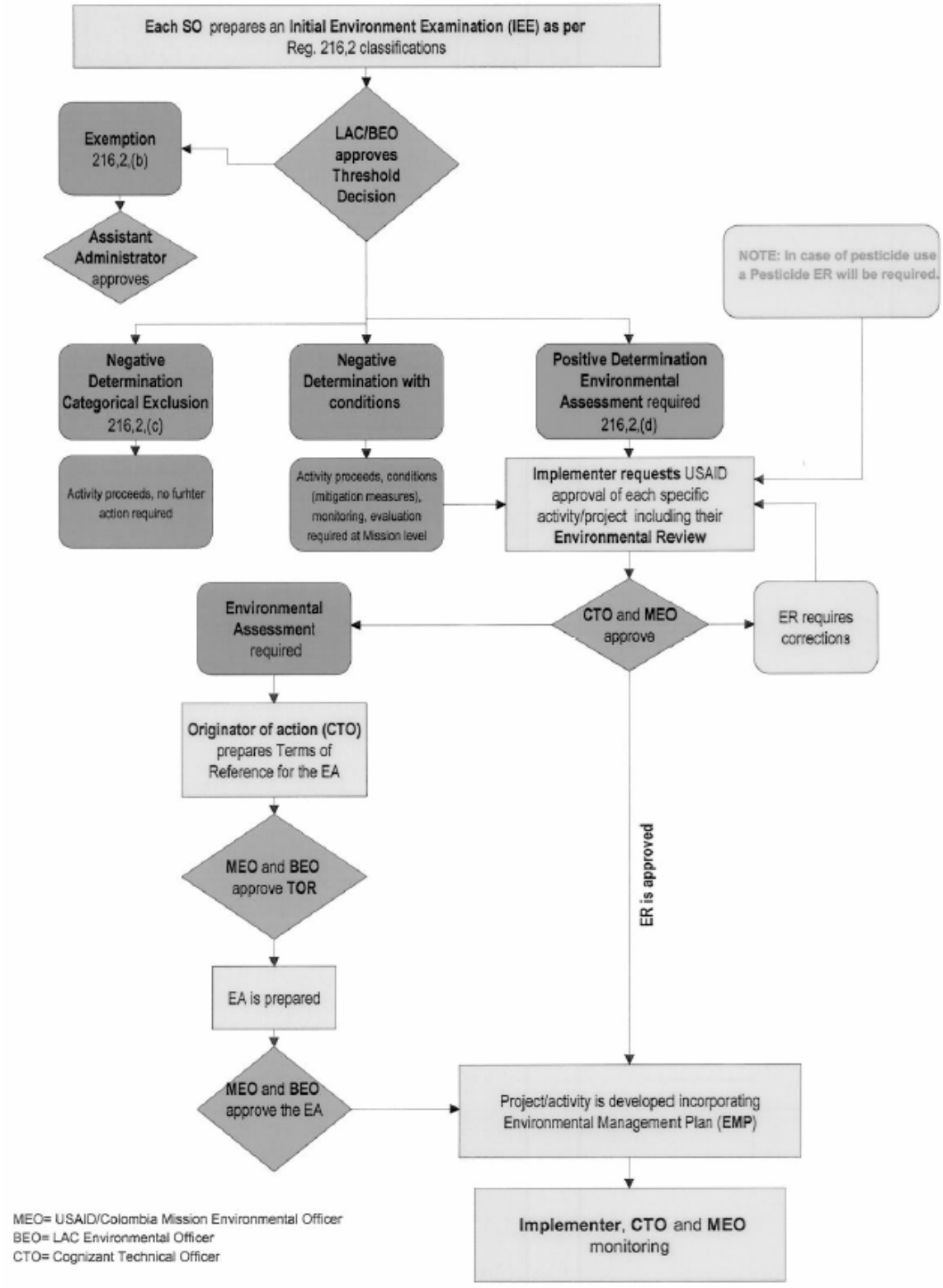
Although USAID/Colombia does not have Strategic Objective for conservation, its programs do help to conserve Colombia's biodiversity and tropical forests. First, it has established an Environmental Review Process (ER) for all of the activities that it finances in Colombia. The process ensures that USAID/Colombia does not finance activities that will cause negative impacts on biodiversity and tropical forests. Second, the Strategic Objectives that USAID/Colombia does finance include components that will assist Colombia to conserve its biodiversity and tropical forests.

The USAID/Colombia Environmental Review Process

In 2000 a Programmatic Environmental Assessment (PEA) was prepared for the entire USAID/Colombia program. The PEA recommended the Environmental Review process (ER) shown in Figure 2. In this process, the Mission Environmental Officer (MEO) reviews activities financed by USAID/Colombia and, unless the proposed activity could cause significant and new negative environmental impacts, either disapproves the activity or approves it subject to the implementation of avoidance or mitigation measures necessary. The LAC Bureau Environmental Officer has determined that the same PEAs is applicable to the activities to be financed by USAID/Colombia, during the strategic period 2006 to 2010. Consequently, a new Programmatic Environmental Assessment (PEA) for the programs to be financed during this period will not be prepared and the Environmental Review process will be applied to the ADAM, MIDAS, IDP, BZ, and NP Programs. Each of these programs has established its own procedures and hired staff to carry out the Environmental Review Process.

Since 2000, USAID/Colombia has successfully applied and developed the Environmental Review process. It has standard manuals that the projects it finances utilize to apply best management practices to the range of different types of projects that USAID/Colombia is financing. The Environmental Review Process thus has proven able to detect the potential negative impacts on the environment, including on biodiversity and tropical forests, of actions proposed for USAID/Colombia financing. For example, the Environmental Review process was able to identify a proposal to introduce tilapia into the Cienaga Grande and deny that Project USAID/Colombia financing. The Environmental Review also has proven able to identify proposed projects that are located in fragile areas. Likewise, the Environmental Review identifies projects that involve the purchase of promotion of pesticides and requires that such projects prepare a plan for Integrated Pest Management (IPM). USAID/Colombia requires that the Mission Environmental Officer (MEO) approve every proposed project that may involve the use of pesticides in some way.

Figure 2. USAID/Colombia environmental review process



Conservation in Strategic Plan Programs

Two documents define the actions required to conserve Colombian biodiversity and tropical forests: the National Biodiversity Policy for Colombia, (National Planning Department, 1996) and the National Forestry Plan (National Planning Department, 1996).

The National Biodiversity Policy for Colombia contains 92 specific actions for conserving Colombia's biodiversity. Table 25 summarizes the relationships between the programs financed by USAID/Colombia and these actions. It indicates that ADAM, MIDAS, IDP, BZ and NP programs could contribute in 259 ways to the implementation of the National Biodiversity Policy for Colombia. The Buffer Zone Program (BZ) contributes to 75 actions, the National Park Program (NP) to 73 actions, the MIDAS Program to 50 actions, the ADAM Program to 35 actions and the Internally Displaced Persons Program (IDP) to 26 actions. All five programs contribute most to the actions in component 1.2 of the National Biodiversity Policy for Colombia, "*Reduce the processes and activities that cause the deterioration of biodiversity*". Together they contribute to this component in 114 ways.

The next largest category of related actions concerns component 1.1 of the National Biodiversity Policy to which the five programs contribute in 41 different ways. Twenty-seven of these actions, however, are concentrated in the BZ and NP Programs, both of which directly concern the National System of Protected Areas. Between them, the five programs contribute in 35 ways, to component 2.1 of the National Biodiversity Policy. Again, all of the five programs contribute, although 17 of the 35 actions are in the National Parks Program (NP).

Only 15 actions (6%) in the five programs of the 259 contributions concern component 3.4 of the National Biodiversity Policy, "*Develop the sustainable economic potential of biodiversity*." Out of the 259 contributions, none concerns Component 3.2, *Strengthen and promote gene banks and biotechnology programs,* or Component 3.3, *design and implement valuation systems for biodiversity and equitable distribution of its benefits*".

As Table 26 indicates, the National Forestry Plan for Colombia has 16 subprograms for conserving Colombia's forests. A total of 140 actions under the five USAID/Colombia programs could contribute to the implementation of these actions: 18 ADAM actions, 53 MIDAS actions, 5 IDP actions, 27 BZ actions, and 37 NP actions. Not only does MIDAS contribute the most actions but it also contributes actions to all 16 subprograms. ADAM, by contrast, contributes actions to only 7 of the subprograms, IDP to 3 subprograms, BZ to 5 subprograms and NP to 4 subprograms. Given that MIDAS could contribute to all the subprograms, that it works with the private sector, that it works in a large geographic area and that has a very large budget, it has the potential to contribute greatly to the conservation of Colombia's biodiversity and tropical forest.

Table 25. National biodiversity policy and USAID/Colombia program components

National Biodiversity Policy Actions	Number of Related Actions					
	ADAM	**MIDAS**	**IDP**	**BZ**	**NP**	**TOTAL**
1. CONSERVE						
1.1 Consolidate National System of Protected Areas	5	8	1	14	13	41
1.2 Reduce the processes and activities that cause the deterioration of biodiversity	17	22	13	31	31	114
1.3 Promote the restoration of degraded ecosystems and threatened species	4	4		6	7	21
2. UNDERSTAND						
2.1 Characterize the components of biodiversity	3	5	2	8	17	35
2.2 Recuperate traditional knowledge and practices	1	2	4	4	3	14
3. UTILIZE						
3.1 Promote sustainable management systems for renewable natural resources	3	4	4	6	2	19
3.2 Strengthen & promote gene banks and biotechnology programs	0	0	0	0	0	0
3.3 Design & implement valuation systems for biodiversity & equitable distribution of its benefits	0	0	0	0	0	0
3.4 Develop the sustainable economic potential of biodiversity	2	5	2	6	0	15
TOTAL	35	50	26	75	73	259

Source: FAA team analysis of USAID/Colombia programs

Table 26. Relationship between National Forestry Plan actions and USAID/Colombia program

National Forestry Plan Programs	USAID/Colombia Program					
	ADAM	MIDAS	IDP	BZ	NP	TOTAL
Forest zoning & management	1	2	0	0	4	7
En situ conservation of ecosystems & biodiversity	2	2	0	4	14	22
Ex situ conservation of biodiversity	2	1	0	0	0	3
Restoration & rehabilitation of forest ecosystems	1	2	2	4	6	15
Protection from forest fires	0	1	0	0	13	14
Zoning of existing plantations	0	5	0	0	0	5
Zoning of potential plantation areas	0	4	0	0	0	4
Expansion of forest production	0	1	0	0	0	1
Management & use of natural forest	4	5	1	6	0	16
Support for forest product businesses	1	5	2	1	0	9
Formation of export businesses & promotion of exports	0	4	0	0	0	4
Administration of natural resources	0	3	0	0	0	3
Administration of forest resources	0	3	0	0	0	3
Strengthening of institutional capacity for plantations	0	2	0	0	0	2
Education and promotion of forestry culture	7	5	0	12	0	24
Promotion of international forestry contacts	0	8	0	0	0	8
TOTAL	18	53	5	27	37	140

Source: FAA team

These two tables, however, do not necessarily completely reflect the significance of the contributions that the USAID/Colombia program will make to the actions or subprograms of the National Biodiversity Policy and National Forestry Plan. There are at least five reasons.

First, the actions under ADAM, MIDAS, and IDP are only *potential* contributions. They *could* contribute to the implementation of the National Biodiversity Policy. But, if they actually contribute or not, will depend on the degree to which USAID/Colombia, contractor, and grantee administrators, ensure that such contributions are monitored and reported. If the administrators give enough attention to these actions they will be implemented. If they ignore these actions, then they will not be implemented. Obviously the grantee and contractor administrators will find these actions worthwhile of their attention only if USAID/Colombia gives them importance.

Second, some actions are likely to have wider and more long-lasting significance than others. For example, the ADAM and MIDAS contributions to Component 3.4, *develop the sustainable economic potential of biodiversity*, could potentially create large, permanent markets for products from natural ecosystems, and thereby help to conserve those ecosystems. It is conceivable, therefore, that such a contribution to the National Biodiversity Policy could outweigh the relatively minor and geographically narrowly focused contribution of the Buffer Zone Program to Component 3.4, even though the Buffer Zone Program's focus is biodiversity conservation.

Third, ADAM and MIDAS support private sector actions. In general, in Colombia, the private sector has more capacity to finance and replicate successful conservation actions, than the public institutions. Therefore, if ADAM and MIDAS identify and promote conservation actions that interest private businesses, there is a reasonable possibility for their replication, financing and widespread application. The Buffer Zone and National Park Programs, by contrast, although important, have more to do with public or communal organizations, whose capacity for promoting replication, financing and application is generally less than that of the private sector.

Fourth, the ADAM, MIDAS, and IDP programs have much more funds than the small Buffer Zone and National Park Programs, giving them more potential for making a significant contribution to the components of the Nacional Biodiversity Strategy.

Fifth, some of the actions and subprograms are more significant than others. For example, *in situ* conservation actions are generally more significant than *ex situ* conservation. A USAID/Colombia program contribution to a significant actions or subprogram, therefore, could be very important even if the program does not contribute to many actions or subprograms.

RECOMMENDED CONSERVATION ACTIONS

The National Biodiversity Strategy and the National Forest Development Plan identify, at a national scale, the priority actions required to achieve sustainable management of Colombia's tropical forests and the conservation of its biological diversity. Colombia, donors and USAID/Colombia should transform these broad actions into specific activities at the national, regional, and local scales.

Colombia

Colombia needs to take five categories of actions in order to implement effectively the National Biodiversity Strategy and the National Forest Development Plan. The categories concern policies, financing, institutions, research and education.

Policies: The Colombian government should fully incorporate the National Biodiversity Strategy and the National Forestry Plan into its policies and programs. No contradiction exists between conservation and the Colombian government's goals of peace, suppression of illicit crops and economic growth. Rather these goals reinforce each other. On the one hand, peace will facilitate the management of protected areas and forest management units. The suppression of coca and poppy production will reduce the rate of associated deforestation and contamination, and economic growth will provide funds for conservation actions. On the other hand, conservation will provide products, such as wood, and services, such as clean water, that will contribute to economic growth and thus to peace and licit activities.

Financing: The Colombian public and private institutions and organizations must adequately finance the investment and operating costs that the implementation of the actions and subprograms in the National Biodiversity Strategy and the National Forest Development Plan require. The best policies, laws, and regulations serve little purpose if they cannot be made effective for lack of adequate financial resources to hire the personnel, buy the equipment, keep the records, make the studies, monitor and evaluate the results, that their implementation requires. The requirement for adequate financing for the conservation of biodiversity and tropical forests, however, does not apply only to public institutions. Private businesses must also adequately fund pollution control, measures to avoid, mitigate or compensate for negative environmental impacts of their activities. They should train their staff in specific practices and procedures that will reduce the threat of productive processes to biodiversity and tropical forests, since financing conservation in a stagnant economy is difficult. Business activity, moreover, generates the funds for government actions. Thus, a robust economy can be considered a prerequisite for effective conservation.

Institutions: Although adequate financing is a necessary condition for conservation, it is by no means sufficient. Colombia must make good use of the funds that it invests in conservation, by ensuring that its institutions with conservation responsibilities work effectively. The required institutions exist. Two ministries, Environment and Housing and Agriculture have responsibilities for biodiversity conservation and forestry. There are 27 regional environmental authorities, the Regional Autonomous Corporations and the Regional Development Corporations. The municipal governments also include the Municipal Technical Assistance Units (UMATA) whose responsibilities include the preparation of Land Use Plans (POT) and enforcement of environmental regulations, as well as the supply of potable water to urban areas. For effective conservation, these institutions must coordinate their conservation actions, effectively and efficiently.

Research: Colombia must organize and finance an adequate, effective system for research on biodiversity and tropical forests and support the development of adequate technology for their protection and management. Colombia already has the basis for an excellent research and technology development in its universities and public research institutions, such as the IAvH.

Education: Colombia must adequately educate professionals in the conservation of biodiversity and tropical forests in its excellent university system.

Other Donors

There is an imbalance in donor support for conservation in Colombia. Almost half (21) of the donor activities, including 13 GEF projects, support conservation planning. Yet no donor project supports research, even though effective planning requires adequate prior research. Likewise, donors support only 7 forestry projects even though forests cover half of Colombia, and harbor most of its biodiversity. Long-term support and technical assistance are required, especially when projects are implemented with the indigenous and Afro-Colombian groups that control much of Colombia's forests, and could make a significant contribution to economic development and political stability. Similarly, donors support only one marine conservation activity in spite of Colombia's long coasts, both Pacific and Caribbean, and large marine territories. Additionally, neither the National Biodiversity Strategy nor the National Plan for Forestry Development mentions, much less analyzes the role of donors in their implementation. This is in spite of the fact that donors, such as USAID/Colombia, the World Bank, the IADB, bi-lateral development programs and international environmental NGOS, such as WWF and TNC, finance more than half of the budget of the Ministry of the Environment and Housing, as well as many individual conservation projects.

The National Biodiversity Strategy, moreover, makes no mention of Colombian environmental NGOs, such as *Fundación Natura*, which are already playing a central role in the conservation of Colombia's biodiversity. Nor does it mention international organizations, public and private, which finance many of the actions, such as infrastructure projects, including roads, dams, oil pipelines and ports, that cause the most severe negative impacts on biodiversity and tropical forests. In short, neither the National Biodiversity Strategy nor the National Plan for Forestry Development incorporates donors fully, leading to imbalance and lack of coordination that can only retard conservation in Colombia.

USAID/Colombia

USAID/Colombia should help Colombia to conserve its biodiversity and tropical forests in three ways: (1) Include biodiversity and forest conservation within current Strategic Objectives; (2) Establish a new conservation strategic objective; and (3) Avoid, mitigate and compensate potential negative environmental impacts.

Include biodiversity and forest conservation within current Strategic Objectives

USAID/Colombia should ensure that its existing programs contribute, when they can, to the conservation of biodiversity and tropical forests. As discussed above, the ADAM, MIDAS, IDP, BZ and NP programs could contribute in 259 of their actions to the implementation of the National Biodiversity Policy and in 140 of their actions to the implementation of the National Forestry Plan. That these programs will support effectively the implementation of these two plans, however, remains only a possibility. The actual contribution of these programs to

conservation of biodiversity and forests will depend on how they are actually implemented. If USAID/Colombia insists that these programs establish links between their actions and conservation of biodiversity and forests, then the programs will be more likely to do so. Otherwise, they may ignore the potential conservation benefits of their actions. USAID/Colombia, therefore, should instruct these programs to establish the links between their actions and conservation of biodiversity and tropical forests. It should request that the programs report regularly on how their actions have supported the National Biodiversity Policy and the National Forestry Plan. [2]

Finance a Biodiversity and Tropical Forest Strategic Objective

USAID/Colombia should finance an additional Strategic Objective for the conservation of biodiversity and tropical forests. There are two main arguments for USAID/Colombia to add a new Strategic Objective to its Strategic Plan for 2006 to 2010:

First, Sections 118 and 119 of the Foreign Assistance Act, which instruct USAID to make a special effort to continue and increase assistance for the conservation of tropical forests and biodiversity, demonstrates the importance that the U.S. Government places on the preservation of biodiversity. In FY 2004, USAID devoted more than $155 million in development assistance funds and more than $15 million in other funds, towards biodiversity conservation in more than 60 countries (USAID, 2005). USAID calculates that the net economic benefits of biodiversity are estimated to be at least $3 trillion per year, or 11% of the annual world economic output. USAID further says that biodiversity is essential to every aspect of the way that humans live around the world, and that conserving biodiversity is especially crucial in developing countries where people's livelihoods are directly dependent on natural resources such as forests, fisheries and wildlife. Thus USAID has made biodiversity conservation a key goal under its program to protect the environment (USAID, 2006).

Colombia is one of the world's most important countries for the conservation of biodiversity. Its Strategic Plan for 2006 to 2010 has a budget of over US$ 450 million. Yet the budget for biodiversity and tropical forests is less than US$ 4 million, or less than 1% of the overall budget. If USAID does not adequately support biodiversity conservation in Colombia, it will be unlikely to achieve its global biodiversity conservation goals. Colombia simply has too important a global significance in biodiversity and tropical forest conservation.

Second, conservation forms an integral, essential part of efforts to achieve USAID/Colombia's goal of peace and reduction of illicit crops. In 2002, the Technical Analysis for the environment and natural resource component of Plan Colombia said:

> "For a licit rural economy to be stable and permanent, it must be based on the sound management and effective protection of biological, soil and water resources. If production technologies for licit crops replicate the environmentally destructive methods used for coca cultivation, natural resource degradation will continue to produce poverty and underdevelopment, two of the very factors that drive the small farmer into illicit crop

[2] Different programs can have very different attitudes towards the implementation of conservation actions. ADAM, for example, immediately responded to a request for its review of the links between its program and the National Biodiversity Policy. National Forestry Plan. MIDAS, by contrast, in spite of several requests, has never reviewed the links between its program and these two documents.

production. As a consequence, spraying, law enforcement and alternative development, rather than eradicating coca cultivation will simply force coca production into the vast areas of Colombia that remain outside of effective government control. The economic, social, and ecological catastrophes that accompany coca production will have been reproduced rather than reduced. This technical analysis, therefore, emphasizes that natural resource/environment management is not a peripheral but an essential, core element of an alternative development program".

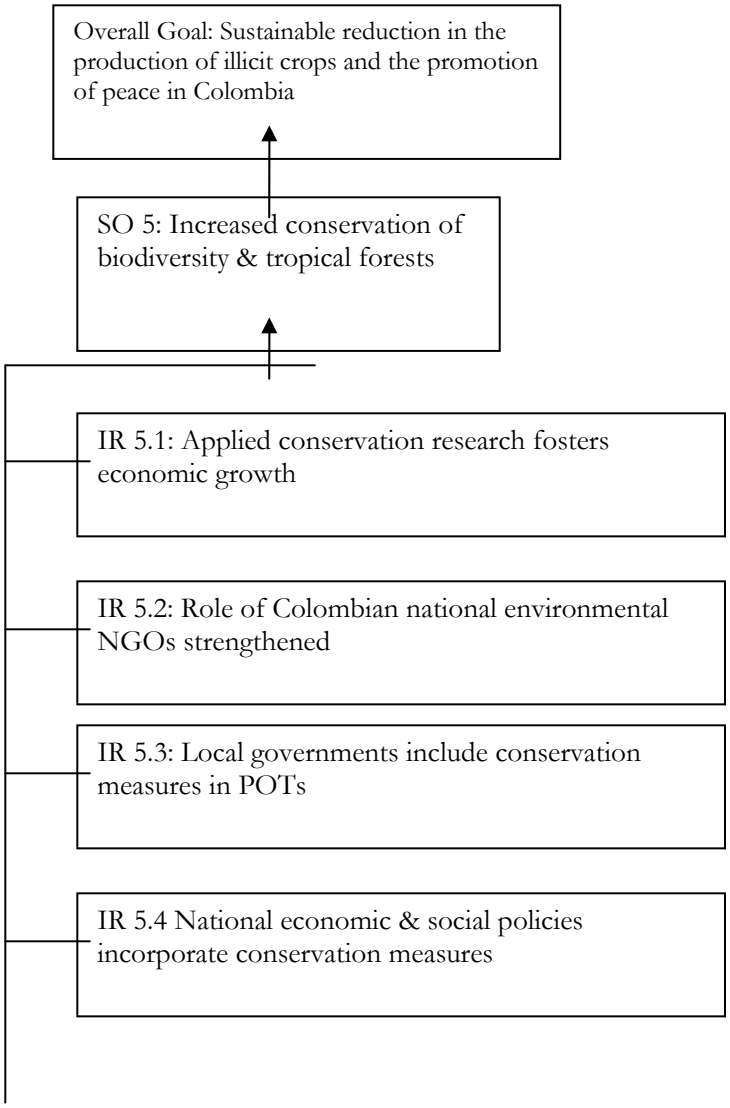
These arguments apply equally to the new USAID/Colombia Strategic Plan for 2006 to 2010. Indeed, without effective conservation of biodiversity and tropical forests, peace and reduction of illicit crops may be unachievable. Biodiversity and tropical forest destruction, coca cultivation and guerrilla activities are inter-twinned. All occur at the colonization frontier where forestland is being converted to agriculture and pasture, where coca is planted, and where guerrilla movements, such as the FARC originated, and continue to be based. Civil order and economic growth must occur on the frontier and beyond if they are to increase the chances for peace, order and reduced coca cultivation. Otherwise, illegality and coca cultivation may not be reduced but will simply move elsewhere. Yet, although its Strategic Plan for 2006 to 2010 has a budget of over US$ 450 million, USAID/Colombia has assigned less than US$ 4 million or less than 1% of the overall budget for the two programs that directly work to conserve biodiversity and tropical forests.

There are three criteria upon which the design of a Strategic Objective (SO) for conservation should be based. First, like the other four SO s the conservation SO must contribute to the achievement of USAID/Colombia's overall goal of peace and reduction in illicit crops. Second, the conservation SO should provide substantial support for the achievement of the other four SOs. Third, the conservation SO should strengthen public and private Colombian conservation organizations. Based on these criteria, USAID/Colombia should design a fifth Strategic Objective that works through and with the five existing USAID/Colombia Programs, supporting their conservation actions. It is beyond the scope of this report to design in any detail the proposed fifth Strategic Objective but Figure 3 indicates what its components might be.

Avoid, mitigate and compensate potential negative environmental impacts

The third way in which USAID/Colombia can contribute to the conservation of Colombia biodiversity and tropical forests is by avoiding, mitigating or compensating for the negative environmental impacts that the actions that it finances could potentially cause. This report has previously described USAID/Colombia's Environmental Review Process (ER), which was designed to identify and avoid, mitigate or compensate for potential negative environmental impacts of proposed actions taken to achieve USAID/Colombia's Strategic Objectives. It was beyond the scope of this report to evaluate the effectiveness of the Environmental Review Process, but there is no reason to believe that it is not functioning effectively. USAID/Colombia should ensure that the ER process continues to function effectively during the new Strategic Objective period. In order to ensure such effectiveness, USAID/Colombia should commission an objective evaluation of the effectiveness of the system, which would identify any weaknesses and provide for their solution.

Figure 3. Proposed conservation Strategic Objective, 2006 to 2010



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Appendix A. Natural Regions, Ecoregions and Ecosystems in Colombia

	Area		Ecosystems			
Ecoregion	Extension		No.	Dominant Ecosystem & % of total area	Special Ecosystems & % of total ecoregion	% transformed
	Km2	%				
Pacific						
Bosques húmedos del Chocó Darien	65780	5.8	9	Bosques altos, densos, muy húmedos o pluviales (47%)	Bosques de catival, natal, sajal, naidizal y mangle (10.8%)	29.5
Bosques montanos del Darien	422	0.04	2	Bosque alto denso de colinas altas (94.2%)		5.8
Bosques húmedos del occidente del Macizo colombiano	3642	0.32	3	Bosque alto denso de manglar hiperhúmedo (21.9%)		52.5
TOTAL	69844	6.16	10			30.6
Andes						
Bosques montanos de la Sierra Nevada de Santa Marta	7885	0.69	5	Bosques secos y matorrales xerofíticos (11.3%) Bosques bajos densos altoandinos húmedos (10.9%)	Bosques medios densos caducifolios (0.3%)	61.8
Bosques montanos orientales de la Cordillera Oriental	59815	5.25	10	Bosques medios densos húmedos andinos (17.4%) Bosques bajos densos altoandinos húmedos (10.9%)		55.4
Bosques húmedos del Catatumbo	6657	0.6	5	Bosques húmedos subandinos (21.3%) Bosques secos y matorrales xerofíticos subandinos (10.6%)		58.5
Bosques montanos occidentales de la Cordillera Occidental	48908	4.29	6	Bosques húmedos subandinos (20.5%) y bosques medios densos húmedos andinos (16.3%)		47.1
Bosques montanos del Valle del Cauca	31428	2.76	5	Bosques bajos densos alto andinos húmedos y de niebla (7.3%)		88.3
Bosques montanos del Valle del Magdalena	87068	7.64	11	Bosques bajos densos alto-andinos húmedo y de niebla (11.4%)		75.6
Bosques montanos del alto Caquetá-Putumayo	11033	0.97	4	Bosques bajos densos alto andinos húmedos y de niebla (40%) y bosques medios húmedos andinos (21.7%)		9.6
Bosques secos del Valle del	19438	1.71	2	Bosque seco y matorrales xerofíticos		96.1

Magdalena				subandinos (19.8%)		
Bosques secos del Valle del Cauca	7322	0.64	2	Bosque seco y matorrales xerofíticos subandinos (66.4%)		32.0
Bosques secos del Valle del Patía	2267	0.20	2	Bosque seco y matorrales xerofíticos subandinos (66.4%)		32.0
Páramo de la Sierra Nevada de Santa Marta	1239	0.11	2	Páramos húmedos (70%) y super pá ramo (30%)		0
Páramo de los Andes del Norte	13796	1.21	3	Páramos húmedos (89.3%) Páramos secos (6.2%) Super páramo (4.6%)		0
Bosques montanos de la Serranía de La Macarena	2908	0.26	5	Bosques altos densos sub-montanos (22.4%) y bosques medios densos montanos (23.6%)	Arbustales esclerófilos de cimas de serranías (7%)	34.5
	299764	26.3	21			62.4
Caribbean						
Bosques húmedos de Urabá-Magdalena	69803	6.1	10	Bosques húmedos subandinos (6.2%), bosques aluviales de pantanos y ciénagas (3.8%)	Manglar hiperhúmedo del delta del Atrato (0.3%)	82.3
Bosques secos del Caribe	44527	3.9	6	Sabanas de las terrazas antiguas (4%)	Manglar bajo denso del Caribe (2.1%)	87.7
Matorrales xerofíticos de la Guajira	30074	2.6	12	Arbustales abiertos caducifolios y subdesérticos con suculentas (23.4%)	Dunas con vegetación escasa (2.6%);vegetación dispersa de desierto (2.2%); Manglar del Caribe (1.7%); Bosques secos y de niebla de la Macuira (1.5%)	46.6
	144456	12.6	19			76.5
Orinoco						
Bosques húmedos del piedemonte de la Orinoquia	23475	2.0	9	Sabanas inundables y bosque de la llanura de desborde (16.7%); Bosque del piedemonte llanero (6.2%); bosque de llanura de inundación de ríos andinos (4.3%)	Sabanas inundables de la llanura eólica (2.7%)	59.9
Llanos orientales	147923	13.0	12	Sabanas de altillanura muy disectada (27.2%); Sabanas de altillanura plana (16.5%); Sabanas inundables y bosques de la llanura de desborde (12.2%)	Sabanas inundables de la llanura eólica (12.9%); Bosques de galería y morichales (11.6%)	5.1
	171398	15.0	14			12.6
Amazon						
Bosques húmedos del Vichada-	105367	9.2	19	Bosques altos densos de la planicie	Sabanas hiperestacionales de ciperáceas y mapataceas	5.3

Inírida				sedimentaria ligeramente (15%) y fuertemente (22%) ondulada. Bosques altos densos de las llanura de inundación de ríos andinos y de varzeas amazónicas (10.5%)	y cratingas altas (21%) Sabanas casmófitas y arbustales esclerófilos de las serranías guyanesas(0.7%)	
Bosques húmedos del Caquetá	188105	16.5	18	Bosques de la planicie sedimentaria ligeramente (26%) y fuertemente (25.1%) ondulada; bosques medios de los planos estructurales arenosos (10%)	Bosques medios de la serranía guyanesa (5.5%); sabanas casmófitas y arbustales esclerófilos de las cimas e la serranía guyanesa (3.6%)	9.0
Bosques húmedos del Napo	41620	3.7	7	Bosque alto denso de la planicie sedimentaria fuertemente (17.5%) y ligeramente (15%) ondulada		56.4
Bosques húmedos del Guainía	35385	3.0	14	Bosque mediodenso de la planicie arenosa residual (60%); bosque medio denso de Caatingas altas (23.7%)	Sabanas casmófitas y arbustales esclerófilos de la cima de la serranía guyanesa (1.1%)	0
Bosques húmedos del Caquetá-Amazonas	83162	7.3	11	Bosque alto denso de la planicie sedimentaria ligeramente (46.7%) y fuertemente (30.1%) Ondulada; Bosque medio y bajo de las llanuras de inundación de ríos amazónicos (11.1%)	Sabanas casmófitas y arbustales esclerófilos de la cima de la serranía guyanesa (0.8%)	0.4
	453639	39.6	24			10.2
Incongruencies						
	5211	0.004				
Todos						
27 ecorregiones	1144311	100	63			33.7

Appendix B. Summary Analysis Colombian National Biodiversity Policy

Componente	Organization	ADAM	MIDAS	IDP	BZ	NP
1. CONSERVAR						
1.1 Consolidará el Sistema Nacional de Áreas Protegidas						
1.1.1 Levantamiento de áreas prioritarias no incluidas en el sistema de áreas protegidas	MMA, UAESPNN	NA	NA	NA	NA	3
1.1.3 Identificar los diversos potenciales de las áreas protegidas para promover su integración a las economías	NE	1,2	3	NA	1&3	3
1.1.4 Reglamentará el funcionamiento de las Reservas de la Sociedad Civil	NE	NA	4	NA	NA	NA
1.1.5 Se determinarán condiciones que favorezcan el establecimiento de áreas protegidas por parte de las CAR	MMA, CAR	1, 2	4	NA	NA	NA
1.1.6 Se crearán los incentivos para promover la conservación	IH	NA	NA	4	1&3	3
1.1.7 Se evaluará el estado actual de las reservas forestales	IH	1	3	NA	NA	NA
1.1.8 Se determinará criterios técnicos que sirvan para establecer el SINAP	IH	NA	3,4	NA	NA	NA
1.1.9 Se estudiará la relación entre la diversidad biológica y el recurso hídrico	IH	NA	NA	NA	NA	3, 2
1.1.10 Se determinará la factibilidad de corredores biológicos	MMA	NA	NA	**NA**	1	NA
1.1.11 Se formulará planes de manejo para áreas protegidas	MMA	NA	3	NA	1&3	1.2.3
1.1.12 Se crearán las condiciones para que las CAR tengan participación en zonas de amortiguadoras	NE	NA	NA	NA	1, 2&3	NA
1.1.13 Se buscarán que las áreas protegidas y sus zonas de amortiguación se administren como una unidad de conservación	NE	NA	NA	NA	12,&3	3,2
1.1.14 Se definirá una política de ecoturismo	NE	NA	4	NA	NA	1,2,3,5
1.2 Reducir los procesos y actividades que ocasionan el deterioro de la biodiversidad						
Transformación de Habitats						
1.2.1 Se coordinará el diseño de una estrategia y un plan intersectorial e interinstitucional	DNP	NA	NA	NA	NA	3
1.2.2 Se elaborará y ejecutará planes de ordenamiento ambiental territorial regionales y locales	MMA, CAR, ET IDEAM	2	3	3, 4, 5	1, 2, &3	3
1.2.3 Se introducirá criterios técnicos	MMA, CAR,	2	3	NA	NA	1,2,3

en planes de ordenamiento ambiental territorial	ET , IDEAM					
1.2.4 Se capacitarán y asesorarán a las entidades territoriales en planificación y ordenamiento ambiental	CARs	2	3	NA	NA	NA
1.2.5 Se revisará las políticas relacionadas con el sector agropecuario y forestal	MMA, MADR	2	3,4	NA	NA	NA
1.2.6 Se adoptarán medidas a reducir y orientar colonización	RA y DA	NA	NA	1-9	1,2,3	2,3,4
1.2.7 Se enfatizarán las consideraciones ambientales en las políticas de RA, adecuación de tierras, créditos agrarios, colonización y titilación de tierras baldías	NE	NA	1,3, 4	NA	NA	3
1.2.8 Se incluirá consideración ambientales en los planes de desarrollo vial y de infraestructura	MT, INV	1,2&3	NA	3,4	2,3	NA
1.2.9 Se pondrá en marcha una estrategia para disminuir la presión que ejerce el consumo de leña sobre los bosques	MME, MMA, CARs	NA	NA	NA	1-3	NA
1.2.10 Se continuarán con las acciones de la Política Nacional de Bosques	MMA, CAR	1	4	NA	NA	NA
1.2.11 Se buscarán reducir el impacto de los incendios	MMA, IDEAM, DNPAD	1	NA	NA	NA	1,2,3,4
1.2.12 Se adelantará proyectos de investigación que introduzcan criterios de conservación de la biodiversidad en los aprovechamientos forestales	IH	NA	NA	NA	1, 3	NA
1.2.13 Se dispondrá medidas orientadas a establecer el impacto de las actividades de las entidades oficiales sobre la biodiversidad	CGN	NA	NA	NA	NA	2,3,4
Introducción de Especies Invasores Y Transplante De Especies Entre Ecosistemas						
1.2.18 Se desarrollarán las reglamentaciones para la bioseguridad	NE	NA	NA	NA	NA	3
1.2.19 Se investigarán el impacto de la introducción de especies	MADR MS, y MMA	NA	NA	NA	3	NA
1.2.20 Se establecerán medidas para el control de especies invasoras	MADR, MS, y MMA	1	NA	NA	NA	NA
Sobreexplotación						
1.2.23 Se determinarán la oferta del medio ambiente y su capacidad de renovación	II	1	3	NA	1,3	3,1
1.2.24 Se fijará los niveles de aprovechamiento de las especies o las vedas necesarias	MMA, INPA	1	3	NA	1, 2	2,3,4
1.2.25 Se establecerán los cupos globales y se determinarán las especies para el aprovechamiento forestal	MMA	1	3	NA	1,2	NA
1.2.26 Se establecerán tallas y edades mínimas de caza, épocas de veda y	NE	NA	NA	NA	1,2	NA

cotos de caza						
1.2.27 Se delimitarán zonas para el desarrollo de especies donde se concentrarán medidas de control	NE	NA	NA	NA	1,2	NA
1.2.28 Se establecerán los mecanismos necesarios para el seguimiento y control de la comercialización de especies amenazadas de CITES	MMA, CAR, AN, FP	1	3	NA	NA	NA
1.2.30 Se fomentarán alternativas de ingreso para persona que derivan sus sustento de la explotación de especies amenazadas	CAR, UMATSAS	NA	3	NA	1,3	3
1.2.31 Se adelantarán labores de concientización en la comunidad	NEs	1	3	5-7	1-3	1,2,3,4,5
1.2.32 Se diseñará una estrategia para abordar el control del trafico ilegal de fauna y flora	MMA, CARs	NA	3	NA	NA	2,3,4
Contaminación						
1.2.33 Se promoverán mecanismos, instrumentos y normas que minimicen el impacto ambiental de las actividades productivas mediante cambios en los procesos productivos	MMA, CAR, UAU	1	1,2,&3	5, 7	1-3	NA
1.2.34 Se elaborará un diagnostico que identifique las áreas criticas de acuerdo con el tipo de contaminante y el nivel de contaminación	MMA	1	1, 3	1-9	1-3	NA
1.2.35 Se definirá la Política de Producción Limpia	MD, MM, MMA	NA	4	NA	NA	NA
1.3 Promover la restauración de ecosistemas degradas y de especies amenazadas						
1.3.3 Se establecerán metodología para propagación y reproducción de especies y material genético	MMA, CARs	NA	1,3	NA	1,3	3
1.3.4 Se establecerán criterios técnicos para identificar áreas prioritarias para restauración	II, CAR	2	NA	NA	1	1,2,3,4,5
1.3.5 Se realizarán inventarios de las áreas y ecosistemas afectados por compactación de suelos, erosión y desertificación	II	2	NA	NA	NA	NA
1.3.6 Se determinarán áreas propensas a deslizamiento, incendios, y erosión	DNAPD, IDEAM, IGAC	2	NA	NA	NA	NA
1.3.7 Se desarrollarán metodologías de restauración de ecosistemas degradadas	II, IDEAM, Univ.	NA	NA	NA	1	3
1.3.8 Se utilizarán instrumentos de incentivos para la reforestación y la conservación	NE	NA	3	NA	1,3	NA
2. CONOCER						
2.1 Caracterizar los Componentes de la Biodiversidad						
2.1.1. Se recopilará la información en materia de investigación de los componentes de la biodiversidad	IH	NA	NA	NA	1	1,2,3,4,5

2.1.2 Se impulsarán la investigación en ecología, recursos genéticos.	MMA, COLCIENCIAS	NA	NA	NA	NA	3
2.1.3 Se fomentará la investigación sobre el conocimiento y practicas de comunidades locales	MMA, COLCIENCIAS	NA	3	NA	1,3	3,2
2.1.6 Se establecerán los instrumentos para garantizar los derechos de propiedad intelectual	MMA	NA	4	NA	NA	NA
2.1.7 Se estudiarán los procesos de la biodiversidad en ecosistemas prioritarios amenazadas	MMA	NA	NA	NA	NA	1,2,3,4,5
2.1.9 Se evaluarán el impacto de las transformación ecosistemitas sobre su productividad	IDEAM	NA	NA	NA	NA	3
2.1.11 Se identificará la biodiversidad en los sistemas de producción agrícola con objeto de evaluar su sostenibilidad	NE	1	NA	5,7	1,3	NA
2.1.12 Se determinará la posibilidad de diversificar y mejorar estos sistemas haciendo uso de los servios ambientales de la biodiversidad	Ministerio de Agricultura	1	NA	NA	1,3	NA
2.1.13 Se consolidará el Inventario Nacional de la Biodiversidad	CAR, Univ, II	NA	NA	NA	NA	3
2.1.14 Se realizará evaluaciones ecológicas rápidas en áreas criticas	IH	1	3	NA	1	3
2.1.19 Se estudiará la demografía y requerimiento de habitas de las especies amenazadas	IH	NA	NA	NA	NA	3
2.2 Recupera y divulgar el conocimiento y practicas tradicionales						2,3,4
2.2.1 Se identificarán posibles usos artesanales e industriales de la biodiversidad mediante un plan de recuperación de etnoconocimiento	MMA, MI, ICA, MA, MS	1	NA	NA	1,3	NA
2.2.2 Se divulgarán los resultados de la investigación que tengan un potencial de desarrollo dentro de los sistemas productivos del país	MMA, MI, ICA, MA, MS	NA	1, 3	7	1,3	NA
3. UTILIZAR						
3.1 Promover Sistemas de Manejo Sostenible de Recursos Naturales Renovables						
3.1.1 Se desarrollará sistemas de manejo sostenible de los componentes de la biodiversidad	MMA, CARs	1	3	NA	1.3	2,3
3.1.3 Se promoverán sistemas de aprovechamiento sostenible de la biodiversidad	MMA, UMATAS	1	3	5,7	1,3	NA
3.1.4 Se establecerán programas de zoocría, piscicultura, frutas, agroforestales, y medicina tradicional	NE	1	1,3	5,7	3	NA
3.1.5 Se titularán a comunidades negras e indígenas y la formación de reservas campesinas	NE	NA	NA	NA	2	NA

3.2 Fortalecer y promover el establecimiento de bancos genéticos y programas de biotecnología						
3.3 Diseñar e implementar sistemas de valoración multi-criterio de los componentes de la biodiversidad y la distribución equitativa de sus beneficios	MMA					
3.4 Desarrollar Sosteniblemente el Potencial Económico de la Biodiversidad						
3.4.2 Se analizará las posibilidades de incorporar valor agregado a los recursos de la biodiversidad	NE	NA	3	7	1,3	NA
3.4.3 Se procurará que la legislación sobre recursos de la biodiversidad favorezca inversiones a largo plazo	NEs	NA	4	NA	NA	NA
3.4.4 Se adelantarán proyectos que permitan la identificación de especies promisorias	IH, S	NA	3	NA	1,3	NA
3.4.5 Se promoverán estudios de mercadeo sobre los productos y usos de recursos silvestres promisorios	IH, IS	1	3	NA	3	NA
3.4.6 Se promoverán la utilización industrial de productos farmacéuticos y agrícolas de potencial económico	MD, MCE, MAA	1	3	7	3	NA

Appendix C. Summary Analyses Colombian National Forestry Plan

Forest Conservation Actions	Responsible Institution	USAID/Colombia Programs				
		ADAM	MIDAS	IDP	BZ	NP
1. Ordenación y zonificación forestal						
1.2. Régimen de Propiedad de los Bosques	IGAC, ICORA MMA	NA	3	NA	NA	NA
1.3. Zonificación y Ordenación Nacional, Regional y Municipal de los Ecosistemas Forestales.	MMA. CAR GM	2	3	NA	NA	3
1.4. Redelimitación de Reservas Forestales Nacionales y Regionales.	MMA. CAR	NA	NA	NA	NA	2,3,4
2. Conservación en situ de ecosistemas y biodivesidad						
2.1. Declaración e incorporación de reserva Forestales y Unidades de Conservación al Sistema Nacional de Áreas Protegidas.	UAESPNN, MMA, CAR, Comunidades y ONG.	NA	NA	NA	NA	1,2,3,4,5
2.2. Formulación e Implementación de Planes Ordenamiento y Manejo de Reservas Forestales y Unidades de Conservación.	MMA, UAESPNN, CAR	1	3	NA	1	2,3,4
2.3. Identificación, conformación y manejo de corredores biológicos que comprometen a ecosistemas forestales.	UAESPNN. MMA, CAR., ETI y ONG.	1	3	NA	1,3	2,3,4
2.4. Definición e implementación de criterios para la administración y manejo de reservas forestales y unidades de conservación	MMA, CAR, ETI, ONG	NA	NA	NA	1	2,3,4
3. Conservación ex situ de la biodiversidad						
3.1.Identificación y priorización de especies forestales con alta presión por el aprovechamiento selectivo.	MMA. IAvH, SINCHI, IIAP, CAR	1	3	NA	NA	NA
3.4.Establecimiento y manejo de rodales semilleros de especies amenazadas	Institutos de Investigación. CONIF, CAR Federacafe	1	NA	NA	NA	NA
4. Restauración y rehabilitación de ecosistemas forestales						
4.1.Sistema de Monitoreo para la restauración	MMA, CAR.	NA	NA	NA	NA	2,3,4

4.3.Establecimiento de bosques protectores.	CAR y Comunidades	NA	NA	NA	1	NA
4.4.Establecimiento de bosques protectores – productores y sistemas agroforestales	MMA, CAR, los Municipios, Cormagdalena y el F.N.R.	1	3	5,7	1,3	NA
4.5.Restauración de ecosistemas degradados	MMA y CAR.	NA	3	NA	1	2,3,4
5. Protección en incendios foretales						
5. 1.Formulación de planes de contingencia contra incendios forestales al nivel regional y local.	CAR, MMA, DGPAD., UAESPNN CB	NA	3	NA	NA	1,2,3,4,5
5. 2.Consolidación de una Red Nacional de Centros de Prevención, detección y control de incendios forestales.	CAR, MMA, DGPAD CB	NA	NA	NA	NA	1,2,3,4
5.3.Desarrollo e implementación de mecanismos y sistemas de detección y monitoreo de incendios forestales.	CAR, MMA. DGPAD, IDEAM y GM	NA	NA	NA	NA	1,2,3,4
6. Zonificación de áreas de plantaciones						
6.1.Identificación y caracterización de las áreas, especies y productos potenciales para programas de reforestación al nivel de núcleos	IGAC, IDEAM, EG, MA	NA	3	NA	NA	NA
6.2.Adopción de Guías Metodológicas para la caracterización y calificación de predios al nivel de núcleo	Empresas CONIF	NA	3	NA	NA	NA
6.3.Estudio de precios y prefactibilidad de productos en mercados potenciales y productos ecoetiquetados. .	Proexport, Mincomex - CCI42, MM, MA	NA	3	NA	NA	NA
6.4.Evaluación de la oferta tecnológica disponible por especie	CONIF. Sector privado - universidades -	NA	3	NA	NA	NA
6.5.Fortalecimiento del componente forestal en el Sistema de Inteligencia de Mercados. .	CCI, Proexport	NA	3	NA	NA	NA
7. Zonificacion de áreas para plantaciones						NA
7.1.Diseño de portafolios de inversiones para las especies promisorias en los mercados nacionales e internacionales	Minagricultura. Mindesarrollo Coinvertir.	NA	3	NA	NA	NA
7.2.Diseño de Un Sistema de Indicadores de Productividad por productos de la Cadena	SINERGIA – DNP - SENA CONIF	NA	3	NA	NA	NA
7.3.Evaluación del impacto y	Minagricultura,	NA	3	NA	NA	NA

aplicabilidad de los instrumentos de fomento a la reforestación existentes y propuesta de modificación.	Minhacienda y Mindesarrollo					
7.4Diseño e implementación al nivel de proyecto piloto de un esquema de titularización aplicado a plantaciones forestales.	Minagricultura CONIF – Empresa Privada	NA	3	NA	NA	NA
8. Ampliación de la oferta forestal productiva						
8.4.Ejecución del Plan de Siembras por Núcleo	MA. Empresas Privadas	NA	3	NA	NA	NA
9. Manejo y aprovechamiento del bosque natural						
9.1.Monitoreo a la ordenación y manejo sostenible de las áreas forestales productoras a través de Criterios e Indicadores.	CAR, MMA Comunidades Empresas	1	3	NA	NA	NA
9.2.Investigación básica y aplicada para el manejo y aprovechamiento de los bosques naturales.	CONIF, SINCHI, IIAP, IavH, CAR, MMA Universidades	NA	3	NA	NA	NA
9.3. Promoción al Manejo y Aprovechamiento de productos no maderables promisorios.	CAR, MMA, II, Empresas	1	3	7	1,3	NA
9.4. Manejo y aprovechamiento de bajo impacto en bosques naturales para la producción.	CAR, MMA, Empresas	1	3	NA	1,3	NA
9.5. Seguimiento y control al aprovechamiento forestal y movilización de productos forestales.	CAR, MMA. Fiscalía, Procuraduría Fuerzas Armadas.	1	3	NA	1,2	NA
10. Apoyo a la conformacion y modernizacion de empresas y microempresas forestales						
10.1.Inventario del estado actual delas industrias forestales que abastecen al sector de materias primas tanto de lbosque natural como plantado.	FONADE Empresas Privadas IFI Mindesarrollo	NA	3	NA	NA	NA
10.2.Establecimiento de unesquema de apoyo para laampliación y modernizacióntecnológica de las IndustriasForestales Existentes.	IFI Mindesarrollo SENA	NA	3	NA	NA	NA
10.3.Apoyo a proyectos de base tecnológica de empresas forestales industriales a nivel nacional.	IFI, SENA, MA, Mindesarrollo, Empresas Privadas.	NA	3	NA	NA	NA
10.4.Capacitar en el manejo de materia prima, procesos industriales, diseño de productos		1	3	6,7	3	NA

maderables						
5.5. Apoyo y co-financiación a los procesos del Sistema de Aseguramiento de la Calidad para los productos de la Cadena.	Proexport, Mincomex, Mindesarrollo.	NA	3	NA	NA	NA
11. Formación exportadora y promoción de exportaciones						
11.1. Diseño de talleres de "Cómo Exportar ".	Proexport, Empresas Privadas	NA	3	NA	NA	NA
11.2.Promoción de proyectos especiales o planes exportadores a mercados prioritarios por parte de empresas especializadas y Conformación de una Comercializadora internacional	Proexport, Mincomex.	NA	3	NA	NA	NA
11.3.Establecer convenios bilaterales u otros mecanismos para acceder a nichos de mercados específicos.	Mincomex Empresas privadas	NA	3	NA	NA	NA
11.4.Apoyar el desarrollo y búsqueda de mercados para productos Eco-etiquetados	Proexport, MMA Certificadoras Forestales	NA	3	NA	NA	NA
12. Administración de Recursos Naturales						
3.Desarrollo normativo forestal	Ministerios, CAR Entes territoriales	NA	4	NA	NA	NA
4. Capacitación y actualización de funcionarios públicos y privados del sector forestal.	Universidades, SENA ESAP Institutos de Investigación	NA	3	NA	NA	NA
5. Incorporación del PNDF en los Planes de Acción de las entidades oficiales y Planes Indicativos del Sector Privado.	Ministerios DNP, CAR Universidades Institutos de Investigación Empresas privadas	NA	3	NA	NA	NA
13. Administración de los Recursos Forestales						
13.1. Fortalecimiento e implementación del Sistema de Información Forestal.	IDEAM, DANE DNP, CAR, DIAN	NA	3	NA	NA	NA
13.2.Diseño de un Sistema de Seguimiento y Monitoreo Forestal.	Ministerios, DNP, las CAR, DIAN Contraloría Procuraduría	NA	3	NA	NA	NA
13.3. Diseño e implementación de un Sistema de Control a la gestión y uso de los recursos forestales.	Ministerios, DNP, CAR, DIAN, Contraloría Procuraduría	NA	3	NA	NA	NA
14. Fortelicimiento de la Capacidad Institucional para el Desarrollo de Plantaciones						

Forestales						
14.2.Proyecto de Ley que reglamente la actividad reforestadora.	MA	NA	3,4	NA	NA	NA
15. Conciencia y Cultura Forestal						NA
1. Identificación y puesta en marcha de alianzas estratégicas entre comunidades, industriales y Estado en torno al uso y manejo sostenible de los recursos forestales.	Ministerios, DNP, SENA Universidades, Empresas privadas, ONG´S Comunidades Agremiaciones	1	3	NA	1,2,3	NA
2. Promoción y capacitación de formas asociativas entre los diferentes actores que participan en el desarrollo forestal.	Ministerios, DNP, CAR SENA, Entes territoriales Asociaciones, Agremiaciones Comunidades, Usuarios, ONG.	1,2	3	NA	1,2,3	NA
3. Participación de la sociedad civil en procesos de planificación y gestión de los recursos forestales.	Ministerios, DNP, CAR SENA, Entes territoriales Asociaciones, Agremiaciones Comunidades, Usuarios, ONG	1,2	3	NA	1,2,3	NA
4.Adopción e implementación de mecanismos de veeduría ciudadana en acciones relacionadas con los recursos forestales.	Consejos Comunitarios Cabildos indígenas Asociaciones de usuarios Agremiaciones, ONG	1,2	3	NA	1,2,3	NA
5. Divulgación y socialización del Plan Nacional de Desarrollo Forestal.	Ministerios DNP, CAR, Universidades Institutos de Investigación, las ONG, Empresas privadas	NA	3	NA	NA	NA
16 Gestión Internacional en Bosques						
1.Articulación de la participación y gestión en convenios y convenciones internacionales	Ministerios DNP, ONG´S Sector privado Comunidades indígenas y afrocolombianas	NA	3	NA	NA	NA
2.Desarrollo de agendas bilaterales para el manejo de ecosistemas Forestales compartidos.	Ministerios, DNP, CAR, UAESPNN Entes territoriales Empresas privadas,	NA	3, 4	NA	NA	NA

	ONG, Comunidades					
3. Establecimiento de un sistema de control a la comercialización de productos forestales en los mercados fronterizos.	Ministerios, DNP, las CAR, UAESPNN Entes territoriales, las ONG y Empresas privadas	NA	3	NA	NA	NA
4. Promoción de bienes y servicios forestales en los mercados internacionales.	Ministerios, DNP, Proexport , DIAN, Agremiaciones Comunidades	NA	3	NA	NA	NA
5. Promoción de la Cooperación Técnica Internacional Forestal.	Ministerios, DNP, CAR´S Universidades Institutos de Investigación Agremiaciones Comunidades indígenas y afrocolombianas	NA	3	NA	NA	NA
6.Capacitación en negociación internacional con énfasis en ecosistemas forestales.	6.Capacitación en negociación internacional con énfasis en ecosistemas forestales.	NA	3	NA	NA	NA
7. Desarrollo de un sistema de seguimiento y evaluación de la gestión internacional forestal.	Ministerios, las DNP, las Contraloría, Procuraduría, ONG Sector privado	NA	3	NA	NA	NA

Appendix D. Colombian environmental and natural resource laws and regulations

General	
Constitución Política de Colombia	Right to a safe environment and community decision making
Código Nacional de Recursos Naturales Renovables y de Protección al Medio, 1974	Regulates the management of renewable natural resources,
Ley 29 de 1990	Foment scientific research
Ley 99 de 1993	Creates the National Environmental System
Ley 491 de 1999	Creates ecological insurance
Plan Nacional de Desarrollo 2002-2006	Recuperate economic growth
Política Nacional de Producción más Limpia 1997	Promote environmentally sound production
Política para la Gestión Integral de Residuos 1997	Reduce & control disposal of toxic wastes
Lineamientos de una Política para la Participación Ciudadana en la Gestión Ambiental, 1998	Public participation in protecting the environment
Política Nacional de Educación Ambiental , 2002	Establishes environmental education
Declaración de Estocolmo de la Conferencia de las Naciones Unidas sobre el Medio Ambiente, 1972	Recognizes the importante of conserving the environment
Convenio de Basilea sobre el Control de los Movimientos Transfronterizos de los Desechos Peligrosos y su Eliminación. Naciones Unidas, 1989, 1996	Control the international movement of toxic wastes
Declaración de Río sobre el Medio Ambiente y el Desarrollo. Naciones Unidas, 1992	Promotes sustainable development
Atmosphere	
Lineamientos de Política de Cambio Climático Ministerio de Medio Ambiente y Departamento Nacional de Planeación 2002	Identifies strategies for responding to climate change
Conpes 3242 de 2003	Mechanisms for sale of environmental services
Convenio de Viena para la Protección de la Capa de Ozono, 1985, 1990	Cooperation on the study of the effect of ozone
Convención Marco de las Naciones Unidas sobre Cambio Climático, CMNUCC, 1992, 1995	Reduce greenhouse gases
Protocolo de Montreal relativo a las Sustancias que Agotan la Capa de Ozono, 1997	Reduce emissions of gases that affect the ozone layer
Protocolo de Kyoto de la Convención Marco de las Naciones Unidas sobre el Cambio Climático, 1997	Improve cooperation regarding climate change
Ley 697 de 2001	Promotes renewable energy sources
Conpes 3190 de 2002	Promotes use of natural gas
Water	
Ley 46 de 1988	Establishes system of prevention and response to disasters
Ley 142 de 1994	Regulates provision of public services such as water
Ley 373 de 1997	Regulates water use and watershed management
Lineamientos de Política para el Manejo Integral del Agua Ministerio del Medio Ambiente, 1998	Establshes policy for watershed management & water use
Conpes 3177 de 2002	Plan for treating wastewater

Conpes 3246 de 2003	Regulates sewage systems
Conpes 3253 de 2003	Promotes & regulates private water companies
Ecosystems	
Ley 388 de 1997	Establishes mechanisms for municipal land use planning & regulation
Lineamientos para la Política Nacional de rdenamiento Ambiental del Territorio Ministerio del Medio Ambiente, 1998	Establishes policy for land use planning & regulation including watershed management
Convención de las Naciones Unidas de Lucha contra la Desertificación en los Países Afectados por Sequía Grave o Desertificación, 1994 Aprobada por la Ley 461 de 1998	Recognizes need to cooperate to fight desertification
Ley 139 de 1994	Creates Certificado de Incentivo Forestal (CIF)
Política de Bosques 1996	Promote sustainable use of forests
Política Nacional para Humedales Interiores de Colombia 2001	Promote conservation of wetlands
Plan Estratégico para la Restauración y el Establecimiento de Bosques en Colombia. Plan Verde. 1998	Promotes protection and production tree plantations and agroforestry plantings
Plan Nacional de Desarrollo Forestal, PNDF 2002	25 year strategy to promote forest management & reforestation with focus on value chains
Conpes 3237 de 2003	Provides incentives for reforestation
Convención Relativa a los Humedales de Importancia Internacional Especialme como Hábitat de Aves (Ramsar), 1971 1997	Conserve globally significant wetlands
Declaración Autorizada, sin Fuerza Jurídica Obligatoria, e Principios para un Consenso Mundial respecto de la Ordenación, la Conservación y el Desarrollo Sostenible de los Bosques de todo Tipo, 1992	Promote forest conservation & management
Convenio Internacional de Maderas Tropicales (CIMT), 1994 1998.	Promote trade in wood from managed forests
Ley 611 de 2000	Establishes regulations for wild faunal species
Política Nacional de Biodiversidad 1995	Establishes national policy for biodiversity conservation such as community participation
Política para la Gestión Ambiental para la Fauna Silvestre 1997	Regulates use of wild animals
Conpes 3164 de 2002	Promotes coastal resource management & protection
Convenio Internacional para la Protección de las Obtenciones Vegetales, 1995	Regulates development of new vegetable varieties
Convenio Internacional de Constitución de un Fondo Internacional de Indemnización de Daños Causados por la Contaminación por Hidrocarburos y su Protocolo odificatorio de 1971 1996.	Establishes responsibilities & idenminizations for spills of contaminants
Convenio Internacional para Prevenir la Contaminación por los Buques, 1973 1981	Prevention of marine contamination from boasts
Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora Silvestres, Cites, 1973, 1991	Protects endangered species through control over their internacional commerce
Convenio para la Protección delMedio Marino y la Zona Costera del	Prevent contamination on southern

Pacífico Sudeste, 1981, 1985	Pacific coast
Convenio 169 sobre Pueblos Indígenas y Tribales en Países Independientes, 1989, 1991	Protect environment & rights of indigenous and traditional peoples
Convenio sobre la Diversidad Biológica, 1992, 1994	Establishes rights over biodiversity
Protocolo de Cooperación para Combatir los Derrames de Hidrocarburos en la Región del Gran Caribe, 1983 1987	Protects marine environments in Caribbean from oil spills
Tratado de Cooperación Amazónica, 1978, 1979	Promote use and conservation of Amazon Basin natural resources
Acuerdo de Cooperación Amazónica Colombo-Ecuatoriano, 1979	Promote frontier development
Acuerdo de Cooperación Amazónica Colombo– Brasileño, 1981	Common actions & research cooperation
Plan Colombo-Peruano para el Desarrollo de la Cuenca Amazónica, para el Desarrollo Integral de la Cuenca del río Putumayo, 1988	Plan, conserve & use natural resources of Putumayo basin
Agenda 21. Amazonia Colombiana,1998-2004	Policies for development in Amazon region
Agenda 21. Chocó Biogeográfico	Promote appropriate development in the Chocó

Appendix E. Principal donor financed environmental projects in Colombia

Current Colombia Global Environmental Facility projects

Project Name	US$000
Conservation of Biodiversity in the Choco Biogeographic Region	6.000
National Biodiversity Strategy, Action Plan and the First National Report to the CBD	0.253
Sustainable Use of Biodiversity in the Western Slope of the Serrania del Baudo	0.750
Conservation of Biodiversity in the Sierra Nevada de Santa Marta	9.375
Caribbean Archipelago Biosphere Reserve: Regional Marine Protected Area System	1.000
Conservation and Sustainable Use of Biodiversity in the Andes Region	15.350
Conservation of Montane Forest and Paramo in the Colombian Massif, Phase I	4.025
Conservation and Sustainable Development of the Mataven Forest	0.750
Capacity Building for the Implementation of the Cartagena Protocol	1.000
Naya Biological Corridor in the Munchique-Pinche Sector	0.750
Assessment of Capacity Building Needs and Country Specific Priorities in the Conservation of Biodiversity, and Participation in the National Clearing House Mechanism -	0.147
Colombian National Protected Areas Conservation Trust Fund	15.350
Enabling Republic of Colombia to Prepare its Initial National Communication in Response to its Commitments to UNFCCC	0.345
Climate Change Enabling Activity (Additional Financing for Capacity Building in Priority Areas)	0.100
Integrated National Adaptation Plan: High Mountain Ecosystems, Colombia's Caribbean Insular Areas and Human Health (INAP)	5.570
National Capacity Needs self-Assessment for Global Environmental Management	0.145
Initial Assistance to Colombia to Meet its Obligations Under the Stockholm Convention on Persistent Organic Pollutants (POPs)	0.500
TOTAL	61.41

Source: http://www.gefonline.org/projectList.cfm

Inter-American Development Bank environmental projects, 1976 - 2004

NAME	APPROVAL DATE
CDM Project Portfolio for Methane Recovery in Landfills	2004
Environmentally Sound Development of a Community Owned Mineral Deposit	2004
National Environmental System Support Program	2004
Environmental Mgm. Clean Technologies	2000
Solid Waste Manag. Disposal Coffee Belt	2000
Development Master Plan Tota Lake Region	1999
Demolition Debris Management & Disposal	1999
Evaluation Natio. Environmental Program	1998
Watershed Management Plan Chinchina Riv.	1998
Environmental Policy Curitiba-Manizales	1997
Seminar Efficient Use of Water	1997
Water Studies in Chile	1997

Environmental Policy Curitiba-Manizales	1997
Environmental Policy Curitiba-Pereira	1996
Industrial Pollution Control	1996
Emergency: Risaralda Department	1995
PPF:CO0059 Pacific Coast Sust. Development	1994
Emergency Program for Paez River	1994
Pacific Coast Sustainable Dev. Program	1994
Pacific Coast Sustainable Development Program	1994
Sustainable Development Program	1994
Complete Credit Request Plan Pacifico	1993
Environmental Program	1993
Pine Plantation & Resin Extraction Proj.	1993
Policy Environmental Pollution Control	1992
Pine Plantation and Resin Plant Project	1992
Recover of Cienaga of "santa Marta"	1992
Atmosphere Pollution Agents	1991
Sanitation Upper Basin Bogota River Program	1990
Environmental Study of Colombia	1989
Project, Water Systems of Cartagena	1982
Br's Coop., Environmental Contamination	1981
Br's Coop, Environmental Contamination	1980
Advisory Services to Sabana Corporation	1979
Combined Drain-Erosion Control	1976

Inter American Development Bank environmental projects in Colombia

NAME	APPROVAL DATE
CDM Project Portfolio for Methane Recovery in Landfills	DEC 17, 2004
Environmentally Sound Development of a Community Owned Mineral Deposit	NOV 8, 2004
National Environmental System Support Program	JUN 16, 2004
Environmental Mgm. Clean Technologies	DEC 13, 2000
Solid Waste Manag. Disposal Coffee Belt	AUG 2, 2000
Development Master Plan Tota Lake Region	AUG 3, 1999
Demolition Debris Management & Disposal	APR 9, 1999
Evaluation Natio. Environmental Program	APR 3, 1998
Watershed Management Plan Chinchina Riv.	MAR 13, 1998
Environmental Policy Curitiba-Manizales	SEP 17, 1997
Seminar Efficient Use of Water	AUG 1, 1997
Water Studies in Chile	JUN 16, 1997
Environmental Policy Curitiba-Manizales	FEB 14, 1997
Environmental Policy Curitiba-Pereira	AUG 15, 1996
Industrial Pollution Control	JUL 18, 1996
Emergency: Risaralda Department	AUG 28, 1995
PPF:CO0059 Pacific Coast Sust. Development	OCT 25, 1994

Emergency Program for Paez River	SEP 8, 1994
Pacific Coast Sustainable Dev. Program	JUL 14, 1994
Pacific Coast Sustainable Development Program	JUL 6, 1994
Sustainable Development Program	JUL 6, 1994
Complete Credit Request Plan Pacifico	DEC 29, 1993
Environmental Program	SEP 29, 1993
Pine Plantation & Resin Extraction Proj.	FEB 24, 1993
Policy Environmental Pollution Control	DEC 30, 1992
Pine Plantation and Resin Plant Project	AUG 25, 1992
Recover of Cienaga of "Santa Marta"	AUG 14, 1992
Atmosphere Pollution Agents	APR 15, 1991
Sanitation Upper Basin Bogota River Program	DEC 19, 1990
Environmental Study of Colombia	FEB 22, 1989
Project, Water Systems of Cartagena	MAR 23, 1982
Br's Coop., Environmental Contamination	FEB 5, 1981
Br's Coop, Environmental Contamination	JUN 27, 1980
Advisory Services to Sabana Corporation	DEC 20, 1979
Combined Drain-Erosion Control	DEC 2, 1976

Appendix F. Threatened species in Colombia

Lista de especies de peces marinos amenazados y casi amenazados de Colombia (Mejía y Acero 2002). CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable; NT: Casi amenazado. Regiones de Colombia Car: Caribe Colombiano; Pac: Pacífico Colombiano.

Especie	Categoría	car	pac
Epinephelus itajara	CR	X	X
Pristis pectinata	CR	X	X
Pristis perotteti	CR	X	X
Ariidae Ariopsis	EN	X	
Balistes vetula	EN	X	
Epinephelus striatus	EN	X	
Lachnolaimus maximus	EN	X	
Mugil liza	EN	X	
Tarpon atlanticus	EN	X	
Lutjanus analis	NT	X	
Anisotremus moricandi	VU	X	
Arius proops	VU	X	
Batrachoides manglae	VU	X	
Centropomus undecimalis	VU	X	
Cetengraulis mysticetus	VU		X
Emblemariopsis tayrona	VU	X	
Eugerres plumieri	VU	X	
Gambusia aestiputeus	VU	X	
Ginglymostoma cirratum	VU	X	X
Hippocampus erectus	VU	X	
Hippocampus ingens	VU		X
Hippocampus reidi	VU	X	
Hypoplectrus providencianus	VU	X	
Lutjanus cyanopterus	VU	X	
Mycteroperca cidi	VU	X	
Priolepis robinsi	VU	X	
Saccogaster melanomycter	VU	X	
Scarus guacamaia	VU	X	

Source: Mejía y Acero, 2002

CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable; NT: Casi amenazado. Regiones de Colombia. Amz: Amazonas; And: Andes; Car: Caribe; Ori: Orinoquia; Pac: Pacífico.

Threatened freshwater fish species in Colombia

Especie	Categoría	amz	and	car	ori	pac
Prochilodus magdalenae	CR		X	X		X
Ageneiosus caucanus	EN		X	X		X
Brachyplatystoma filamentosum	EN	X			X	
Brachyplatystoma flavicans	EN	X			X	
Brachyplatystoma vaillantii	EN	X			X	

Goslinea platynema	EN	X			X	
Ichthyoelephas longirostris	EN		X	X		
Osteoglossum ferreirai	EN				X	
Paulicea luetkeni	EN	X			X	
Pseudoplatystoma fasciatum	EN	X	X	X	X	
Pseudoplatystoma tigrinum	EN	X			X	
Sorubim cuspicaudus	EN		X	X		
Carlastyanax aurocaudatus	NT		X			
Colossoma macropomum	NT	X			X	
Eremophilus mutisii	NT		X			
Grundulus bogotensis	NT		X			
Hyphessobrycon poecilioides	NT		X			
Imparfinis macrocephala	NT		X			
Microgenys minutus	NT		X			
Parodon caliensis	NT		X			
Saccodon caucae	NT		X			
Trichomycterus caliense	NT		X			
Abramites eques	VU		X	X		
Ageneiosus freiei	VU		X			
Arapaima gigas	VU	X				
Brachyplatystoma juruense	VU	X			X	
Callichthys fabricioi	VU		X			
Cetopsorhamdia picklei	VU		X			
Cochliodon hondae	VU		X	X		X
Curimata mivartii	VU		X	X		
Doraops zuloagai	VU		X			
Duopalatinus malarmo	VU		X			
Genycharax tarpon	VU		X			
Mylossoma acanthogaster	VU		X			
Osteoglossum bicirrhosum	VU	X				
Pimelodus coprophagus	VU		X			
Potamotrygon yepezi	VU		X			
Prochilodus reticulatus	VU		X			
Rhinodoras thomersoni	VU		X			
Salminus affinis	VU		X	X		
Sorubim lima	VU	X			X	
Sorubimichthys planiceps	VU	X			X	

Source: Mojica et al. 2002

Lista de especies de anfibios amenazados de Colombia. CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable. Regiones de Colombia Amz: Amazonas; And: Andes; Car: Caribe; Pac: Pacífico.

Threatened amphibians in Colombia

Especie	Categoría	amz	and	car	pac
Atelopus ebenoides	CR		X		
Atelopus farci	CR		X		

Atelopus ignescens	CR		X		
Atelopus lozanoi	CR		X		
Atelopus muisca	CR		X		
Atopophrynus syntomopus	CR		X		
Bolitoglossa capitana	CR		X		
Colostethus ranoides	CR	X			
Colostethus ruizi	CR		X		
Cryptobatrachus nicefori	CR		X		
Dendrobates lehmanni	CR		X		X
Eleutherodactylus phragmipleuron	CR		X		
Hyla phantasmagoria	CR			X	
Phyllobates terribilis	CR				X
Atelopus eusebianus	EN		X		
Atelopus minutulus	EN		X		
Atelopus pedimarmoratus	EN		X		
Atelopus sernai	EN		X		
Atelopus subornatus	EN		X		
Bolitoglossa pandi	EN		X		
Colostethus edwardsi	EN		X		
Dendrobates viridis	EN				X
Eleutherodactylus acutirostris	EN		X		
Eleutherodactylus bernali	EN		X		
Eleutherodactylus jorgevelosai	EN		X		
Eleutherodactylus lichenoides	EN		X		
Eleutherodactylus maculosus	EN		X		
Eleutherodactylus mnionaetes	EN		X		
Eleutherodactylus repens	EN		X		
Eleutherodactylus ruizi	EN		X		
Eleutherodactylus scoloblepharus	EN		X		
Eleutherodactylus spilogaster	EN		X		
Eleutherodactylus torrenticola	EN		X		
Eleutherodactylus tribulosus	EN		X		
Eleutherodactylus veletis	EN		X		
Gastrotheca espeletia	EN		X		
Gastrotheca ruizi	EN		X		
Phrynopus adenobrachius	EN		X		
Ramphophryne rostrata	EN		X		
Ramphophryne truebae	EN		X		
Bolitoglossa lozanoi	VU		X		
Dendrobates bombetes	VU		X		
Dendrobates occultator	VU				X
Eleutherodactylus actinolaimus	VU		X		
Eleutherodactylus carrangerorum	VU		X		
Especie	Categoría	amz	and	car	pac
Eleutherodactylus fallax	VU		X		
Eleutherodactylus fetosus	VU		X		
Eleutherodactylus ingeri	VU		X		
Eleutherodactylus necopinus	VU		X		

Eleutherodactylus renjiforum	VU		X		
Eleutherodactylus suetus	VU		X		
Epipedobates ingeri	VU	X			
Hemiphractus johnsoni	VU		X		
Osorphryne percrassa	VU		X		
Rhamphophryne macrorhina	VU		X		

Source: Rueda-Almonacid et al. , 2004

Lista de reptiles amenazados y casi amenazados de Colombia CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable. Regiones de Colombia. Amz: Amazonas; And: Andes; Car: Caribe; Car insular: Territorio insular caribeño; Ori: Orinoquia; Pac: Pacífico; Pac insular: Territorio insular del Pacífico; Pantrop: Pantropical, abarca todo el trópico.

Threatened reptiles in Colombia

Especie	Categoría	amz	and	car	car insular	ori	pac	pac insular	pantrop
Caretta caretta	CR								X
Crocodylus acutus	CR		X	X					
Crocodylus intermedius	CR	X				X			
Dermochelys coriacea	CR								X
Eretmochelys imbricata	CR								X
Geochelone carbonaria	CR			X	X	X	X		
Podocnemis expansa	CR					X			
Podocnemis unifilis	CR					X			
Aristelliger georgeensis	EN				X				
Batrachemys dahli	EN			X					
Chelonia agassizii	EN						X	X	
Chelonia mydas	EN								X
Geochelone denticulata	EN	X				X			
Lepidochelys olivacea	EN								X
Melanosuchus niger	EN	X							
Podocnemis expansa	EN	X							
Podocnemis lewyana	EN			X					
Podocnemis unifilis	EN	X							
Chelus fimbriatus	NT	X				X			
Peltocephalus dumerilianus	NT	X				X			
Podocnemis vogli	NT					X			
Rhinoclemmys melanosterna	NT			X			X		
Trachemys scripta	NT						X		
Geochelone denticulata	VU	X							
Kinosternon dunni	VU						X		
Kinosternon scorpioides	VU				X				
Podocnemis erythrocephala	VU	X							
Rhinemys rufipes	VU	X							
Rhinoclemmys diademata	VU		X						
Trachemys scripta	VU						X		

Source: Castaño-Mora, 2002

Lista de especies de aves amenazadas y casi amenazadas de Colombia (). CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable; NT: Casi amenazado. Regiones de Colombia. Amz: Amazonas; And: Andes; Car: Caribe; Car insular: Territorio insular caribeño; Ori: Orinoquia; Pac: Pacífico; Pac insular: Territorio insular del Pacífico.

Threatened birds in Colombia

Especie	Categoria	amz	and	car	car insular	ori	pac	pac insular
Amazilia castaneiventris	CR		X					
Ammodramus savannarum	CR		X					
Crax alberti	CR		X	X				
Crax globulosa	CR	X						
Crypturellus saltuarius	CR		X	X				
Cypseloides lemosi	CR		X					
Eriocnemis mirabilis	CR		X					
Gallinula melanops	CR		X					
Hapalopsittaca fuertesi	CR		X					
Lepidopyga lilliae	CR			X				
Lipaugus weberi	CR		X					
Macroagelaius subalaris	CR		X					
Netta erythrophthalma	CR	X	X	X				
Odontophorus strophium	CR		X					
Ognorhynchus icterotis	CR		X					
Pterodroma phaeopygia	CR							X
Sporophila insulata	CR						X	
Thryothorus nicefori	CR		X					
Touit stictoptera	CR	X	X					
Vireo caribaeus	CR				X			
Anas cyanoptera	EN		X					
Anas georgica	EN		X					
Atlapetes flaviceps	EN		X					
Bangsia aureocincta	EN		X					
Basileuterus conspicillatus	EN			X				
Campylopterus phainopeplus	EN			X				
Capito hypoleucus	EN		X					
Carduelis cucullata	EN		X	X				
Cistothorus apolinari	EN		X					
Clytoctantes alixii	EN		X	X				
Crypturellus columbianus	EN			X				
Diglossa gloriosissima	EN		X					
Doliornis remseni	EN		X					
Eremophila alpestris	EN		X					
Goethalsia bella	EN						X	
Grallaria alleni	EN		X					
Grallaria gigantea	EN		X					
Grallaria kaestneri	EN		X					
Grallaria milleri	EN		X					
Harpyhaliaetus solitarius	EN		X	X				
Hypopyrrhus pyrohypogaster	EN	X	X				X	
Leptotila conoveri	EN		X					

Margarornis bellulus	EN						X	
Especie	Categoria	amz	and	car	car insular	ori	pac	pac insular
Metallura iracunda	EN			X				
Muscisaxicola maculirostris	EN		X					
Myotheretes pernix	EN			X				
Odontophorus dialeucos	EN						X	
Oroaetus isidori	EN	X		X			X	
Oxyura jamaicensis	EN		X					
Penelope perspicax	EN		X				X	
Phylloscartes lanyoni	EN		X	X				
Podiceps occipitalis	EN		X					
Psarocolius cassini	EN						X	
Pyrrhura viridicata	EN			X				
Rallus semiplumbeus	EN		X					
Sarkidiornis melanotos	EN		X					
Schizoeca perijana	EN		X					
Scytalopus panamensis	EN						X	
Tangara fucosa	EN						X	
Tinamus osgoodi	EN		X					
Vultur gryphus	EN		X	X				
Aburria aburri	NT	X	X	X				
Accipiter collaris	NT	X	X	X			X	
Ampelion rufaxilla	NT		X					
Andigena nigrirostris	NT		X					
Aphanotriccus audax	NT			X			X	
Basileuterus cinereicollis	NT		X					
Bucco noanamae	NT						X	
Cacicus uropygialis	NT		X				X	
Campephilus gayaquilensis	NT						X	
Campylorhamphus pucheranii	NT		X					
Capito quinticolor	NT						X	
Capito squamatus	NT						X	
Chloropipo flavicapilla	NT		X					
Cyanolica pulchra	NT						X	
Cypseloides cherriei	NT		X					
Dacnis viguieri	NT			X			X	
Eriocnemis cupreoventris	NT		X					
Eriocnemis derbyi	NT		X					
Geotrygon goldmani	NT						X	
Grallaricula cucullata	NT		X					
Habia gutturalis	NT			X				
Haplophaedia lugens	NT						X	
Harpia harpyja	NT	X		X			X	
Heliodoxa gularis	NT	X						
Iridosornis porphyrocephala	NT		X				X	
Leucopternis plumbea	NT						X	
Margarornis stellatus	NT		X					
Micrastur plumbeus	NT						X	

Morphnus guianensis	NT	X		X			X	
Neochen jubata	NT	X	X			X		
Nyctiphrynus rosenbergi	NT						X	
Odontophorus hyperthyrus	NT		X					
Especie	Categoria	amz	and	car	car insular	ori	pac	pac insular
Odontophorus hyperthyrus	NT						X	
Otus colombianus	NT		X					
Phlogophilus hemileucurus	NT		X					
Pittasoma rufopileatum	NT						X	
Polystictus pectoralis	NT		X			X	X	
Semnornis ramphastinus	NT		X				X	
Siptornis striaticollis	NT		X					
Synallaxis cherriei	NT	X						
Tangara johannae	NT						X	
Veniliornis chocoensis	NT						X	
Acestrura bombus	VU		X					
Andigena hypoglauca	VU		X					
Andigena laminirostris	VU						X	
Anthocephala floriceps	VU		X	X				
Ara ambigua	VU						X	
Ara militaris	VU	X	X	X			X	
Aramides wolfi	VU						X	
Atlapetes fuscoolivaceus	VU		X					
Attila torridus	VU						X	
Bangsia melanochlamys	VU		X					
Basileuterus basilicus	VU			X				
Basileuterus ignotus	VU						X	
Bolborhynchus ferrugineifrons	VU		X					
Buthraupis wetmorei	VU		X					
Cephalopterus penduliger	VU						X	
Chauna chavaria	VU			X			X	
Chlorochrysa nitidissima	VU		X					
Chlorospingus flavovirens	VU		X					
Coeligena prunellei	VU		X					
Crax daubentoni	VU		X					
Crypturellus kerriae	VU							X
Dacnis berlepschi	VU						X	
Dacnis hartlaubi	VU		X					
Dysithamnus occidentalis	VU		X				X	
Galbula pastazae	VU	X						
Glaucidium nubicola	VU		X					
Grallaria bangsi	VU			X				
Grallaria rufocinerea	VU		X					
Grallaricula lineifrons	VU		X					
Hapalopsittaca amazonina	VU		X					
Leptosittaca branickii	VU		X					
Melanerpes chrysauchen	VU		X	X				
Molothrus armenti	VU			X				

Neomorphus radiolosus	VU		X				X	
Odontophorus atrifrons	VU		X	X				
Odontophorus melanonotus	VU		X					
Oreothraupis arremonops	VU		X				X	
Ortalis erythropera	VU						X	
Pauxi pauxi	VU		X	X		X		
Penelope ortoni	VU		X				X	
Especie	Categoria	amz	and	car	car insular	ori	pac	pac insular
Phoenicopterus ruber	VU			X				
Pionopsitta pyrilia	VU		X	X			X	
Pipreola chlorolepidota	VU	X						
Pseudocolopteryx acutipennis	VU		X					
Pyrrhura calliptera	VU		X					
Saltator cinctus	VU		X					
Sula granti	VU							X
Synallaxis fuscorufa	VU			X				
Vireo masteri	VU		X				X	
Xenornis setifrons	VU						X	

Source: Renjifo et al., 2002

Lista preliminar de especies de mamíferos amenazados de Colombia (Rodríguez 1998). CR: En Peligro Crítico; EN: En peligro; VU: Vulnerable; NT: Casi amenazado. Regiones de Colombia. Amz: Amazonas; And: Andes; Car: Caribe; Ori: Orinoquia; Pac: Pacífico.

Especie	categoría	Amz	And	Car	Ori	Pac
Priodontes maximus	CR	2			1	
Pteronura brasiliensis	CR	2			1	
Sphiggurus vestitus	CR		1			
Tapirus bairdii	CR					1
Tapirus pinchaque	CR		1			
Trichechus manatus	CR			1	1	1
Pudu mephistophiles	EN		1			
Saguinus oedipus	EN			1		1
Tremarctos ornatus	EN		1			1
Trichechus inunguis	EN	1				
Alouatta palliata	VU			1		1
Alouatta seniculus	VU	1	1	1		1
Aotus brumbacki	VU				1	
Aotus hershkovitzi	VU				1	
Aotus lemurinus	VU		1	2		1
Ateles belzebuth	VU	2			1	
Ateles geoffroyi	VU			1		1
Atelocynus microtis	VU	2				
Cacajao melanocephalus	VU	1			1	
Callicebus cupreus	VU	1				
Callimico goeldii	VU	1				
Dinomys branickii	VU		1			
Diplomys rufodorsalis	VU			1		

Felis concolor	VU	2	1	2	1	1
Felis pardalis	VU	2	1	2	1	1
Felis wiedii	VU	2	1	1	1	1
Gracilinanus perijae	VU		1	1		
Inia geoffrensis	VU	2			1	
Lagothrix lagothricha	VU	1		1		1
Leopardus tigrina	VU		1			
Lutra longicaudis	VU	2			1	
Mazama rufina	VU		1			
Myrmecophaga tridactyla	VU	2		1	1	1
Odocoileus virginianus	VU	1	1	1	1	1
Oryzomys gorgasi	VU			1		1
Panthera onca	VU	2	1	2	1	1
Pithecia monachus	VU	1				
Saguinus leucopus	VU		1	1		1
Sotalia fluvitilis	VU	2		1	1	
Speothos venaticus	VU	2		1	1	
Tapirus terrestris	VU	2		2	1	1
Tayassu pecari	VU	2		1	1	1

Source: Rodríguez, 1998

Lista de palmas amenazadas de Colombia (Galeano Y Bernal 2003). Regiones de Colombia, Amz: Amazonas, And: Andes, Car: Caribe, Car insular: Territorio insular caribeño, Ori: Orinoquia, Pac: Pacífico.

Threatened palm species in Colombia

Taxón	IUCN	Amz	And	Car	Car insular	Ori	Pac
Aiphanes graminifolia	CR		X				
Aiphanes leiostachys	CR		X				
Ceroxylon sasaimae	CR		X				
Reinhardtia gracilis	CR						X
Reinhardtia koschnyana	CR		X				X
Reinhardtia simplex	CR		X				
Aiphanes acaulis	EN						X
Aiphanes duquei	EN		X				
Aiphanes parvifolia	EN		X				
Astrocaryum malybo	EN		X	X			X
Astrocaryum triandrum	EN		X				
Attalea amygdalina	EN		X				
Attalea cohune	EN		X				
Attalea colenda	EN		X				
Ceroxylon alpinum ssp. alpinum	EN		X				
Ceroxylon quindiuense	EN		X			X	
Ceroxylon ventricosum	EN	X	X				
Coccothrinax argentata	EN				X		
Chamaedorea ricardoi	EN		X				
Elaeis oleifera	EN		X	X			X
Hyospathe wendlandiana	EN		X				
Phytelephas tumacana	EN		X				

Prestoea simplicifolia	EN		X				
Acoelorraphe wrightii	VU				X		
Aiphanes gelatinosa	VU		X				
Aiphanes pilaris	VU	X					
Attalea nucifera	VU		X	X			
Bactris gasipaes var. chichagui	VU		X	X		X	X
Bactris rostrata	VU						X
Cryosophila kalbreyeri	VU		X	X			X
Chamaedorea pygmaea	VU		X				
Chamaedorea sullivaniorum	VU		X				X
Geonoma chlamydostachys	VU		X				
Geonoma santanderensis	VU		X				
Hyospathe frontinoensis	VU		X				
Oenocarpus circumtextus	VU	X					
Syagrus sancona	VU	X	X			X	
Wettinia hirsuta	VU		X	X			
Wettinia microcarpa	VU		X				
Aiphanes erinacea	NT		X				
Taxón	IUCN	Amz	And	Car	Car insular	Ori	Pac
Aiphanes hirsuta	NT		X				X
Aiphanes lindeniana	NT	X	X				
Aiphanes linearis	NT		X				
Aiphanes macroloba	NT		X				X
Aiphanes simplex	NT		X				
Attalea cuatrecasana	NT		X				X
Attalea septuagenata	NT	X					
Bactris guineensis	NT		X	X			
Bactris hondurensis	NT		X				X
Bactris pilosa	NT		X	X			X
Calyptrogyne ghiesbreghtiana	NT						X
Ceroxylon parvifrons	NT	X	X				
Ceroxylon vogelianum	NT	X	X				X
Cocos nucifera	NT						X
Copernicia tectorum	NT			X			
Chamaedorea allenii	NT		X				X
Chamaedorea christinae	NT		X				
Chamaedorea linearis	NT		X	X			X
Chamaedorea tepejilote	NT		X				X
Chelyocarpus dianeurus	NT		X				X
Geonoma jussieuana	NT		X				X
Geonoma orbignyana	NT	X	X			X	
Geonoma triglochin	NT	X					
Geonoma undata	NT		X	X			X
Geonoma wilsonii	NT	X					
Leopoldinia piassaba	NT	X					
Oenocarpus makeru	NT	X					
Oenocarpus simplex	NT	X					
Pholidostachys kalbreyeri	NT		X				X

Phytelephas seemannii	NT		X				X
Phytelephas tenuicaulis	NT	X					
Prestoea carderi	NT	X					
Prestoea ensiformis	NT		X				
Roystonea oleracea	NT					X	
Sabal mauritiiformis	NT		X	X			
Wettinia castanea	NT		X				X
Wettinia lanata	NT		X				X
Wettinia oxycarpa	NT		X				X
Wettinia praemorsa	NT	X		X			
Wettinia verruculosa	NT		X				

Source: Galeano Y Bernal 2003

Lista de especies de palmas endémicas y casi endémicas de Colombia (Henderson et al. 1995). Regiones naturales de Colombia, Amz: Amazonas, And: Andes, Car: Caribe, Pac: Pacifico.

Endemic and nearly endemic palm species in Colombia

Taxón		Amz	And	Car	Pac
Aiphanes acaulis	Endémica				X
Aiphanes duquei	Endémica		X		
Aiphanes graminifolia	Endémica		X		
Aiphanes leiostachys	Endémica		X		
Aiphanes lindeniana	Endémica	X	X		
Aiphanes linearis	Endémica		X		
Aiphanes parvifolia	Endémica		X		
Aiphanes pilaris	Endémica	X			
Aiphanes simplex	Endémica		X		
Astrocaryum malybo	Endémica		X	X	X
Astrocaryum triandrum	Endémica		X		
Attalea amygdalina	Endémica		X		
Attalea cuatrecasana	Endémica		X		X
Attalea nucifera	Endémica		X	X	
Attalea septuagenata	Endémica	X			
Bactris rostrata	Endémica				X
Ceroxylon quindiuense	Endémica		X		
Ceroxylon sasaimae	Endémica		X		
Cryosophila macrocarpa	Endémica				X
Chamaedorea christinae	Endémica		X		
Chamaedorea ricardoi	Endémica		X		
Chelyocarpus dianeurus	Endémica		X		X
Geonoma chlamydostachys	Endémica		X		
Geonoma paradoxa	Endémica		X		X
Geonoma santanderensis	Endémica		X		
Geonoma wilsonii	Endémica	X			
Hyospathe frontinoensis	Endémica		X		
Hyospathe wendlandiana	Endémica		X		
Oenocarpus circumtextus	Endémica	X			
Oenocarpus makeru	Endémica	X			

Oenocarpus simplex	Endémica	X			
Phytelephas schottii	Endémica		X		
Phytelephas tumacana	Endémica		X		
Prestoea simplicifolia	Endémica		X		
Wettinia castanea	Endémica		X		X
Wettinia disticha	Endémica				X
Wettinia fascicularis	Endémica	X	X		X
Wettinia hirsuta	Endémica		X	X	
Wettinia lanata	Endémica		X		X
Wettinia microcarpa	Endémica		X		
TAXON		Amz	And	Car	Pac
Aiphanes macroloba	casi endémica		X		X
Attalea luetzelburgii	casi endémica	X			
Bactris pilosa	casi endémica		X	X	X
Chamaedorea linearis	casi endémica		X	X	X
Desmoncus cirrhiferus	casi endémica		X		X
Geonoma linearis	casi endémica		X		X
Mauritiella macroclada	casi endémica		X		X
Socratea rostrata	casi endémica	X	X		X
Wettinia oxycarpa	casi endémica		X		X
Wettinia radiata	casi endémica		X		X
Wettinia verruculosa	casi endémica		X		

Source: Henderson et al., 1995

Appendix G. Cateogories of Colombian Critical and Fragil Areas

Category of Area	Definition
CRITICAL AREAS	Areas bajo algun tipo de proteccion legal
Sistema de Parques Nacionales Naturales	Conjunto de áreas con valores excepcionales para el patrimonio nacional que se reserva en beneficio de los habitantes de la nación y debido a sus características naturales.
Distritos de Manejo Integrado:	Áreas que constituyan modelos de aprovechamiento racional donde se permitirán actividades económicas controladas, investigativas, educativas y recreativas.
Cuencas hidrográficas en ordenación:	Área de aguas superficiales o subterráneas, que vierten a una red hidrográfica natural con uno o varios cauces naturales cuya cuenca es sujeta a planes de ordenacion con el fin de garantizar la sostenibilidad de los servicios ambientales.
Distritos de conservación de suelos:	Área que se delimite para someterla al manejo especial orientado a la recuperación de suelos alterados o degradados o la prevención de fenómenos que causen alteración o degradación en áreas especialmente vulnerables
Parques regionales y locales:	Áreas reservadas, alinderadas y administradas por las Corporaciones Autónomas Regionales, los entes territoriales y la sociedad civil
Áreas de protección del paisaje:	Zonas que contribuyan al bienestar físico y espiritual de la comunidad, en las cuales prohibirá la construcción de obras, la tala o la siembra o la alteración de la configuración de lugares de paisaje que merezca protección
Territorios fáunicos y reservas de caza:	Áreas que se reservan y alinderan con fines de conservación, investigación y manejo de la fauna silvestre para exhibición
Reservas pesqueras	Zonas geográficas seleccionadas y delimitadas en las cuales se prohibe la explotación de especies piscícolas o se condiciona a la explotación de determinadas especies.
Reservas de la sociedad civil	La parte o el todo de un inmueble que conserve una muestra de un ecosistema natural y sea manejado bajo los principios de la sustentabilidad en el uso de los recursos naturales, cuyas actividades y usos se establecerán de acuerdo a reglamentación, con la participación de las organizaciones sin ánimo de lucro de carácter ambiental.
Resguardos indígenas	Institución legal y socio-política de carácter especial, conformada por una comunidad o parcialidad indígena, que con un título de propiedad comunitaria, posee su territorio y se rige para el manejo de éste y de su vida interna por una organización ajustada al fuero indígena o a sus pautas y tradiciones culturales
Zonas de ronda	Faja paralela a la línea de mareas máximas o a la del cauce permanente de ríos y lagos, hasta de treinta metros de ancho.
Áreas de reserva forestal (productora, protectora, protectora-productora	Terrenos baldíos ubicados en las hoyas hidrográficas que sirvan o puedan servir de abastecimiento de aguas para consumo interno, producción de energía eléctrica y para irrigación, y cuyas pendientes sean superiores al 40%.

AREAS FRAGILES	Areas que poseen valores ambientales sobresalientes o suceptibles a deterioros intensos, pero que no se encuentran protegidas bajo ninguna figura legal.
Páramos	Región de vida que comprende las extensas zonas que coronan las cordilleras entre el bosque andino y el límite inferior de las nieves perpetuas. Está definida como región natural por la relación entre el suelo, el clima, la biota y la influencia humana
Reservas potenciales.	Áreas propuestas para protección por entidades del orden nacional, regional y local
Areas de estudio	Zonas en las que se están adelantando estudios de investigación de tipo ambiental
Areas de deslizamiento	Áreas con pendientes pronunciadas
Areas inundables	Zonas susceptibles a inundaciones
Areas inestables	Sitios con alto grado de erodabilidad

Source: FAA TEAM