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Biodiversity and Tropical Forest Conservation, Protection, and Management in Mexico

Assessment and Recommendations

FAA Sections 118-119

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Acronyms and Glossary

ANP	*Areas Naturales Protegidas* (Natural Protected Area)
BECC	Border Environment Cooperation Commission
CABEI	Central American Bank of Economic Integration
CAS	Country Assistance Strategy
CBD	Convention on Biological Diversity
CCA	(North American) Commission for Environmental Cooperation
CESPEDES	*Centro de Estudios del Sector Privado para el Desarollo Sustenable*
CI	Conservation International
Cibiogem Secretariat	Commission for Biosafety and Genetically Modified Organisms
CIMEX	Conservation International Mexico
CITES	Convention on International Trade in Endangered Species
CCMSS	Civil Mexican Council for Sustainable Forestry
CMDA	*Centro Mexican de Derechos Ambientales*
CNA	National Water Commission
CONABIO	National Council for the Knowledge and Use of Biodiversity
CONACYT	National Council for Science and Technology
CONAFOR	National Forestry Commission
CONANP	National Natural Protected Areas Commission
CRC	Coastal Resources Center
DGFDSFS	General Directorate for Decentralization, Federalization of Forest and Soils Services
DGVS	General Directorate for Wildlife Services
DUMAC	Ducks Unlimited Mexico
DfID	Department for International Development (Great Britain)
DOE	US Department of Energy
D&G	Democracy and Governance
EA	Environmental Assessment
ejido	a form of collective ownership, defined under Mexican law as distinct from state and private ownership
EPA	US Environmental Protection Agency
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (USAID)
EU	European Union
FAA	US Foreign Assistance Act
FMCN	Mexican Fund for the Conservation of Nature
FWS	US Fish and Wildlife Service
G-CAP	Guatemala-Central America Program (USAID)
GCC	Global Climate Change
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gases
GOF	Government of France
GOM	Government of Mexico
GTZ	German Cooperation Agency

ICRI	International Coral Reef Initiative
IDB	Inter-American Development Bank
INAH	National Institute for Anthropology and History
INE	National Institute of Ecology
INEGI	National Institute for Statistics, Geography and Informatics
INI	National Institute for Indigenous People
IPM	Integrated Pest Management
IR	Intermediate Result
IUCN	International Union for the Conservation of Nature
JICA	Japanese International Cooperation Agency
LAC	Latin America and Caribbean
LAN	National Water Law
LEGEEPA	General Law of Ecological Equilibrium and Environmental Protection
LGF	General Law for Forestry
LGVS	General Law for Wildlife
MAB	Man and the Biosphere Program (UNESCO)
MBC	Mesoamerican Biological Corridor
MFI	Micro-finance Institution
NABCI	North American Bird Conservation Initiative
NADB	North American Development Bank
NAFTA	North American Free Trade Agreement
NBS	National Biodiversity Strategy
NFP	National Forest Plan
NFR	National Forestry Register
NGO	Nongovernmental organization
NOM	Official Mexican Norm
OECD	Organization for Economic Cooperation and Development
OA	Opportunity Alliance
OET	Environmental Land Plan
PA	Protected Area
PAN	*Partido de Accion Nacional* (National Action Party)
PEMEX	*Petroleos Mexicanos* (Mexico's national oil company)
PET	Temporary Employment Program
PF	Packard Foundation
PGR	Attorney General's Office
PiP	Parks in Peril
PPP	Plan Puebla Panama
PRI	*Partido Revolucionario Institucional* (National Revolutionary Party)
PROCAMPO	Program of Direct Support to Farmers
PROCEDE	Program for Land Titling of *Ejido* and Communal Land
PROCYMAF	Program for Sustainable Development of Forest Resources
PRODEFOR	CONAFOR Forestry Program
PRODEPLAN	CONAFOR Forest Plantation Program
PRODERS	Plan to Promote Sustainable Development in Marginal Communities with High Biodiversity
PROFEPA	Environmental Attorney Office
PRONARE	National Reforestation Program

RPC	Priority Conservation Region
SAGARPA	Secretariat for Agriculture, Ranching and Fisheries
SE	Secretariat for Economy
SECTUR	Secretariat for Tourism
SEDEMAR	Secretariat for Marine Resources
SEDENA	Secretariat for National Defense
SEDESOL	Secretariat of Social Development
selva	"tropical forest," corresponds to five Mexican biomes
SEMARNAT	Secretariat of Environment and Natural Resources
SEP	Secretariat for Public Education
SG	Secretariat of Government
SHCP	Secretariat of Finances and Treasury
SNIB	National System for Biological Information
SO	Strategic Objective (USAID)
SpO	Special Objective (USAID)
SRA	Secretariat of Agrarian Reform
SSGPA	Undersecretariat of Management and Environmental Protection (SEMARNAT)
SSNFA	Undersecretariat of Promotion and Environmental Regulation (SEMARNAT)
SSPPA	Undersecretariat of Planning and Environmental Policy (SEMARNAT)
TES	Threatened and Endangered Species
TIES	Training, Internships, Exchanges, and Scholarships
TNC	The Nature Conservancy
UCAI	Coordinating Unit for International Affairs (SEMARNAT)
UMA	Environmental Management Unit
UNAM	National Autonomous University of Mexico
URI	University of Rhode Island
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USFS	United States Forest Service
USG	United States Government
WB	World Bank
WWF	World Wildlife Fund
ZOFEMAT	Federal Coastal Marine/Terrestrial Zone

1.0 Introduction

The Mexican conservation movement started in the 1970s, but with the signing of the Convention on Biological Diversity (CBD) in 1992, a renewed energy drove the movement into mainstream Mexican culture. Initially the concern mainly of academics, conservation—and sustainable development—was taken up by government, and transformed into full-blown Government of Mexico (GOM) institutions and programs by 1997. The United States Agency for International Development (USAID) was the first bilateral donor to support Mexico's conservation efforts. Its original partners and programs have taken on lives of their own, and are now leaders in the conservation field on an international level.

As a result of the CBD, the GOM developed a "National Biodiversity Strategy" (NBS), which remains the key working document, guiding and coordinating actions of the GOM, nongovernmental organizations (NGOs), donors, and universities working in conservation. The NBS sets out four strategic lines of action:

1. Biodiversity protection and conservation,
2. Biodiversity research and information management,
3. Valuation of biodiversity, and
4. Diversification of uses of biodiversity.

Progress along these four strategic lines of action has been uneven: the GOM, NGOs, and donors have given the first two strategic lines far greater attention than the last two. As a result, Mexico has an advanced and highly regarded system of natural protected areas (ANPs), and has generated an enormous amount of ecological data. Only very recently has attention expanded to the last two lines of action, progress on which requires greater intersectoral collaboration. Conservation professionals must work in tandem with economists, business and market development specialists, and community workers. Mexico's conservation community will benefit from continued donor support as it takes up these challenges. USAID/Mexico's 2004-2008 Strategy Concept Paper reflects this emphasis on public-private partnerships and intersectoral collaboration that will enable environmental interests and benefits to become "mainstreamed."

The "Forest Strategic Program for Mexico 2025" is operationalized in the "National Forest Plan 2001-2006" (NFP) which includes three priority programs: increase production through fostering forest plantations (PRODEPLAN $54.6 million), reforest 210,000 ha (PRONARE $42.3 million), and sustainable management of 2,380,000 ha of natural forest (PRODEFOR $21.9 million). Together these programs comprise 78 percent of the GOM's planned expenditures for the forest sector.

This biodiversity and tropical forest assessment was conducted to meet the requirements of USAID's Automated Directive System 201.3.4.11.b, as derived from the 1986 amendments to the Foreign Assistance Act (FAA). FAA Sections 118, "Tropical Forests" and 119, "Endangered Species" require that all country strategic plans include an evaluation of the actions necessary in that country to conserve biological diversity and tropical forests, and the extent to which the current or proposed USAID actions meet those needs. The Scope of Work for this assessment is included in Annex 1. FAA Sections 118/119 are included in Annex 2.

One expatriate and two Mexican specialists—the 118/119 Team—carried out this assessment from mid-October to mid-November 2002 through a review of available documents (see Annex 3) and interviews with key persons (included in Annex 4). The Team's assessment describes Mexico's tropical forest and biodiversity assets, the legislative and institutional framework, key players in Mexico's conservation community, and the status of conservation efforts. The assessment evaluates threats and obstacles to tropical forest and biodiversity conservation and analyzed the actions proposed in USAID/Mexico's Strategy Concept Paper and supporting documents for their contributions to tropical forest and biodiversity conservation. The 118/119 Team then presents recommendations for USAID's future role in conservation in Mexico.

2.0 Country Overview

2.1 Political Situation

Mexico is a centralized federal republic of 31 states and one federal district, with a democratically elected President, a bicameral National Congress (128 senators and 500 representatives), and a Judicial Branch. Prior to 2000, one political party, the *Partido Revolucionario Institucional* (PRI), dominated Mexico's politics.

In the presidential election of December 1, 2000, Vicente Fox Quesada, the *Partido de Accion Nacional* (PAN) candidate, became the Constitutional President of Mexico, and the first opposition party candidate to fill that role in the 20th century. The seventy-year ruling PRI loss—by an ample margin—in the presidential election resulted in a major reshuffling of power, and the PAN victory signaled that Mexico had become a multiparty democracy.

The priorities of the current government are economic growth and better distribution of wealth; sustainable development; development of human resources by strengthening education and training systems; and consolidation of the rule of law and reform of the judicial system.

The transition, from a highly centralized state to a more democratic one, began in the 1980s; and the presidential election of 2000 was a clear indication of voters' desires for more decentralized, accountable, and responsive government and an improved quality of life.

The Fox administration's commitment to transform the highly centralized, top-down, closed political regime of the past, to a more transparent and decentralized form of governance is significantly affecting all sectors of society: health, education, the economy, and the environment. Previously ineffective state and municipal governments are becoming empowered to provide services and to effect positive changes in the lives of their citizens.

2.2 Socioeconomic Situation

Mexico is the world's 13th largest economy, the eighth largest exporter of goods and services, and the fourth largest oil producer.[1] After virtual economic stagnation in the 1980s, Mexico experienced average annual growth of almost three percent in the 1990s.[2] Trade liberalization and the North American Free Trade Agreement (NAFTA) are significantly contributing to Mexico's rapid economic transformation.

Ninety percent of Mexico's international trade is covered by free trade agreements. The US is Mexico's principle trading partner, accounting for 88% of Mexico's trade. Since the signing of NAFTA in 1994, trade with the US and Canada has tripled. Mexico's GDP in 1999 was $484 billion; two years later, in 2001, it had nearly doubled, to $920 billion. Mexico is currently experiencing a decline in real growth of -0.3%, caused mostly by the slow down in the US economy. Mexico's low inflation (4.4% in 2001), 3.2% official unemployment in 2001, US $25 billion foreign investment in 2001, strong trading partnerships, and the strong peso bode well for economic growth; however, 40% of the population still live below the poverty line, and has yet to be positively affected by Mexico's economic growth.[3]

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1 The World Bank, Mexico Country Brief, September 2000, http://wbln0018.worldbank.org/External/lac/lac.nsf/d5c7ea5f4536e705852567d6006b50ff/b32b6c2eebdcbb8f852567ea0006a0ca?OpenDocument.

2 Ibid.

3 Central Intelligence Agency, The World Factbook 2002, http://www.cia.gov/cia/publications/factbook/geos/mx.html#Econ.

Typically, agriculture is one of the more vulnerable sectors of the economy. Traditional crops include rain-fed corn, wheat, soybeans, beans, cotton, and tomatoes. From year to year, production is highly variable, rendering farmers vulnerable to poverty and migration.

Illicit crops were harvested from about 8,000 hectares of land in 2001—roughly half of the crop is poppy and half cannabis.[4] These figures vary depending on the intensity of the GOM's eradication campaign. Drug traders pay farmers in advance to plant fields with illicit crops and pay bonuses after harvest. Both the national and local economies are influenced by drug money. Almost three-quarters of the population lives in urban areas. Eighty-three percent has access to clean and safe water. In urban areas, 92 percent of the population has access to sanitation; and 21% in rural areas has adequate sanitation.[5]

2.3 Geography

North and South America were once two separate continents, each with its own plant and animal communities. Northern Mexico and the Yucatan were covered by shallow seas; volcanic activity was rampant. Episodes of uplifting, continental rifting, and sedimentation produced the varied terrain of Mexico. About 5 million years ago, sections of Central America rose above sea level, forming a land bridge between the two continents. Species from two major biogeographic regions—the Neotropical and Neartic—which had evolved independently, were now brought together. This clash fostered speciation and endemism in the transition zone, and a diverse array of life forms evolved, producing the rich biodiversity of Mexico.

Mexico is about one-fourth the size of the US (1,953,162 km^2). It is split almost in half by the Tropic of Cancer. Over 65% of the country is highland (over 1,000 meters). About one half of the Mexican terrain is rugged with slopes steeper that 27%.[6] Mexico shares borders of 3,141 km with the US, 962 km with Guatemala, and 250 km with Belize. The official length of the shoreline along the Pacific, Caribbean, and Gulf of Mexico is between 11,208 km (INEGI, Series II LU/LC map series) and 30,000 km (ZOFEMAT).[7] Mexico's physiographic provinces are the Baja Peninsula, the Mexican Altiplano, Sierra Madre Occidental, Sierra Madre Oriental, Mexican Neovolcanic Belt, Sierra Madre del Sur, the Chiapas Lowlands, and the Yucatán Peninsula.

2.4 Climate

The climatic variability of Mexico spans all climatic groups and subgroups and rainfall varies greatly across the country. For most (but not all) climates in Mexico, highest precipitation and temperatures are distributed from May to August. Dry and wet climates coexist within short distances. This variability results from Mexico's location relative to global wind patterns, the country's topography, the triangular configuration of the land mass, temperature variations in the ocean currents, the path of summer storms, and the winter movement of polar masses from the north.

2.5 Water Resources

There are 31 major watersheds in Mexico and forty-two major rivers drain Mexico.[8] Natural fresh water resources are scarce and polluted in the north; inaccessible and poor quality in the center and extreme

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4 Ibid.

5 The World Bank, Mexico Country Brief, September 2000, op. cit.

6 UNAM, 1990 *Atlas nacional de México. Instituto de Geografía*; UNAM, 2000 *Atlas nacional de México. Instituto de Geografía.*

7 These figures vary because of the difference in scales. As the scale increases in resolution, the length of edges increase. The differences in shoreline length impact on policy and resource allocation.

8 INEGI, 1995b, http://www.planeacion.sgp.cna.gob.mx.

southeast; and raw sewage and industrial effluent pollutes rivers draining the major urban areas. Except for the Usumacinta River, all of Mexico's major rivers have hydroelectric dams.

The average rainfall of the country is 700 mm, equivalent to the bare minimum rainfall to grow corn. The total water availability is 471,891 million cubic meters (i.e., cubic hectameters [hm^3]). The total volume of water extracted is 72,183 hm^3. Agricultural consumption is 56,210 hm^3, half of which is used for irrigation. Domestic usage is 8,291 hm^3; industry usage is 6,129 hm^3. Approximately 143 hm^3 of water circulated through hydroelectric dams in 2000. At most, 16% of wastewater is treated.[9]

The federal government is responsible for the administration of water in Mexico; however, the Mexican Constitution defines public administration on the basis of states and municipalities. Federal regulations govern the use and discharge of water resources, and the discharge of wastewater and sewage. The National Water Commission (CNA), a semi-autonomous agency of the Ministry of Environment (SEMARNAT), manages the delivery and distribution of water throughout the country, which it has divided into 13 hydrologic and administrative regions. The federal government is only beginning to define a national policy for watershed management that would provide a basis for integrated water resource management (*Programa Nacional de Medio Ambiente* 2001-2006, *Plan Nacional Hidráulico* 2001-2006). At present, the user community interacts with CNA through watershed councils, but community participation is low and the meetings sporadic (none took place in 2001). Most of the interaction with CNA is at regional and state levels (48 meetings in 2001) and through technical working groups. Nonetheless, there is considerable interest at many levels in integrated watershed management, and the Fox administration has declared water a national security concern. There are several examples of integrated watershed management activities being implemented at the sub-watershed level, including Zapalinamé Municipality, Saltillo, Coahuila;[10] Coatepec, Veracruz;[11]and the Upper Watershed of the Grijalva River.[12]

2.6 Energy Resources

To fulfill its $13.7 billion per year energy requirements Mexico draws mostly on domestic fossil fuels (76%) and hydroelectric power (17%). Electricity production in 2000 was 194,367 billion kW; while electricity imports amounted to 2,145 billion kW. Only 26% of the energy supply in Mexico is clean energy from renewable resources.[13]

President Fox is promoting the privatization of portions of the electricity sector but facing strong opposition in Congress. The administration contends that without reforms to this sector, Mexico will be unable to sustain its development trajectory.

Mexico is the sixth largest oil producing country in the world. Oil exploration and production is done exclusively by *Petroleos Mexicanos* (PEMEX), mostly from fields from along the Gulf coast.

2.7 Land Ownership

Approximately 80% of Mexico's forests are "social property"—*ejidos* and indigenous community property. Although the trend is toward converting socially owned lands into private parcels, many *ejidos* and indigenous communities still own land collectively, and take decisions in a collective way, as defined through the Agrarian Law. In 1992, changes to Article 27 of the Constitution opened up the possibility of

[9] CNA, *Plan Nacional Hidráulico,* 1995-2000.
[10] Rene Gonzalez, Director Areas Naturales Protegidas, FMCN, personal communication, November 2002.
[11] Pedro Ernesto del Castillo, Regional Coordinator, CONAFOR, personal communication, November 2002.
[12] Packard Foundation/GEF Project Appraisal Document, *Reserva el Triunfo.*
[13] SEMARNAT, 2002, *Documentao d País, 2002, Reunión de la OECD, del 21 al 25 de octubre.*

converting *ejido* and community-owned land into private land, included recognition of *ejido* and community land borders by adjacent landholders, and stipulated that forested land must remain communal land. Many *ejido* and other indigenous community landholders have formed successful community forestry enterprises. Over three thousand (3,079) *ejidos* and communities hire their own foresters and sell about 1.6 million m3/year of roundwood. Almost one thousand (953) communities have their own sawmills, selling over 2 million m3 of sawed timber each year.[14] These quantities represent over one-third of the total timber sales in Mexico.

2.8 Population Distribution/Demographics

Almost 100 million people live in Mexico; about 62 million of whom are of working age. The population density is 51.3/km^2.[15] About 30% of Mexicans live in small communities scattered throughout the country, and about 47% live in major urban centers. There is a net migration of adult males from the most impoverished rural areas–the states of Michoacan, Oaxaca, and Zacatecas—to urban centers and coastal areas. The largest domestic emigration is from the Federal District (31%), Zacatecas (29%), Durango, Oaxaca, San Luis Potosi, Guerrero, and Michoacan. The largest internal immigration is to the states of Quintana Roo (52%), Baja California (32%), Mexico (35%), Baja California Sur, and Morelos.[16]

Less than 10% of the population is Amerindian, although in the "tropical" states of San Luis Potosi, Veracruz, Hidalgo, Puebla, Guerrero, Oaxaca, Chiapas, Campeche, Yucatan, and Quintana Roo, these groups may make up as much as 37% of the population over five years of age. The population growth rate is 1.4% a year; although the growth rate is higher by a factor of two in rural than in urban areas. The growth rate has declined from a high of 3.9% in 1960.[17]

[14] Chapela, F. & Y. Lara. 2002. El papel de las comunidades campesinas en la conservación de los bosques.
[15] The World Bank, Mexico Country Brief, op. cit.
[16] INEGI, 2000. *Censo de Poblacion y Vivienda 2000*.
[17] Ibid.

3.0 Mexico's Tropical Forest and Biodiversity Resources

3.1 Description of Mexico's Tropical Forests

The English term, "tropical forest" corresponds to five Mexican biomes, known in Spanish collectively as "*selvas*." A selva is a forest where vines grow. In addition, the tropical forest classification includes all hydrophilic vegetation, such as mangroves and ecosystems with no trees. For USAID's purposes, tropical forests are all forests that occur between the Tropics of Cancer and Capricorn. The approximate extent of tropical forests is shown in the biome tables below. Tropical forest covers 17% of Mexico.[18]

Most forests (80%) are community owned (see Section 2.7), and another 15% are privately owned. Many of these forests are contained within the boundaries of ANPs, especially in Biosphere Reserves. Management plans have been prepared for approximately 5.6% of the forested area, mainly for temperate conifer forests in the states of Chihuahua, Durango, Jalisco, and Oaxaca. Mexico harvests a total of about 245,000 tons of non-timber products annually, of which 45 percent is resins, mostly from temperate forest. Stems and leaves of yucca, opuntia, agave, aloe, and palms comprise another 45 percent.[19]

3.1.1 Government Role

Created in 2001, the National Forestry Commission's (CONAFOR), mandate is to promote forest production and reforestation in accordance with the National Forestry Plan; however CONAFOR has had a slow start. Among many other activities, CONAFOR manages PRODEPLAN (program to develop forest plantations); PROCYMAF (conservation and sustainable management of forest resources); PRODEFOR (natural forest management); and PRONARE (National Program for Reforestation).

The General Directorate for Federalization and Decentralization of the Forest and Soil Services (DGFDSFS) keeps the National Forestry Register (NFR). All forestry activities must be conducted according to management plans. The Environment Attorney's Office, PROFEPA, carried out 7,445 inspections from 1998 to 2001 to enforce compliance with the requirements of the NFR and with management plans.[20]

As a somewhat loose indication of relative importance, government investment in the forestry sector is 0.05% of federal expenditures, while SAGARPA (the agricultural agency) spends 0.61%.[21]

3.1.2 Forest Inventory

While the GOM has taken leadership positions on many conservation issues, there are significant information gaps in the forestry sector. For the past twenty years, there has been no comprehensive forest inventory. Stakeholders disagree on basic definitions (i.e., for different types of forests) and methodologies (i.e., for conducting the inventory). In addition, stakeholders disagree on purposes for the inventory, and shifting priorities by successive GOM administrations have resulted in national "inventories" that are not comparable. (Deforestation estimates are discussed in Section 5.0).

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[18] Instituto Nacional de Estadistica Geografia e Informatica. 2002. Digital LULC, Map Series II. Scale 1:250,000. 1993.

[19] SEMARNAT report to the OECD, op. cit.

[20] PROFEPA, *Programa de Procuración de Justicia Ambiental*, (2001-2006).

[21] Federal Administration, 2002. *Anexo del Segundo Informe de Gobierno.*

3.1.3 Forest Fires

Forest fires can have significant impacts on the extent, composition, and functioning of forests. Because impacts from fires are highly visible and often felt far from the source, public opinion has come down strongly against allowing fires to burn and contributed to the development of plentiful and reliable forest fire data. These data show that the yearly loss of forest cover due to fire is small—two percent of total area—and that 95 percent of forest fires are related to fire management of pasturelands.[22]

3.2 Description of Mexico's Biodiversity

Mexico ranks fourth in biodiversity among the world's countries, following Brazil, Colombia and Indonesia. Mexico contains at least 10 percent of the world's biodiversity.[23] As described earlier, this exceptionally high biodiversity results from its location, where Neartic and Neotropical biotas merged. Thus, Mexico's biodiversity includes Neartic, Neotropical and endemic biota, placing it first in numbers of reptiles, second in mammals, and fourth in amphibians and plants. Furthermore, it is the center of origin and distribution of pine and oak species, cacti, agave, and *Neolinaceae* palms. Globally important crops such as corn and avocado also have their origin in Mexico.[24] There may be as many as 212,932 different species in Mexico, yet only 64,878 of these are known to science.[25] Based on these figures, Mexico would be the most ecologically diverse country in Latin America. Relative to its terrestrial biodiversity, Mexico's marine biodiversity is not well known.

3.2.1 Major Ecological Regions

Mexico has nineteen biogeographic regions (see map below) and more ecosystems than any other country in Latin America. Mexico comprises all five principle types of terrestrial ecosystems identified by the World Bank and WWF, nine of the eleven principle habitats, and 51 of the 191 ecological regions of the world. Five of the world's eleven mangrove ecological regions occur in Mexico.[26] One third of the ecological regions of Mexico are considered priority for world conservation—eight of them have been raised to the level of maximum priority, while six are considered to be maximum regional priority for preserving regional biodiversity. Most of Mexico's biodiversity resides in temperate forests.[27]

Conservation professionals disagree over the classification of biomes. The biomes recognized by the National Institute for Statistics, Geography and Informatics (INEGI) and the National Council for the Knowledge and Use of Biodiversity (CONABIO), and land covered by these vegetation types are shown in Table 3.1 and in Annex 5.

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22 CONABIO, www.conabio.gob.mx (Forest Fire Early Warning Program).

23 CONABIO, 2000a. Annual report.

24 Mittermeier, R. y C. Goettsch. 1992. *La importancia de la diversidad biológica de México. En: Sarukhán, J. y R. Dirzo (comps.). México ante los retos de la biodiversidad*. Conabio. México.

25 Cordero, C. y E. Morales. 1998. Panorama de la biodiversidad de México. Conabio (manuscrito).

26 Dinerstein, E., D.M. Olson, D.J. Graham, A.L. Webster, S.A. Primm, M.P. Bookbinder y G. Ledec. 1995. Conservation Assessment of the Terrestrial Ecoregions of Latin America and the Caribbean. The World Bank/The World Wildlife Fund. Washington D.C.

27 CONABIO, 2000a. op. cit.

Table 3.1: Area of Major Biomes of Mexico (excluding agriculture 29.04% of land mass)

Biome	Area (km^2)	% of total
Temperate Forest	34,503,836.15	18
Tropical Forest	34,229,443.14	17
Shrubs	55,588,182.28	28
Grasslands	16,351,907,26	8
Other types of natural vegetation	9,829,343.02	0.05
Forest Plantations	25,465.20	0.01
Total	162,799,564.36	71.06

Source: Instituto Nacional de Estadística Geografía e Informática. 2002. Digital LULC, Map Series II. Scale 1:250,000., 1993.

CONABIO identified 334 priority conservation regions (RPC), which are scattered throughout the country: an indication of how biodiversity riches are not concentrated but found throughout Mexico. RPCs are divided into terrestrial, hydrologic, coastal, marine, and waterfowl. The distribution of RPCs can be seen at CONABIO's website: (http://www.conabio.gob.mx/conocimiento/regionalizacion/doctos/regionalizacion.html

The majority of productive land in Mexico has been in production for hundreds of years. Areas of high biodiversity are either economically unproductive or the exploitation of their key resources is not allowed.

3.2.2 Biodiversity and Endemism

Terrestrial Biodiversity

CONABIO keeps the master biodiversity list of Mexico as part of the National Biodiversity Information System (SNIB). It includes data from many institutions and it can be seen at www.conabio.gob.mx/institucion/snib/doctos/acerca.html. The SNIB is a major achievement, in support of the second strategy line of the NBS. There are however, large numbers of species of fungi, flowering plants, echinoderms, insects, and crustaceans in Mexico yet to be described.

Flora

The number of species of algae, briophyte, pteridophytae, and flowering plants is at least 23,702. Mexico has about 10,000 endemic species of plants. Forty percent of Mexican plants are endemic. Flowering plants number over 18,000 species; and there could be as many as 36,000 species of flowering plants . This represents 9% of the world's flowering plant diversity, and might be as high as 14% once all species are identified.[28]

There are more than 1,200 flowering plants endemic to Mexico, in particular cacti (79% of which are endemic); agave (67%), and *Neolinaceae* palms (65%).[29] Some cases of endemism are so distinct that new plant families were created for them (e.g., *Lacandonia schismatica* of Martínez y Ramos, 1989).

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[28] Rzedowski, J. 1996. Tortricidae (Lepidoptera). En: Llorente, J., A.N. García-Aldrete y E. González-Soriano (eds.). Biodiversidad, taxonomía y biogeografía de artrópodos mexicanos: hacia una síntesis de su conocimiento. Conabio/UNAM. México.

[29] Arias, S. 1993. Cactáceas: conservación y diversidad en México. in Gío, R. y E. López-Ochoterena (eds.). Diversidad Biológica en México. Revista de la Sociedad Mexicana de Historia Natural, vol. XLIV (especial). ; García, A. y R. Galván. 1995. Riqueza de las familias Agavaceae y Nolinaceae en México. En: Boletín de la Sociedad Botánica de México, núm. 56, pp. 7-24.; Rzedowski, 1996, op.cit.

Fauna

A large portion of the faunal biodiversity belongs to marine invertebrates with as many as 50,751 species. Arthropods alone might be represented by as many as 42,496 species . Known vertebrates number 5,167, half of them amphibians. The Mexican vertebrate fauna is one of the richest in the world,[30] and there is no estimate of how many vertebrates are yet to be described.[31] Over 900 species of vertebrates are endemic to Mexico. Sixty percent of Mexican amphibians are endemic.[32]

Birds

There are 1,054 bird species recorded in Mexico, representing 12% of the world diversity. The most diverse groups are Anatidae, Troquilidae, Tyrannidae, and Emberezinae. The bird faunas are rich throughout the country, but most notably in the lowlands of the Gulf of Mexico, mountains, and the Altiplano. More than 100 bird species are endemic to Mexico.[33] Endemism is more pronounced in the mountains, deserts and islands.[34]

Mammals

Mexican mammals are the second most diverse in the world, with 491 species. Rodents and bats are represented by 352 species (79% of the total).[35] There are 41 species of marine mammals.[36] Mexican mammalian diversity increases southwards: primates, armadillos, and wild boars are restricted to the Yucatan and tropical coastal lowlands. Lagomorphs, insectivores, and bats are most diverse in Central Mexico. Rodents are distributed throughout.[37] Almost one third of the Mexican species of terrestrial mammals are endemic. The areas where mammalian endemism reaches its peak are the Mexican Volcanic Belt, the low rainforest of the Pacific Slope, and the islands of Baja California.[38]

Amphibians

Mexico has 48% of all the amphibian world families and is fourth in the world in amphibian diversity. Frogs, salamanders and newts are the most diverse (290 species) and show the greatest endemism—families Pletodontidae, Ambistomidae, Hylidae, Leptodactilae, and Ranidae.[39]

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30 Espinosa, H., P. Fuentes-Mata, M.A. Gaspa-Dillanes y V. Arenas. 1993. Notes on Mexican ichtyofauna. En: Ramamoorthy, T.P., R. Bye, A. Lot y J. Fa (eds.). Biological Diversity of Mexico. Origins and Distribution. Oxford University Press. Nueva York.

31 Flores, O. y P. Gerez. 1994. Biodiversidad y conservación en México: vertebrados, vegetación y uso del suelo. UNAM/Conabio. México.

32 Ibid.

33 Flores, O. y A. Navarro. 1993. Un análisis de los vertebrados terrestres endémicos de Mesoamérica en México. En: Gío, R. y E. López-Ochoterena (eds.). Diversidad Biológica en México. Revista de la Sociedad Mexicana de Historia Natural, vol. XLIV (especial).

34 Navarro A.G. y H. Benitez. 1993. Patrones de riqueza y endemismo de las aves. En: Flores, O. y A. Navarro (comps.). Biología y problemática de los vertebrados en México. Ciencias, núm. especial, 7.

35 Cervantes, F.A., A. Castro y J. Ramírez. 1994. Mamíferos terrestres nativos de México. Anales del Instituto de Biología UNAM, Serie Zoología, vol. 65, núm. 5, pp. 177-190. ; Medellín, R. A., H. T. Arita y O. Sánchez. 1997. *Identificación de los murciélagos de México. Clave de campo. Asociación mexicana de Mastozoología,* A. C. *Publicación Especial* No. 2.

36 Salinas, M. y P. Ladrón de Guevara, 1993. *Riqueza y diversidad de los mamíferos marinos.* En: Flores, O. y A. Navarro (comps.*). Biología y problemática de los vertebrados en México*. Ciencias, núm. especial, 7.

37 Fa, J. y L.M. Morales. 1993. Patterns of Mammalian Diversity in Mexico. En: T.P. Ramamoorthy, R. Bye, A. Lot y J. Fa (eds.). Biological Diversity of Mexico. Origins and distribution. Oxford University Press. Nueva York.

38 Arita, H.T. y I. León. 1993. Diversidad de mamíferos terrestres. En: Flores, O. y A. Navarro (comps.). Biología y problemática de los vertebrados en México. Ciencias, núm. especial, 7.

39 Flores, O. 1993a. Herpetofauna of Mexico: Distribution and endemism. En: Ramamoorthy, T.P., R. Bye, A. Lot y J. Fa (eds.). Biological Diversity of Mexico. Origins and Distribution. Oxford University Press. Nueva York. ; Flores y Gerez, op. cit.

Reptiles

Mexico has the richest reptilian fauna of the world (9.8% of the total). There are 704 species, 154 genera, and 37 families. The best represented groups are lizards (Sauridae) and snakes. Endemism is most common in families of Iguanidae, Anguidae, Tejidae, Xantusidae, Colubridae, and Viperidae.[40] Endemic amphibian and reptilian faunas combined comprise 52% of all the endemic species of these groups.

The tables below illustrate the number of species within each biome; and the extent of biodiversity in Mexico. Biodiversity is rich throughout most biomes.

Table 3.2: Number of Vertebrate Species* by Biome

Biomes	Number of Species	Endemic Species**
Oak forests	332	19
Mountain Mesophilic forest	298	38
Coniferous forest	294	18
Tropical deciduous forest	253	10
Xerophyte shrubs	250	36
Tropical evergreen forest	217	9
Secondary forest	204	3
Semievergreen forest	194	7
Thorn forest	145	4
Induced grassland	112	2
Aquatic and semiaquatic vegetation	56	4
Natural pasture	26	1

* Amphibians, reptiles, birds, and mammals
**Endemic species restricted by vegetation type

SOURCE: Flores y Gerez, 1994, *Conservación en México. Síntesis sobre vertebrados terrestres, vegetación y uso del suelo, Instituto Nacional de Recursos Bióticos*. Xalapa, Ver.

Table 3.3: Distribution of Plant Species by Biome

Biomes	Angiosperms	Gymnosperms	Pteridofitas	Bryophytes
Conifer Forest	578	864	665	4
Mixed Oak Pine Forest	585	750	887	2
Chaparral	107	107	56	
Oak Forest	296	286	539	1
Mountain Mesophyllic Forest	354	256	962	4
Xerophyte Shrubs	616	242	313	1
Mesquite Forest	40	3	6	0
Palm Forest	2	1	7	0
Semideciduous Forest	807	18	137	0
Low thorn Forest	4	2	5	0
Deciduous Forest	668	83	414	0

[40] Flores 1993a, op. cit.; Flores y Gerez, 1994, op. cit.

Biomes	Angiosperms	Gymnosperms	Pteridofitas	Bryophytes
Evergreen and Sub-evergreen Rainforest	557	71	907	588
Vegetation of Sandy Deserts	1	1	0	0
Halophyllic Vegetation	62	7	7	0
Wetlands	84	9	58	2
Áreas with no apparent vegetation	0	5	19	4
Induced Grassland (no cultivation)	751	323	282	14
Natural Grassland	171	43	48	6
Water	57	20	230	117

SOURCE: SNIB - Conabio (2001).

Aquatic Biodiversity in Mexico

There is limited information on the biodiversity of the 500,000 km2 of the Mexican continental shelf and 28,000 km2 of estuaries and coastal lagoons—marine biodiversity is the least well known. The Gulf of California accounts for only 0.008% of the world's seas, but contains 800 species of fish and 34 marine mammal species. The Mesoamerican Reef in the Caribbean is the second longest reef in the world and provides habitat for more than 500 species of fish and over 60 species of corals.[41]

Fish

There are 41 orders and 206 fish families in the world: 82% of the fish orders and 46% of the families are found in Mexico. There are 506 freshwater fish species, 375 continental marine species, and 1,241 pelagic fish species.[42]

[41] World Wildlife Fund-Mexico, www.wwf.org.mx/coralreef.php ; www.wwf.org.mx/coralreef_threats.php ; www.wwf.org.mx/coralreef_what.php ; www.wwf.org.mx/coralreef_projects.php (Mesoamerican Reef)

[42] Espinosa, H. 1993. Riqueza y diversidad de peces. En: Flores, O. y A. Navarro (comps.). Biología y problemática de los vertebrados en México. Ciencias, núm. especial, 7. ; Espinosa *et al.* 1993, op. cit.; Flores y Gerez, op. cit.

4.0 Background: Conservation Backdrop

4.1 Policy, Regulatory, and Institutional Framework

Mexico's tropical forest/biodiversity framework is guided by the NBS, the cornerstone for implementing biodiversity conservation activities in Mexico, which has lent stability to GOM environmental policy since the early 90s. The "National Program on Environment and Natural Resources 2001-2006," developed in line with the "National Development Plan 2001-2006," provides an overall framework for Mexico's environmental policy and management. The "Forest Strategic Program for Mexico 2025," setting the objectives and way forward in the forestry sector.

SEMARNAT (formerly SEMARNAP) was formed in 1992 as a result of GOM commitments to the CBD, and is the GOM agency responsible for the environment. SEMARNAT's key organizations for biodiversity and tropical forest conservation are the offices of Wildlife (DGVS); Decentralization of Forest and Soil Services (DGFDSFS); and Federal Coastal Zone (ZOFEMAT). Relevant semi-autonomous agencies of SEMARNAT are the Commissions for National Protected Areas; National Waters (CNA, which represents 80% of SEMARNAT's budget); Biodiversity Data (CONABIO); and National Forest Agency (CONAFOR). The National Institute of Ecology (INE) has authority over national land use plans (OETs), wildlife use, climate change issues, and generates data to support policymaking. Compliance with environmental law is carried out by an underfunded and understaffed Environmental Attorney's Office (PROFEPA).

The responsibility for permitting and research in the fisheries sector was transferred from SEMARNAT to SAGARPA in 2000. SAGARPA is also responsible for the management of grasslands: burning of pasture and croplands is the cause of most forest fires in Mexico.[43]

Mexico signed into law the Kyoto Protocol, CITES, the Cartagena Protocol, Man and the Biosphere (MAB), the Ramsar Convention, ICRI, the Cancun Declaration, CCA, NABCI, and NAFTA. International treaties, once ratified by Congress, have the status of second tier law. The CBD has guided the conservation work of GOM agencies, Mexico's NGOs, donor agencies, and universities, resulting in a well-orchestrated and coordinated conservation movement. The table below presents a summary of relevant environmental legislation and international agreements:

Table 4.1: Relevant Environmental Legislation and International Agreements

Law or Regulation	Category/Translation	Content
Constitución Política de los Estados Unidos Mexicanos	Mexican Constitution	Defines environmental rights, ownership of natural resources, environmental protection, conservation, and energy.
Acuerdo de Cooperación entre los Estados Unidos Mexicanos y los Estados Unidos de América sobre la Contaminación del Medio Marino por derrames de hidrocarburos y otras sustancias nocivas	International Agreement / Agreement GOM/US to deal with oil spills in the sea	International agreements have the status of a General Law.
Ley General de Equilibrio Ecológico y Protección al Ambiente	Second tier law/ General Law of Environmental Equilibrium and Protection (LEGEEPA)	Regulates the conservation and restoration of environmental equilibrium; protection of the environment to foster sustainable development; defines federal, state, and local responsibilities, for planning, administration, management, and surveillance of matters related to the environment. Defines responsibilities of SEMARNAT

[43] CONABIO, Forest Fire Early Warning Program,op.cit..

Law or Regulation	Category/Translation	Content
Ley General de Vida Silvestre	Third tier law/ General Wildlife Law LGVS	Regulates the use, protection, conservation, and exploitation of wildlife. Does not have rules and regulations. Defines responsibilities of DGVS/SEMARANT
Ley Forestal	Third tier law/Forestry Law LF	Regulates forestry matters, includes rules and regulations and is affected by the creation decree of the Federal Forestry Commission (CONAFOR). Defines responsibilities for DGFDSFS
Ley de Aguas Nacionales	Third tier law/National Water Law LAN	Regulates use and administration of water, including water quality and waste waters. Defines the responsibilities of the National Water Commission (CNA)
Ley General de Bienes Nacionales	Second tier law/Public Property Law	Regulates the use, management, and administration of public property, such as surface and subsurface water, beaches, territorial water, and real estate.
Ley Agraria	Third tier law/National Water Law	Regulates the promotion of sustainable development of agricultural land
Ley Federal de Turismo	Third tier law/National Water Law	Regulates sustainable development of tourism sector
Reglamento en Materia de Impacto Ambiental	Fourth tier law/Environmental Impact	Defines and regulates environmental analysis
Reglamento de la Ley Forestal	Fourth tier law/Rules and Regulations of the Forestry Law	Defines and regulates forest and forest uses. Relevant norms are: NOM-015 fire use in rural areas; NOM to estimate deforestation (in progress);
Reglamento de Áreas Naturales Protegidas	Fourth tier law/Rules and Regulations of the National Protected Areas	Defines & regulates National Protected Areas. CONANP operates through this R&R.
Acuerdo Presidencial de Creación de la Comisión Nacional para el Conocimiento y Uso de la Biodiversidad	Presidential Decree to create CONABIO	Defines and regulates national biological inventories, data banks, project development, cooperation with other agencies, and education on biodiversity. The key document that guides the operation of CONABIO is the National Biodiversity Strategy. The current effort is towards developing biodiversity strategy at the state level, with success already for the State of Morelos
Reglamento para el Uso y Aprovechamiento del Mar Territorial, Vías Navegables, Playas, Zona Federal Marítimo Terrestre y Terrenos Ganados al Mar	Fourth tier law/Rules and Regulations of the National Coastal Zone	Defines coastal zone. Regulates the use, administration, and management of coastal resources within federal control.
Convention on International Trade of Endangered Species (CITES is implemented in Mexico through the NOM-059)	International Agreement /(CITES)	Key agreement on control of trade in threatened and endangered species. DGVS is the responsible authority in Mexico, supported by PROFEPA
Kyoto Protocol	International Agreement	Key agreement for the control of GHG, with INE as the responsible authority in Mexico
Montreal Process	International Agreement	Agreement for the conservation and sustainable development of temperate and boreal forest
Man and Biosphere Program	International Agreement	Implemented through CONANP for 13 Biosphere Reserves in Mexico.

Law or Regulation	Category/Translation	Content
Convención sobre la Protección del Patrimonio Mundial, Cultural y Natural	International Agreement	Key agreement for the protection of world heritage. Implemented through CONANP (in part) and SECTUR for the protection of Gray Whales at Lagunas de Vizcaino and the Biosphere Reserve of Sian Ka'an. Leader in the concept of biodiversity conservation through sustainable tourism.
Iniciativa Internacional para la Conservacion de los Arrecifes Coralinos (ICRI)	International Agreement	Initiative to stop degradation and restore coral reefs, mangroves, and areas of sea grasses. CONANP as responsible Mexican Authority.
Ramsar Convention	International Agreement	Convention on wetlands of international importance for waterfowl. Includes 7 wetlands (1,157,121 ha) and 9 programs of the Wetlands Fund for the Future.
Trilateral Committee CANADA-US-Mexico for Wildlife and Ecosystem Conservation	International Agreement	Forum for the discussion of biodiversity conservation in NA. It participates in CITES. The main program is Wildlife Without Borders (USFWS), which has funded 167 projects.
Iniciativa para la Conservacion de Aves de Norte America (NABCI)	International Agreement	Initiative to conserve native NA birds as an ecological, eco-touristic, and economic resource. Derived from the Commission for Environmental Conservation of NAFTA, 87 approved projects. The Mexican authorities are CONABIO, DGVS, CONANP, FMCN, UNAM, PRONATURA
Acta de Conservación de Humedales de Norte America	International Agreement	Declaration for the sustainable use of wetlands, implemented through DGVS and by the USFWS
Corredor Biológico Mesoamericano	International Agreement / between Mexico and Central American countries	A program that spans a mosaic of ecosystems linking ANPs. In Mexico the CBM aims for the sustainable conservation of five corridors linking 17 protected areas in the states of (Chiapas, Campeche, Yucatan, and Quintana Roo).
Sistema Arrecifal Mesoamericano	International Project/ Guatemala, Belize, Honduras, and Mexico	Agreement to coordinate policy and management of the Mesoamerican Reef. $11 million in WB funds are approved, pending matching funds from recipient countries.
Agreement between CONANP and the US Park Service	Inter-institutional agreement	To cooperate in the management and protection of ANPs
NOM 007 RECNAT	Supplement to 4th tier law	Regulates use and exploitation of non-wood products: twigs, leaves, and stems (cacti, opuntia, and agave), flowers, fruits, and seeds.
NOM 0015 SEMARNAT/SAGAR 1997	Supplement to 4th tier law	Regulates use of fires in forest and agricultural lands
NOM EM 001 RECNAT	Supplement to 4th tier law	Defines use, protection, and restoration of mangroves
NOM 131 ECOL 1988	Supplement to 4th tier law	Regulates whale watching and whale habitat preservation
NOM 020 RECNAT 2001	Supplement to 4th tier law	Regulates restoration and use of forest lands used as grasslands for domestic animals
NOM 023 RECNAT 2001	Supplement to 4th tier law	Cartographic specifications for soil mapping for the purpose of soil inventories
NOM 059 ECOL 2001	Supplement to 4th tier law	Native wildlife species under protection

GOM-mandated activities, responsible agency, and funding sources are provided in the following table.

Table 4.2: GOM-mandated Activities

Activity	Agency	Donor
Protection		
1.1. Bio-safety	CONABIO/Cibiogem	UCAI
1.2. Invading species	SAGARPA	CONANP/ PROFEPA
1.3. Prevention and control of illicit activities	PROFEPA	Sedena/PGR/ Sedemar
1.4. Emergency response	SG/DGDSFS	
Management		
2.1. Sustain large scale ecological processes	CONANP/ CONAFOR	UCAI/CNA
2.2. Ecosystem, species, and processed management	CONANP/ COANFOR	
2.3. Sustainable Use	CONANP/SEDESOL/SAGARPA/INAH	DGVS/ SECTUR
2.4. Preservation of germplasm and genetic diversity	CONABIO/Cibogem	SAGARPA/ Conacyt
Restoration		
3.1. Recovery of species and their habitat	CONANP	DGVS
3.2. Restoration of priority conservation areas	CONANP/ CONAFOR	CNA
3.3. Restoration of environmental services for watershed and forests	CNA/CONAFOR	SSNFA
Knowledge		
4.1. Research of biological, social and economic topics	INE/CONABIO	Conacyt
4.2. Inventory and scientific collections	CONABIO	
4.3. Rescue and systematization of	CONABIO/INE/ INI	
4.4. Information management and administration	CONABIO/INE/ SSPPA	
4.5. Criteria, indicators and follow up	CONABIO/INE	SSPPA
Culture		
5.1. Value	CONANP/Cecadesu	
5.2. Public relations	DGCS	CONANP/INE
5.3. Environmental Education	Cecadesu	SEP
5.4. Participation	CONANP	UCPAST/ DGVS
5.5. Training and education	INE/Cecadesu	SEP/Conacyt
Gestión		
6.1. Planning and Policy	SSPPA	
6.2. Modernizing	Legislativo	SSPPA
6.3. Development and legislation	SSFNA	SSGPA
6.4. Promotion and market development	SSGPA (DGVS-DGDSFS)/ CONAFOR	SE
6.5. Incentives	SSPPA/SHCP	Legislative/SRA

4.2 NGO Community: Highlights of Program Priorities

The Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ) report, "The USAID/Mexico Environment Program: Partnership and Program Assessment" (February 2002) assesses the status and quality of USAID partnerships; and is a high quality resource for in-depth information on USAID's NGO partner programs (FMCN, TNC, WWF, CI, CRC).

4.2.1 *Fondo Mexicano para la Conservacion de la Naturaleza* (FMCN)

FMCN manages a GEF-financed endowment fund, whose interest (approximately $1.4 million/year) supports the operation of 10 ANPs:

- Montes Azules Biosphere Reserve
- El Vizcaíno Biosphere Reserve
- Mariposa Monarca Biosphere Reserve
- Sian Ka'an Biosphere Reserve
- Ría Lagartos Biosphere Reserve
- Sierra de Manantlán Biosphere Reserve
- El Triunfo Biosphere Reserve
- Calakmul Biosphere Reserve
- Islas del Golfo de California Portected Wildlife Area
- Isla Contoy National Park

GEF evaluated environmental funds worldwide and singled out FMCN for its outstanding performance. GEF II awarded a $22.5 million endowment to protect 12 additional ANPs. Mexico is the only country to receive GEF II funding for expanding an endowment fund. A participatory process was used to select the 12 ANPs covered under GEF II:

- High Gulf of California and Colorado River Delta
- Biological Corridor Chichinautzin-Zempoala
- Cuatro Cienegas
- Tehuacan-Cuicatlan
- Banco Chinchorro
- El Pinacate and Gran Desierto de Altar
- La Encrucijada
- La Sepultura
- Pantanos de Centla
- Sierra de Alamos Rio Cuchujaqui
- Sierra de Huautla
- Sierra La Laguna

Figure 4.1: Phase I, II, and Proposed Phase III FMCN/GEF-supported ANPs

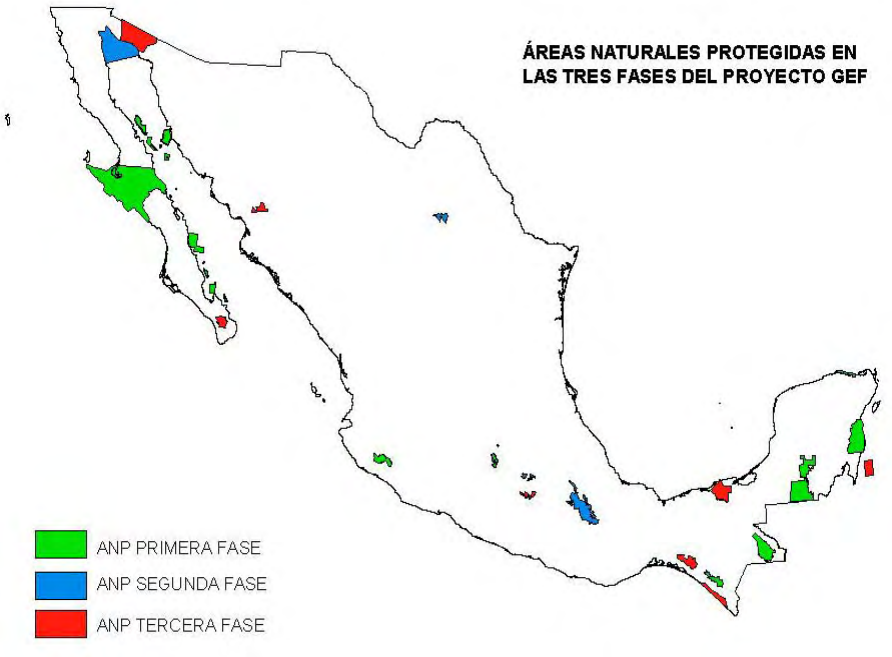


Figure 4.1 shows the locations of Phase I, II, and proposed Phase III FMCN/GEF-suported ANPs.

FMCN works in partnership with CONANP: CONANP manages and operates the ANPs, while FMCN promotes strengthening of the ANP program (in collaboration with other NGOs) and administers GEF funds.

FMCN has been a leader in leveraging conservation funds. Working in tandem, WWF and FMCN obtained a $5 million endowment from the Packard Foundation, $1 million from SEMARNAT, and financing from USAID, and started the Fund for the Conservation of the Monarch Butterfly. Similarly, the FMCN raised $2 million in endowment funds from the Packard Foundation and started the Fund for the Conservation of El Triunfo and Manatlan. FMCN has leveraged several other funding sources in support of Mexico's ANPs.

One important element of the FMCN and its "offspring" is the explicit link between conservation and environmental services. Preservation of the Monarch is linked to actual cash payments to the landowners that preserve their forest. The water catchment at El Triunfo generates 1% of the total hydroelectric power of Mexico—roughly $28 million/year in direct environmental services; Manantlan provides the water for the City of Colima and the tourism corridor of Manzanillo.[44]

4.2.2 PRONATURA

PRONATURA, currently with five regional offices, has been working in Mexico since 1981. PRONATURA handles over 50% of ($725,000) GEF I money, to manage and conserve ANPs. PRONATURA works in five additional strategic areas: environmental education, lobbying, grassroots organization, institutional development, and public awareness. PRONATURA is a leading Mexican NGO with a regular and respected presence in environmental forums, and is the only NGO addressing the legal aspects of private land ownership in environmental conservation.

[44] INEGI, 2000., op. cit.

4.2.3 The Nature Conservancy (TNC)

TNC's Parks in Peril (PiP) program has worked with local partners to build organizational capacity and to strengthen site-based conservation, aiming to transform "paper parks" to well-managed and sustainable PAs. By 2003, nine PiP-supported sites (comprising twelve ANPs) should be consolidated in Mexico; the majority in southern Mexico. TNC is transitioning to the PiP 2000 initiative, which will expand TNC and partner activities to leverage impact, support private lands conservation, and strengthen conservation policy and sustainable conservation financing. Currently, there are six potential sites being developed for PiP 2000 suport: the Chiapas Coastal Watershed; the Sian Ka'an; the Maya Forest; Pinacate; the Sea of Cortez; and Ajos-Apache Highlands. [USAID/Mexico funding: US $7 million, FY 1991-2001.]

4.2.4 Conservation International – Mexico (CIMEX)

CI focuses its efforts on 25 biologically rich areas around the world under significant threat. In Mexico, there are two CI hotspots: the Mesoamerica Hotspot; and the southern part of the California Floristic Province, which contains a small portion of northern Baja California and Guadalupe Island. In the Mesoamerica Hotspot, CIMEX promotes sustainable income producing activities, and supports participatory land use planning and monitoring programs. CIMEX, also collaborates with University of Rhode Island's Coastal Resources Center on integrated coastal zone management in the Gulf of California. [Total amount of USAID funding: US $4 million, FY 1990 to present]

4.2.5 World Wildlife Fund Program - Mexico

WWF's goal over the next three years is to "mobilize conservation on an ecoregional scale [according to WWF's Global 200 Ecoregion Initiative] by improving protected areas establishment and management and by influencing regional development in support of conservation." In WWF Mexico's five-year strategic plan, the Gulf of California ranks highest in conservation importance. The Mesoamerican Reef is a Global 200 Ecoregion; and two types of Mexican forests are included in WWF's Global 200 Ecoregions: Mexican Pine and Oak Forests; and Dry Forests. In its Mexican Forests program, WWF is using watershed management concepts to support sustainable land and forest use in the states of Chihuahua and Oaxaca. [USAID funding: FY 1990-1998, US $5 million, USAID/W; and US $1.86 USAID/Mexico. (USAID/Mexico FY 1999-2000 hiatus in funding)]

4.2.6 Coastal Resources Center (CRC)

With Mexican NGO partners, the CRC focuses on participatory, integrated coastal zone management, targeting implementation of best practices to reduce environmental impacts; co-management of resources; and building capacity of partners to work with government and other stakeholders. The five-year CRC Cooperative Agreement with LAC Bureau ends in September 2003. [LAC Bureau, FY 1996-1998, US$ 600,000; FY 1999-2003, USAID/Mexico, US $ 2 million]

4.2.7 Ducks Unlimited - Mexico (DUMAC)

DUMAC's major initiative in Mexico is the "Mexican Habitat Program," targeting coastal marsh and estuary restoration and enhancement to protect wintering habitat for waterfowl and other wetland-dependent species. The DU Continental Conservation Plan identifies 28 wetlands in Mexico as key for waterfowl.

4.3 Donors, Foundations, Multilateral Banks, and USG Efforts

4.3.1 World Bank/Global Environment Facility (WB/GEF)

The World Bank's current (2003-2005) Country Assistance Strategy (CAS) lays out a five-point agenda in line with the GOM's National Development Plan for 2001-2006: 1) consolidate macroeconomic gains; 2) accelerate growth through enhanced competitiveness; 3) reduce poverty by investing in human capital; 4) create environmental sustainability; and 5) more efficient, accountable, and transparent government. Mexico accounts for the second largest share in the Bank's portfolio: as of May 31, 2002, 31 active projects and US $5.4 billion in net commitments. Projects in the Bank's environment portfolio include: Consolidation of the Protected Areas System Project (GEF, $16.1 million/total project cost, $60.12 million, capitalization of the PA endowment fund, and management and implementation at the PA level); Land Conservation Mechanisms Project (GEF, US $0.75 million, focus on agriculture, fishing, forestry); Mesoamerican Biological Corridor Project (GEF, $14.84 million, total project cost, $90.05 million, supports conservation and sustainable use of resources, maintains native ecosystems, and restores degraded ecosystems in five biological corridors in southeast Mexico); and the Indigenous and Community Biodiversity Conservation Project (GEF, $7.5 million/total project cost, $18.7 million, community initiatives and sustainable land use in prioritized ecological zones in Oaxaca, Michoacan, and Guerrero). A Programmatic Environmental Structural Adjustment Loan for $202 million will support the GOM's efforts to mainstream environment concerns into the agendas of key economic sectors. Environmental reviews are conducted for all proposed WB projects. Environmental impacts of proposed projects are discussed with WB at the USAID/Washington level, and environmental reviews for all proposed projects/loans are circulated to the appropriate mission. If USAID has significant environmental concerns which, after USAID-WB collaboration, remain unaddressed, USAID may issue a report to Congress, and funding may be held until the concerns are addressed.

4.3.2 Inter-American Development Bank (IDB)

The IDB's 2002-2006 Operational Strategy will focus on southern states within the context of the Plan Puebla Panama (PPP), and includes four basic themes: 1) social sector modernization and poverty reduction; 2) integration in line with the PPP, emphasizing regional integration between southern Mexico and Central America; 3) modernization of the state; and 4) lowering barriers that limit competitiveness. IDB financing for the 2002-2006 strategy period is approximately $1.2 billion; about 40% will be used to support modernization of social sectors; 35% to increase private sector productivity; 10% to modernize and decentralize the state; and the rest will support integration.[45] IDB projects will support technical cooperation in areas such as channeling remittances toward productive investments, strengthening competitiveness of small and micro-enterprises, and environmental management. Some recent IDB-funded projects include: Education, Health and Nutrition Program, January 2002; Training and Employment Support, December 2001; Support for Small Farmers through PROCAMPO, August 2001; Capitalization of Remittances for Local Economic Development, December 2001; Housing Finance Program, December 2000; Support to Productive Sector, September 2000; and Vitro Cogeneration Power Project, September 2000.[46] Proposed IDB projects go through the same environmental review process as described for the World Bank.

[45] IDB, www.iadb.org/exr/doc98/apr/lcmexi.htm, (Approved Projects, Mexico).
[46] Ibid.

4.3.3 North American Development Bank (NADB)

The NADB was created under the auspices of NAFTA in 1993 to finance environmental infrastructure projects along the common border, and to address the environmental consequences of NAFTA. NADB facilitates financing for projects that receive certification by the Border Environment Cooperation Commission (BECC). NADB also administers EPA grant resources (to date, $330 million for projects in the US and Mexico). Currently, NADB has invested approximately US $1 billion on environmental infrastructure projects (US and Mexico). The BECC is responsible for certifying projects so that they comply with sound technical, environmental, financial, and public participation principles. In March 2002, the geographical scope of NADB-BECC was expanded from 100 kilometers to 300 kilometers from the border. In August 2002, NADB authorized a US $80 million "Water Conservation Fund" for financing water conservation projects on both sides of the border.

4.3.4 Central American Bank of Economic Integration (CABEI)

CABEI was established to promote the integration and balanced economic and social development of the Central American countries. CABEI's strategy takes into account Mexico's potential in the region, and therefore, focuses on integration of southern Mexico with Central America through South-South cooperation. The "Strategic Plan of CABEI 2000-2005" states that the Bank will work in three strategic areas: development and integration (includes sustainable management of natural resources and habitat protection); financial viability; and organizational modernization.

4.3.5 The David and Lucile Packard Foundation

The Packard Foundation's goal is to conserve coastal and marine systems by supporting efforts to strengthen and expand the region's marine PAs network, improve fisheries management, especially within marine PAs, and formally protect and restore ecologically fragile islands. Grants for 2002 focused on northwest Mexico—the Gulf of California (including coastal environments in Sonora and Sinaloa), and the Pacific coast of the Baja California Peninsula, where there are several "globally significant marine and terrestrial eco-regions." The Packard Foundation's Conservation Program and Science Program will be merged in 2003, and conservation funding will be reduced due to the 2001 economic downturn. Priorities for the merged program are being developed and will be posted on the website.

4.3.6 The Ford Foundation

Along with the MacArthur and Hewlitt Foundations, a major focus of the Ford Foundation's activities in Mexico is on graduate fellowships. In addition, the Ford Foundation supported the Ajos Bavispe endowment with $500,000; the Foundation's US-Mexico Border Initiative promotes binational development along the US-Mexico border; and the "Governance and Civil Society" program addresses transparency, best practices, and local capacity building.

4.3.7 German Technical Cooperation (GTZ)

Currently, assistance is focused on environmental and natural resource protection, concentrated primarily in the Greater Mexico City area. Future projects will focus on decentralization of environmental policy, community waste management, and sewage tariffs.

4.3.8 Japan International Cooperation Agency (JICA)

JICA's environmental conservation initiatives in Mexico are implemented within the framework of the "Environmental Initiative of the US-Japan Common Agenda," signed on March 29, 2001 by all three

governments. Potential projects (some of which USAID is already funding) include Quintana Roo Environmental Management Program in the Caribbean Coast; Oaxaca Social Forestry Program; Urban Environmental Improvement Initiative; Water Quality Program; and Yucatan Park Management Program.

4.3.9 Department for International Development (DFID)

DFID has supported the "Monitoring and Evaluation of PRODERS" for a total of $640,000. DFID intends to close out its assistance program in 2003.

4.3.10 Government of France

France supports the "SALSA-MEX" program, which works in the region of San Pedro, and analyzes human impacts on ecosystems and on the hydrological cycle, and looks at water provision issues. The GOF also supports the integration of southern Mexico's small farmers into a regional agricultural effort.

4.3.11 Government of Spain

Spain's funding priorities are primary education and environment.

4.3.12 European Union (EU)

EU's "Country Strategy Paper, 2000-2006" includes the following priorities: social development and reduction of inequalities; economic growth; scientific and technical cooperation; and consolidation of the rule of law/institutional support. Environment is addressed under the economic growth priority, but unlike in the previous strategy, environment is no longer a priority area for EU assistance.

4.3.13 US Government

- *US Environmental Protection Agency (EPA):* The EPA, along with the US Department of Health and Human Services, SEMARNAP, Secretaria de Salud, US border tribes, and environmental agencies from the ten US border states developed the successor to Border XXI, the Border 2012 Program, whose mission is sustainable development through protection of human health and the environment.
- *US Department of Interior, Fish and Wildlife Service (FWS):* FWS and SEMARNAT have a long history of cooperation in natural resource management and conservation, covering a range of themes: migratory birds, endangered species, wetlands and other ecosystem management, protected areas, training, and regulation of trade in flora and fauna.
- *US Department of Agriculture (USDA)*: Collaborates with SEMARNAT in the following areas: forestry, watersheds, carbon, rural development, and biotechnology. USDA is primarily interested in trade issues.
- *US Department of Agriculture, Forest Service (USFS)*: The USFS has had a long relationship with counterparts in the GOM. Recently, USFS strengthened the capacity of SEMARNAT to respond to fires, trained fire fighters, and helped to develop a fire command center in Mexico City, linked to an early fire detection system. In 1998, the USFS played an important role in assisting Mexico to cope with severe forest fires. The USFS and SEMARNAT formed the North American Fire Management Team to provide training and technical assistance in fire management.
- *US Department of Energy (DOE)*: DOE supports the Center for Clean Air Policy to encourage the use of renewable energy in Mexico.

4.3.14 USAID Regional

- *Mesoamerican Reef Alliance*: USAID supports the International Coral Reef Initiative (a GEF program). Six project themes are emphasized: watershed management and land based sources of pollution; sustainable tourism; sustainable fisheries; management of marine protected areas; economic valuation; and communication and information dissemination.
- *USAID Opportunity Alliance for Central America and Mexico*: The Opportunity Alliance (OA) is a USAID regional initiative which will complement the Mexico and the Central America Regional country programs. The OA "will form strategic partnerships with the US private sector and international financial institutions to strengthen the competitiveness of the region's rural economies, generate new business and investment, and build country trade capacity to trade regionally and with the US" (OA Strategy)
- *USAID/Guatemala-Central America Program*: According to the USAID Central America Program Strategic Plan FY 2002-2006 (September 7, 2000), four strategic objectives feed into the overarching goal, "sustainable regional development." Strategic Objective 2 is "improved environmental management in the Mesoamerican Biological Corridor."
- *USAID/LAC Bureau*: The LAC Bureau supports the Rainforest Alliance in Durango working with certified wood producers to improve marketability and market linkages. USAID/Mexico is linking this program to their work in Oaxaca.

4.4 Commercial Private Sector

Most private conservation contributions are funneled through NGOs. Mexican businesses interested in environmental conservation formed the Latin American Council of Business for Sustainable Development (CESPEDES). In cooperation with the Coordinating Business Council, CESPEDES publishes a bimonthly magazine that serves as a public relations tool for conservation and that could potentially "ramp up" conservation interest among Mexico's private sector. Under the auspices of PRONATURA and TNC, a public forum for private conservation will be held in Cancun in December 2002. This could thrust private conservation initiatives to the foreground of conservation.

SEMARNAT reports contributions from the following private sector companies: Pemex, Ford, Nestlé, Bimbo, Coca-Cola, Vitro, and Agua Santa María; and aggregated contributions to NGOs worth $15 million.[47]

4.5 Status and Management of Protected Areas System

4.5.1 ANP Definitions and Biodiversity Represented

The *Areas Naturales Protegidas* (ANP) system is one of the pillars of Mexican conservation and supports the first objective of the NBS: the protection and conservation of biodiversity. The ANP system is representative of the biodiversity of Mexico. The chart below describes the different classes of ANPs,[48] and Table 4.3 shows the percent of land area/type under the ANP system.

[47] SEMARNAT, 2000, *op. cit.*
[48] CONANP, http://www.conanp.gob.mx/.

Natural Protected Areas are classified as follows:

- Biosphere Reserves. Representative areas for one or more ecosystems. The ecosystems should be unaltered by humans or if altered, these systems should be preserved or restored. A biosphere reserve should harbor species that represent national biodiversity, including endemic, threatened, or endangered species. Resource use for productive purposes may be allowed in Biosphere Reserves. Nuclei zones may be set aside for strict conservation, while limited use may be allowed in designated buffer areas.
- Natural Monuments. Areas with one or more natural elements that in virtue of its uniqueness (aesthetic, historic, or scientific value) deserve full protection. Typically the extent and ecologic variability is not enough to merit inclusion in other categories.
- National Parks. Areas spanning one or more ecosystems distinctive for their scenic beauty, scientific, educational, recreational, or historic value; their particular flora or fauna, suitability to develop tourism, or other similar reasons of public interest.
- Areas for the Protection of Natural Resources. These areas are designated for the protection and preservation of soil, watersheds, water, and the natural resources at large that are located in forest or forest suitable lands.
- Wildlife Protection Areas. Protection status given to areas with high floristic or faunal diversity, generally with abundance of species, subspecies, or habitat with restricted geographic extent. Examples are creeks, river banks, ecological islands, caverns, caves, sinkholes, estuaries, and other topographic or geographic units that need to be preserved or protected.
- Sanctuaries. In June 2002, marine turtle refuge zones were classified as "sanctuaries," thus increasing the number of ANPs, as shown in the following table.

Table 4.3: Percent of Land Area/Type under the ANP System

Category	2001		2002		
	Number of ANP	Area (ha)	Number of ANP	Area (ha)	% of total area of ANPs
Biosphere Reserves	31	10,436.3	32	10,466.5	59.80
National Parks	66	1,346.3	66	1,346.4	7.69
National Monuments	4	14.1	4	14.1	0.08
Protected Natural Resources Area	1	183.6	2	223.2	1.28
Area of Protected Wildlife	21	4,473.9	24	4,847.3	27.70
Sanctuaries	0	0	17	2.5	0.01
Other Categories	4	602.2	4	602.2	3.44
Totals	**127**	**17,056.4**	**149**	**17,502.2**	**100**

SOURCE: *Comisión Nacional de Áreas Naturales Protegidas*. Work Plan 2002-2006, SEMARNAT.

4.5.2 Responsibilities

CONANP is responsible for management of the ANPs; and CONABIO, is devoted to the knowledge of biodiversity. Elements of CONANP's current strategy for ANPs are:

- Consolidation of existing ANPs
- Hiring administrative staff with regional responsibilities
- Drafting and customizing management plans for ANPs
- Integration of academia, NGOs, GOM, state and local government

4.5.3 Land Ownership

The ANP system in Mexico is unique in that 95% of the land is privately owned (including *ejido* and communal lands as well as individually-owned private property). Efforts to preserve and use biodiversity must take into account that key conservation land is not owned by government, but in private hands. NGOs and the GOM adapt their strategies to this situation by building collaborative relationships with landowners. ANPs are created by government decree, and only a fraction of land has been expropriated to develop the ANP system.

4.5.4 ANP Operations

The FMCN endowment, together with CONANP (GOM), will cover salaries of field staff and operational costs of 22 ANPs. SEMARNAT's budget is $1.4 billion of which $22.7 million a year supports ANPs, and $13.8 million of that goes directly to the field.[49] PRONATURA also supports ANP conservation and management. Although there are still some "paper parks" in Mexico, the situation is being addressed by endowments, the GOM, and by other income sources.

Figure 4.2: Land Priority Conservation Regions (from CONABIO - includes the ANPs)

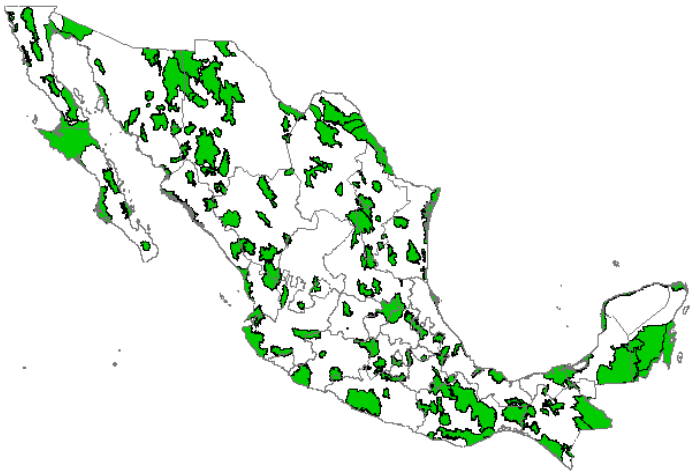
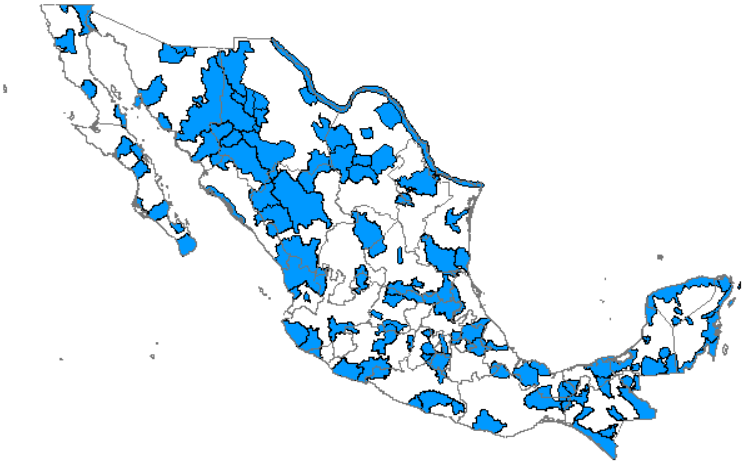
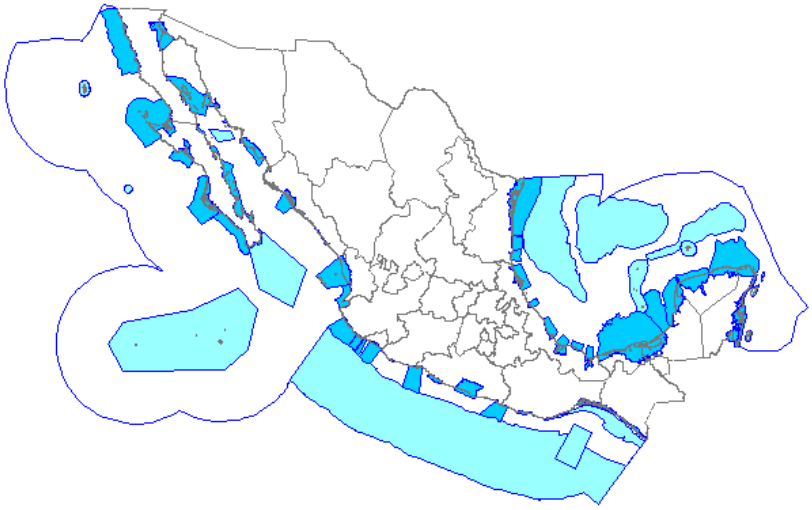


Figure 4.3: Hydrologic Priority Conservation Areas (from CONABIO)



[49] SEMARNAT, 2002., op. cit.

Figure 4.4: Marine Priority Conservation Areas (from CONABIO)



The maps present above show priority conservation areas (RPC) in Mexico. These RPC maps are a combination of ANPs and/or Plan to Promote Sustainable Development in Marginal Communities with High Biodiversity (PRODERS) sites.

In addition to the federal system's ANPs, 22 states have declared a total of 173 state ANPs—often in response to interest group pressure. Some of these state ANPs will be funded using federal funds channeled to the states. Natural resource use is permitted in these areas.

Constraints regarding private ownership issues aside, the ANP system is one of the major achievements of conservation in Mexico. The extent of diversity conserved in the ANPs, and the operation and management of many of the ANPs are examples of cooperation between the GOM, international partners, the private sector, local communities, NGOs, and academic leadership.

4.6 Status and Protection of Endangered Species

4.6.1 Laws and Regulations

The General Law of Ecological Equilibrium and Environmental Protection (LEGEEPA) and its subordinated General Wildlife Law (LGVS) regulate the exploitation, sustainable use, and protection of Mexican wildlife. The LGVS is currently undergoing revision; and until the law is revised, regulations for the LGVS cannot be drafted.

The General Forestry Law (LGF) and its regulations are also relevant to the protection of endangered species. The LGF can be a loophole for the extraction of non-wood products from forests: endangered species products such as saguaro ribs are collected and exported as "forest products," bypassing the requirements of the LGVS.

Summary statistics for the IUCN Red Book list are included as Annex 6.

4.6.2 Threatened and Endangered Species (TES) Responsibilities

DGVS AND PROFEPA are mandated with the protection of endangered species. The administrative authority and the representative of CITES is the Directorate General of Wildlife (DGVS). The DGVS still lacks a work plan two years after the current administration has taken over; in addition, nearly 30% of its budget has been cut, and public perception is of widespread corruption within the DGVS. The monitoring and surveillance branch of SEMARNAT, PROFEPA, enforces compliance with CITES. PROFEPA has approximately 500 field inspectors, and must police compliance and management of almost 5,000 UMAs; nationwide logging and extraction of non-wood products; fisheries; and the traffic of wildlife though ports, airports, and borders.

Marine life falls under the control of SAGARPA, which has the mandates for production. Protection of endangered species in the coastal zone is covered by ZOFEMAT.

Mexico (CONABIO) has been a leader in the CITES committees for flora and fauna since 1998: the chair for the Fauna Committee of CITES went to Mexico in November 2002; and Mexico will continue to be the alternate chair for the Flora Committee.

4.6.3 Incentives for Private Landowners to Conserve TES

Section 4.7 contains additional information on private land conservation. Land use planning instruments (OETs) are the main instruments for conserving private land—and TES on private land. From 1995-2000, the Social Development Secretaria (SEDESOL) supported the development of OETs for 18 major cities (Mexico, Guadalajara, and Monterrey included); and later expanded to 100 medium size cities. The OETs promote the establishment of conservation areas, rational water use, and proper waste disposal. The total investment to date is $34.4 million. SEDESOL also promoted the national OET to consolidate isolated land planning efforts.

PRONATURA is working on legal instruments and incentives for private landowners to conserve their land. PRODERS and UMAs (Section 4.7) provide instruments for conservation of TES on private land.

The Temporary Employment Program (PET) aimed to produce food, water, and coverage for wildlife; erosion control; and infrastructure. A total of 30 species and their habitats were targeted. The PET was active in 15 states, 263 municipalities and covered 340,436 hectares, for a total investment of $30 million. The Forestry Development Program (PRODEFOR), funded with $27.8 million in 2002, works in 238 municipalities with 161 rural and/or Amerindian communities. This program aims to certify sustainable wood extraction of natural forested areas, habitat for many TES.

4.6.4 Habitat Restoration

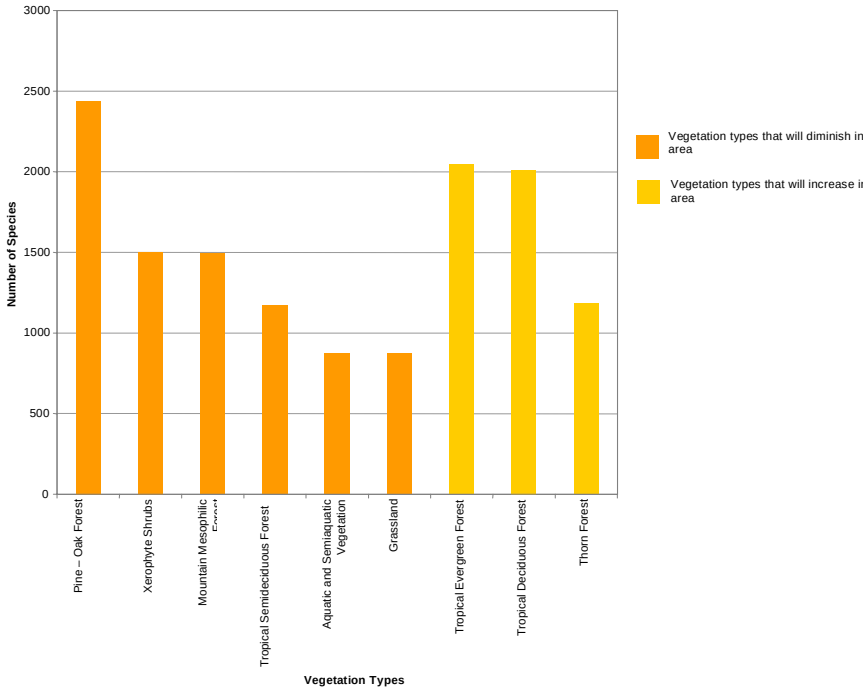
Restoration is the focus of a new effort headed by CONABIO, and supports the first NBS strategic objective.

4.6.5 Climate Change Impact on TES and Mitigation

UNAM's Institute of Biology is the leader in evaluating climate change impacts on TES, and landmark papers have been published in major journals of ecology. CONABIO is seeking funding for a high performance computer to run climate change models at the ecosystem level. Figure 4.5 illustrates expected changes in the number of species by habitat under a climate change scenario.[50]

[50] SEMARNAP, 2000, op. cit.

Figure 4.5: Effect of Climate Change on Vegetation



4.7 Status of Conservation Outside the Protected Areas System

4.7.1 PRODERS

SEMARNAT's Program for Regional Sustainable Development (PRODERS) is the main GOM initiative addressing conservation outside ANPs. PRODERS aims to develop marginal communities by supporting grants or training programs, mainly targeting eco-productive projects: reforestation, wildlife exploitation, water and soil conservation, and ethno and ecotourism. The objective of PRODERS is to promote sustainable use and management of natural resources within a framework of sustainable development, balancing conservation with social goals.[51] A total of US $2.2 million had originally been earmarked for PRODERS in up to 44 communities with high biodiversity. However, the budget was reduced to US $170,000, and a further reduction in funding is expected for 2003.[52] PRODERS funding is inadequate to make any real impact, and the program is essentially a "paper program." A constraint to the PRODERS approach is that the design fails to consider the need to be self-sustaining.

4.7.2 UMAs

Wildlife Management Units (UMAs) are the centerpiece of GOM policy for sustainable wildlife use and conservation. A total of $15 million has been invested in UMAs, covering 209 communities. An UMA is a specific tract of land with a registered landholder. There are 4,935 UMAs and 14 "Project Areas for Sustainable Development" that jointly cover 55 million hectares (28% of Mexico). A landholder may request a permit from the DGVS for sustainable wildlife use. The landholder is required to conduct inventories and describe the sustainable use program/management plan. The onus is on the landholder to conduct inventories and develop a management plan, and because of under-staffing and under-funding of the DGVS, there is

[51] Carlos Toledo y Armando Bartra, 2000, Del Círculo Vicioso als Círculo Virtuoso: cinco miradas al desarrollo sustentable de las regines marginadas. SEMARNAP, Rlaza y Valdez, 294 p.

[52] Carlos Enriques, Director, PRODERS, Personal communication, October 17, 2002.

little opportunity to ensure compliance with the management plan. UMAs are a useful instrument for sustainable wildlife management on private lands, but for large or migrating animals whose ranges may cover more than one owner's land, the individual landowner management plan and census are inadequate for designing management activities.

4.7.3 Coastal Zone/ZOFEMAT

In 1997, administration of the coastal zone was consolidated under ZOFEMAT (the General Directorate of the Maritime Coastal Federal Zone). GOM policy considered the coast as an "economic zone." Accordingly, activities occurring within the coastal zone used economic development models rather than conservation models; and the coastal zone program is headed by public administrators, rather than conservation professionals. ZOFEMAT is a sustainable development model for integrating multiple actors: the three levels of government and intersectoral agreements.

After being scolded as the most backward of all GOM agencies, ZOFEMAT was transformed in 1996 to comply with "Total Quality Standards." It produced organizational, operational, and service manuals with clearly defined roles and responsibilities. ZOFEMAT is a model of successful decentralization—the program has taken advantage of constitutional changes so that states and municipalities can retain 100% of the tax revenue generated in their coastal zone; the revenue must be reinvested in the coastal zone. This is in contrast to the UMA program, where 100% of the revenue generated from wildlife resources is returned to the federal government. The tax revenue generated from ZOFEMAT permits prior to 1995 was under $500,000/year; within seven years ZOFEMAT's revenue collection increased to $18 million.[53]

ZOFEMAT's successes include: attributing economic and social values to the coastal zone; regulating growth of human settlements and production activities, thus reducing conflict; and improving public policy coordination, decreasing corruption, and developing clear operational guidelines.

4.7.4 Rangeland, Arid, Semi-arid Land Conservation

SAGARPA oversees activities on rangeland and on other semi-arid and arid lands (not contained within the ANP system). DGVS controls the illegal exploitation of natural resources—for arid and semi-arid zones, exploitation of cacti and nonlinacea palms are a specific concern. African grasses have been introduced and have displaced natural grasses. Arid zone vegetation uses also fall under the General Forestry Law.

The Sustainable Hillside Agriculture Project, funded by GEF and implemented by SAGARPA in collaboration with the graduate school of Chapingo, recognizes that traditional land uses in the highlands of Oaxaca include a rotation from forest to agricultural land and vice-versa. The program introduces fruit trees as economically viable alternatives to maize. The program could serve as a model for sustainable development and conservation of biodiversity in marginal communities.

4.8 Impacts of GOM Major Development Plans

Historically, GOM economic and social programs significantly contributed to land use changes: in the 1960s and 1970s, the Law of Fallow Lands and the National Commission to Clear Cut Forest; in the 1980s, forest concessions; and in the 1990s, PROCAMPO agricultural subsidies (a cash incentive program to prepare farmers for NAFTA, which motivated farmers to plant marginal lands at the expense of woodlands). In addition, activities of the agrarian reform ministry (SRA), the land titling program of *ejido* lands (PROCEDE), and SAGARPA's National Grassland Program (subsidizes up to 50% of the expenses to establish or improve grasslands) result in land use conversion.

[53] SEMARNAT report to the OECD, op. cit.

At the onset of his administration, President Fox proposed two mega-projects: Plan Puebla Panama (PPP) and Northern Border/Nautical Ladder (*Escalera Nautica*). For the most part, the plans fail to provide environmental plans, and to include conservation opportunities other than tourism. For example, the PPP states that CBD principles are incorporated; and aims to integrate Amerindian communities in the decision-making process. Yet the PPP proposes to relocate indigenous populations into larger towns so that the GOM can provide health services and education; but according to conservation and indigenous peoples' organizations, indigenous people are yet to be consulted on these proposals. Documents available on the Mesoamerican network of highways (part of the PPP) have inadequate information on proposed new road construction and the environmental impacts. CONANP refused to authorize the OET for *Escalera Nautica*; and a detailed plan for the PPP has yet to be submitted to CONABIO for their input. The *Escalera Nautica* will largely be funded by the private sector, and would be required to comply with GOM environmental assessment (EA) requirements. The PPP would largely be funded by multilateral banks, donors, and Mexican banks, and would be required to comply with multilateral bank EA requirements, as well as the GOM's EA requirements. Currently, the conservation community (as well as indigenous and rural populations) has failed to organize and to advocate for implementation of only PPP and Escalera Nautica activities that would take into account sustainable criteria, conservation, and culturally acceptable activities.

The Mexican coastal zone is one of the foundations of Mexican tourism. Mass tourism to Mexico started with a GOM mega-project: the development of Cancun in the 1970s. Additional coastal development firmly established Mexico as a major tourist destination for North America and Europe. Tourism developments along the shore are regulated by ZOFEMAT and are key to sustainable development. Conservation groups and ZOFEMAT struggle to make environmental goals compatible with economic development. SAGARPA, SEDESOL, and organizations working with Amerindian populations have been promoting goat herding as an alternative enterprise, attractive because it can be undertaken by young children and women in marginal areas where large scale migration of males has occurred. "*Chivatización*"—or "goatification" is a threat to biodiversity; discourages school attendance; and illustrates a lack of intersectoral coordination in the GOM.

4.9 Ex-situ Conservation and Conservation of Economically Important Species and Germplasm

There is an extensive network of gene banks, generally structured as cooperative efforts between government and either research institutions or NGOs. Economically important seed crops, grasses, fruit trees, and pine varieties constitute most of the ex-situ germplasm. The National Network of Forest Germplasm consists of 37 gene banks distributed throughout the country**.** There are 96 botanical gardens, 60 zoos, and two aquariums. No information is available about gene banks kept at universities.

There are eight programs to breed and re-introduce native species to the wild–most notably the Mexican wolf and black bear.

5.0 Threats to Tropical Forests and Biodiversity, and Obstacles to Overcoming the Threats

From a review of the literature, meetings with key players in the conservation community, and from a Threats and Obstacles Roundtable held with USAID, the flowing principle threats to tropical forest and biodiversity conservation emerged: deforestation and forest fragmentation; global climate change; habitat loss and degradation; and unsustainable and illegal use, collection, and trade in fish, wildlife, and plants. These threats as well as obstacles to overcoming them are discussed below.

5.1 Threat: Deforestation and Forest Fragmentation

Deforestation Estimates: As discussed in Section 3.0, the varying purposes for which deforestation rate estimates have been developed has led to a wide range of estimates—from 75,000 to nearly 2 million hectares/year.[54] SEMARNAT decided in 1994, and again in 2000, to not use the land cover/land use (LC/LU) definitions issued by the national cartographic authority (INEGI) and in their place to use different class concepts for the national forest inventory. SEMARNAT issued a deforestation figure for tropical forests of 510,122 hectares for 1993-2000, an estimate questioned by INEGI because satellite-derived land cover data were compared with land use data. In addition, the agencies failed to agree on the definition and interpretation of "map classes." For example, over 50% of the tropical area reported deforested by SEMARNAT corresponds to areas where shifting cultivation is practiced. The SEMARNAT analysis ignored this separate INEGI category, and thus reported these large areas as newly deforested. Recently, SEMARNAT and INEGI have come to agreement on concepts and methods that may provide greater consistency while meeting their respective purposes.

Yet another indicator of deforestation comes from PROFEPA. PROFEPA used surveillance data to report on "critical tropical deforestation areas," and showed that in the State of Veracruz, "critical tropical deforestation areas" occur in 76 municipalities—the highest prevalence of "critical deforestation areas." The State of Chiapas follows, with 38 municipalities; 31 each in Puebla and Guerrero; 24 in the State of Mexico; 23 in Jalisco; 18 in San Luis Potosi; 17 each in Oaxaca and Hidalgo; 14 in Campeche, 11 in Yucatan, and 9 in Colima. Sinaloa and Coahuila are critical areas for deforestation of non-tropical forest. According to PROFEPA, all of the states with tropical forest have critical areas of deforestation.[55] Data from PROFEPA do not match the forestry inventory data.

Although deforestation estimates are problematic, an acceptable estimate (range) of deforestation for non-commercial forest is approximately one million hectares (+/- 500,000) each year.[56] For the most part, the conservation community recognizes deforestation as a principle threat to tropical forests and biodiversity conservation in Mexico—several reports state that Mexico has one of the highest rates of forest loss and degradation in the world.[57] However, the original sources of these reports are comparisons of INEGI and SEMARNAT/UNAM with the difficulties already noted. Ultimately, a sound forest management program capable of addressing Mexico's high deforestation rate will depend on timely and accurate data that goes beyond simply identifying areas of forest and non-forest, but also provides data about the location, status, and productivity of the country's forest resources.

[54] ARD Inc & Grupo DARUM 2002.
[55] INEGI 1999, *Estadísticas del Medio Ambiente,* Tomo II.
[56] Gonzalo Chapela and Sergio Madrid, 1999, *Criterios para la Caracterización del Proceso de Deforestación en México.*
[57] World Bank CAS, USAID Mission Strategy Concept Paper.

5.1.1 Causes of Deforestation and Forest Fragmentation

The 20th century advent of mechanized forestry in Mexico opened up pristine areas for timber extraction. The costs of extensive exploration could be justified because of the high price of prime quality logs. Forests were high graded, and the infrastructure built for forest exploration and extraction paved the way for further forest exploitation. Development of settlements, agriculture, and hunting followed in the wake of timber enterprises. A familiar pattern emerged: landless peasants migrate to a previously inaccessible area; they clear additional land for subsistence agriculture; typically the deforested land has poor soils, unsuitable for agriculture, and after a few years, the peasants move on to clear other areas.[58] The majority of commercially viable forest in Mexico was cut down between 1960 and 1990.

Currently, deforestation and forest degradation in Mexico result from agricultural expansion (although many reports consider this a significant cause of deforestation, CCMSS data show that no additional forested land is being cleared for agriculture),[59] inappropriate grazing practices, and economic development/industrial projects (roads, tourism infrastructure, dam building, oil and mineral extraction) that fail to adequately consider the environment.[60] The lack of profitability in the forestry sector is fueling deforestation and land use change.

The states of Veracruz, Chiapas, Yucatan, Campeche, and Quintana Roo are experiencing the most rapid forest—and other ecosystem—conversion in the country.[61]

SAGARPA's economic incentive program to increase agricultural production by rural communities resulted in conversion of forests to agriculture. The incentive program has since been modified to correct for this. The GOM's PROCAMPO and PROCEDE have resulted in conversion of forest land, although there is no data available on the amount of area affected. Many activities proposed under the PPP could result in deforestation in the southern forests. PPP activities will have to comply with Mexico's environmental analysis (EA) requirements, and the activities funded by bilateral and multilateral sources must also fulfill their respective EA requirements—which in theory should minimize deforestation resulting from these activities.

Mangrove forests are cut down to provide wood for curing tobacco and fish; to make way for development; and to provide construction material; and mangrove systems are degraded by pollutants—agricultural, industrial, and sewage.[62] Infrastructure in the coastal zone is subject to regulatory instruments that are designed to control and mitigate development impacts; however, unregulated settlements still appear, and are a threat to the coastal environment.[63] The lack of sewage and water treatment, and inadequate garbage disposal degrades mangrove forests. Although OETs—where they have been developed—should control development in these fragile environments, mangrove forests continue to be converted and degraded.

The NBS and NFP identify deforestation as a threat to Mexican biodiversity. Forests provide a potentially important economic base, especially for rural economic growth; they provide most of the carbon sequestration potential in Mexico; and contain much of the biodiversity assets (see Tables 3.2 and 3.3, Section 3.0)

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58 G. Chapela and S. Madrid, 1999.

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60 GEF, 2000. Project Appraisal Document on Proposed Grant: Mesoamerican Biological Corridor Project. 6 November 2000.

61 GEF Project Appraisal Document, op. cit.; PROFEPA estimates.

62 WWF-Mexico, www.wwf.org.mx/forests.php (Mexican Forests).

63 Ibid.

5.1.2 Obstacles

The following are obstacles to overcoming the threat of deforestation:

1. Limited economic viability due to inefficient forestry practices, favoring conversion to alternative land uses; and
2. Inadequate information (deforestation, tropical silviculture techniques, markets).

Obstacle 1: Forestry's economic viability

Most decisions about how to use land are based on economics, i.e., if the value of a stand of pine is high relative to the value of alternative uses of the land, the landowner is more likely to manage the land for pine. For example, Mexican mills can currently purchase plantation pine logs from Chile at 30% less than logs from Mexican forests. Forest road infrastructure has deteriorated, and since 60% of the cost of timber is attributed to extraction costs, Mexican pine forestry is outside the competitive market range.[64] The landowner has no economic incentive to manage his land for forestry, and alternative uses become more attractive.

Because pine has commercial potential, most forest studies have focused on production of pine timber, which grows on the Sierra Madre Occidental and other high sierras, mostly along the Pacific shore. However, Mexican oak species have not been so well studied, and may have commercial potential. In addition, there are no known uses and markets for broadleaf deciduous forest, which is found in the states of Jalisco, Colima, Michoacan, Guerrero, and Oaxaca. Without an economic incentive to conserve and practice sustainable forest management, the oak and broad leaf deciduous forests are especially at risk. According to SEMARNAT, only 8.6 million hectares of forest are currently managed for commercial timber production (12% of the total forest area).

Most of Mexico's forests are socially (*ejido* or community-owned) or privately owned rather than owned by the state. Forests may be small, medium or large tracts of land, and may be contained within an ANP. All natural forest ownership/management systems are constrained by a lack of profitable markets. Most forestry enterprises have no direct market links. Low prices, and a market structure in which middlemen capture much of the profits, has discouraged development of sustainable forest management enterprises. In addition, community forestry enterprises often have limited capacity to manage—technically and financially—a commercial forestry business. Market incentives fail to encourage sustainable forest management. The Mexican community forestry model, which incorporates non-economic values, such as maintaining forests for their cultural values, has potential for growth and for conserving biodiversity.

Obstacle 2: Inadequate information: deforestation, silviculture techniques, markets

As described above, incompatible definitions and methods have resulted in wide ranging estimates of deforestation. The need for sound data is especially critical when evaluating environmental impacts of development projects, and for balancing development with environmental conservation. Deforestation—and potential/projected deforestation needs to be translated into economic terms to illustrate the complete deforestation picture. Deforestation data, including economic impacts of deforestation, could be used by environmental agencies and NGOs to promote development that adequately considers the environment.

Silviculture techniques were largely developed for plantations and for temperate forests rather than for complex tropical forest systems; these techniques do not directly translate to tropical environments, and limited information has been disseminated to forest owners about best practices in tropical silviculture.

[64] Sergio Madrid, CCMSS and Pedro Ernesto del Castillo, CONAFOR, personal communication.

As discussed in "Obstacle 1," there are undeveloped links between producers and markets, and inadequate information available to the forest owner on accessing markets.

5.2 Threat: Global Climate Change (GCC)

As described in Section 4.6, scientists predict that some of Mexico's richest biomes will be most affected by climate change scenarios: temperate coniferous forests, high tropical evergreen forests, mountain cloud forests, xerophyte shrubs, and aquatic and subaquatic vegetation. Climatic optimal ranges of broadleaf deciduous forest, subdeciduous tropical forest, grasslands, and thorn forest will expand under climate change scenarios. One of the difficulties in using established climate change models for Mexico is that the country sits at the intersection of many of the models, making predictions problematic.

The actual economic cost of climate change to Mexico is only beginning to be addressed—mainly by CONABIO and UNAM. A small increase in sea level due to climate change would inundate coastal wetlands and mangrove forests, resulting in a loss of breeding habitat for fish. This would cause significant economic impact to the commerical fisheries industry. Climate change will also affect crop production, especially regions with rain-fed agriculture, narrowing the belt of land where crops can be grown profitably. (CONABIO needs to increase its computing power to carry out these analyses.)

Some ecosystems will experience a climate change scenario of warmer and drier conditions. Warmer, drier conditions will support new pests and diseases that ecosystems will be ill-adapted to repel. Decreased forest ecosystem health, along with drier conditions, will increase vulnerability to forest fires in some forested areas.[65]

Mexico is very concerned about desertification, and was one of the first countries to ratify the Convention on Desertification.

5.2.1 Obstacles

Obstacles to overcoming the threat of climate change are:

3. Failure of the USG to sign the Kyoto Protocol.
4. Inadequate data to evaluate the economic impact of climate change and to guide policy and mitigation.

Obstacle 3: Failure of the USG to sign the Kyoto Protocol

Given the current political climate, the USG may be constrained in GCC policy engagement. Historically, USAID/Mexico has made great strides in strengthening Mexico's environmental policies; however, this avenue of engagement is currently unavailable.

Obstacle 4: Inadequate data to evaluate the economic impact of climate change

This obstacle results in a lack of political will to provide mitigation measures and to account for climate change in development plans. (Studies by UNAM and CONABIO are ongoing and computing power needs to be increased.)

[65] Huppe, Heather. Proposed Forestry Approach for FY 02 and Beyond in Mexico (draft). November 2002.

5.3 Threat: Habitat Loss/Degradation

Mexico is in a transitional stage of economic development. In certain cases, the path to development is resulting in habitat degradation and loss. Threats to habitats and ecosystems are particularly critical in Baja and the Gulf of California, other coastal/marine areas and inland wetlands, in Mexican forests, in grasslands, and in the northern semi-arid and arid regions. The most critical areas may well be those where governance is weak--Izta-Popo, Chichinautzin, Monarch Reserve, the High Sierras of Durango and Chihuahua—and for Tropical Forest, the areas of Uxpanapan, Chimalapas and Montes Azules. The problems of narcotrafficking, armed movements, and violent civil disobedience provide cover for deforestation and the illegal use of forest resources. PROFEPA lists 26 critical forest areas in 72 municipalities and six states: Baja California, Baja California Sur, Campeche, Chiapas, Chihuahua, and Coahuila.[66] International conservation NGOs, including WWF, CI, and TNC (among USAID's principle partners in conservation), track threatened areas particularly rich in biodiversity. The following discussion is primarily derived from the websites of these organizations. These regions can be compared with the maps in Section 4.5, which show the GOM's priority areas for conservation (RPCs).

Baja and the Gulf of California

This region has some of the most unique terrestrial and marine environments in the world,[67] and contains a variety of habitats including salt marsh and mangrove wetlands, archipelagos, eelgrass and algae beds, and the northernmost coral reef. Approximately 800 species of fish are found in the Gulf,[68] and it is an important area for commercial and sport fishing. Pollution, insufficient freshwater flows, and overfishing threaten the coastal and marine ecosystems. Deregulation of the commercial fisheries industry has resulted in increased pressure on commercially valuable fish. With decreased populations of fish, the fishing industry and small-scale fishers are targeting less desirable fish and age classes. The region is also threatened by development—in particular—the *Plan Escalera Nautica*. Aquaculture and agriculture threaten the wetlands on the coast, and pollutants from these activities impact the Gulf waters. The Gulf of California has been given the highest status in WWF Mexico's five-year strategic plan.

Other Coastal/Marine/Wetlands

As of 1999, Mexico had 3,318,500 hectares of wetlands, 47% coastal, and 53% continental. Thirty-five percent of the wetlands have "suffered to some degree."[69] Wetlands are threatened by agricultural expansion and runoff, road construction and other development projects, erosion, and river channelization. For example, the Laguna Madre, a mosaic of coastal wetlands, freshwater ponds and native grasslands, which provides one of the most important wintering habitats for North American waterfowl, as well as commercial and sport fish species, is increasingly stressed by development, sewage, agricultural runoff, and increased commercial boat traffic. The Yucatan coastal wetlands are comprised of coastal dunes, lagoons, mangrove swamps, and lowland forest. The system's salt and freshwater pools provide critical breeding areas for approximately 500 species of birds; and the wetlands are a buffer for the Mesoamerican Reef. This wetland system is threatened by development, overfishing, inadequate waste management, and poor agricultural practices. Over the next five years, the 80-mile stretch, extending from Cancun to Tulum, could double its tourist capacity.[70]

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66 PROFEPA, http://www.profepa.gob.mx.

67 The Nature Conservancy, http://nature.org/wherewework/northamerica/mexico/index.html (Mexico Program: Places We Work).

68 Ibid.

69 Convention on Wetlands, http://www.ramsar.org (COP7 DOC7: Regional overview of implementation of the Convention).

70 WWF-Mexico website, Mesoamerican Reef, op.cit.

The Mesoamerican Reef

The Mesoamerican Reef is the second largest reef formation in the world, the largest coral reef in the Western Hemisphere, and supports over 500 species of fish[71]—many of them important to artisanal fishers' livelihoods. The Mesoamerican Reef is a WWF Global 200 priority ecoregion. The reef is threatened by infrastructure development mainly for tourism (highways, airports, cruise docks, hotels), water quality degradation from agricultural runoff, erosion, poor waste management practices, bilge dumping, toxic spills, overfishing, and illegal extraction of reef creatures. Climate change could potentially threaten the extent and health of the coral reef.

Mexican Forests

Mexican forests are some of the most important sources of biodiversity on the planet.[72] Mexican forests include mature tropical forests, lowland forests, dry forests, and Mexican pine and oak forests. Unsustainable agricultural practices are a principle threat: new settlers clear land for agriculture, and use production practices unsuitable for tropical forest conditions. Settlers are forced to regularly move to new plots, and clear—usually by the slash and burn method—additional forest. Conversion and fragmentation of forest is occurring at an alarming rate.[73] Large-scale development projects—the Plan Puebla Panama—are also a threat, especially to the southern forests. The southern forests are a trinational treasure, shared by Mexico, Guatemala, and Belize.

Semi-arid, arid and grasslands

The Sonoran Desert has more than 200 imperiled species and numerous endemic plants, reptiles, and fish. The Sonoran Desert is a shared resource, spanning the border between Mexico and the US. In 1990, 6.9 million people lived in the desert; by 2020 the population is expected to reach 12 million.[74] The desert system is fragile, and population growth places pressure on the scarce water resources. Infrastructure to support the growing population results in loss and fragmentation of habitat. In Mexico, only a small percent of the Sonoran Desert is officially protected, and most is communally or privately held. The Chihuahuan Desert is one of the most biologically rich deserts in the world. Nearly 25% of the world's cactus species are found in the Chihuahuan Desert, and millions of birds use the desert at some point in their life cycles, for breeding, wintering, resting, and feeding grounds.[75] The Chihuahuan Desert is a WWF Global 200 ecoregion, classified for its terrestrial and freshwater importance. In the Chihuahuan Desert, goat overgrazing is one of the primary threats. Mexico's grasslands represent some of the most fertile land, so are particularly at risk, rapidly being transformed into farms, ranches, and housing developments.

Other biodiversity rich areas include the Central Mexico highlands and valleys, which are home to the greatest diversity of endemic bird species, threatened by development, pollution, river channelization, dams, and aquifers that are being overdrawn; Veracruz, home to one of the world's most concentrated flyways for birds of prey, threatened by development, mainly for tourism; and the Apache Highlands, also known as the "Sky Islands," an archipelago of 40 mountain "islands" rising above desert grasslands, containing the San Pedro River, threatened by unsustainable grazing practices.

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71 TNC website, op. cit.
72 WWF-Mexico website, Mesoamerican Reef, op. cit.
73 TNC website, op. cit.
74 Ibid.
75 WWF-Mexico website, Threats, op. cit.

5.3.1 Obstacles

Obstacles to overcoming the threat of habitat loss and degradation are:

5. Intense pressure to develop, often at the expense of the environment.
6. Enabling environment for conservation is weakened by inadequate intersectoral coordination and by the gap in transforming policy into action.

Obstacle 5: Intense pressure in Mexico to develop, often at the expense of the environment

The GOM has responded to this pressure by proposing large-scale development projects, mainly aimed at spurring economic growth in areas that are lagging behind Mexico's growth trajectory. NAFTA brought jobs and raised incomes, while placing stress on fragile habitats and scarce water supplies. Economic growth in the south has lagged behind the north, creating the concept of "two Mexicos:" the wealthier north, and the still highly marginal south.[76] The GOM aims to raise incomes and alleviate poverty in the south through the Plan Puebla Panama. In addition, Baja and the Gulf of California are GOM priorities for tourism development, and envisioned as a competitive destination in the world tourism market. The *Escalera Nautica* would develop tourism infrastructure in Baja and the Gulf of California, with the intention of providing jobs, raising incomes, and spurring economic growth. Large-scale development plans often provide short-term economic fixes, rather than taking into account a long-term vision that incorporates optimal land uses. In some cases, even small and medium-scale development—mainly housing and commercial developments—can be a cause of habitat degradation and loss.

Obstacle 6: Enabling environment for conservation is weakened by inadequate intersectoral coordination and by the gap in transforming policy into action

Although Mexico has strong laws and regulations protecting biodiversity and promoting sustainable use, lack of collaboration among sectors may undermine conservation attempts. For example, INI's policy of "goatification" has resulted in unsustainable use of habitat—mainly forests and rangeland.

Inadequate collaboration: Lack of collaboration results in loopholes: the Forestry Law (LGF) allows the exploitation of non-wood products from forestlands; the LGVS protects saguaro cactus; and CITES prohibits international trade in saguaro. However, saguaro ribs can be extracted under the LGF as a non-wood forest product, and although international trade is prohibited, it is possible to harvest saguaro cactus in compliance with the LGF. Legislation to conserve species is being undermined by the lack of intersectoral coordination and an avid US market for these products.

Lack of intersectoral collaboration has meant that "environmental services" are economically undervalued (assigning value to environmental services is one of the four strategic actions of the NBS), and there is limited economic incentive for sustainable use and conservation. Environmental services (water—potable, for irrigation and for energy; soil; aesthetics; beneficial "pests"—IPM; and soil microorganisms) are often viewed as free services. Water may be the most tangible and overall critical environmental service, and can be used as a demonstration of how beneficiaries would pay for environmental services. Currently, beneficiaries of environmental services fail to cover the costs of the services, and the mostly rural communities that "supply" these services receive no benefit—and there is no economic incentive for habitat conservation.

[76] Lusitg, Nora C. And Luis F. Lopez-Calva. Poverty Assessment: Mexico (draft). November 4, 2002.

Policy into action: UMAs (see Section 4.7) are designed for sustainable use of natural resources, and they provide an instrument for habitat conservation; however, the lack of regulations and guidance for UMA operations often work counter to sustainable use and conservation. To receive a permit, an UMA must have a controlled breeding program. However, the definition of a controlled breeding plan is inadequate. Equipping an UMA with a waterhole could qualify as a controlled breeding program. UMAs can be a useful tool for the sustainable use of wildlife and habitat conservation, but the framework must be strengthened.

The GOM's decentralization plans are moving ahead. To date, however, the legal instruments needed to devolve authority for natural resource management to state and municipal levels are still inadequate, and this has slowed the process. Lack of capacity at local levels also constrains progress in decentralization.

SEMARNAT catalogued 117 services that they control, and determined that 58 of those services could be decentralized to state level—to some degree.[77] SEMARNAT vetted the decentralization proposal at local levels, and of the 58 services, the states were willing to accept ten services in a pilot program. However, for states to take on natural resource management activities, they will need a revenue stream. Decentralization of Mexico's fiscal policy is lagging behind—80% of the states' budgets are from highly conditioned federal transfers.

Environment is often one of the more contentious sectors to decentralize. Natural resources do not respect state boundaries, and natural resource management authority is seen as less attractive than securing authority for health, education, and indigenous peoples' programs. The global conservation community is largely in agreement over the importance of devolving authority for certain aspects of natural resource management. The EPIQ partnership assessment cautions about devolving authority for land use planning: "….the potential pitfalls of decentralization of the land use planning process to the most local levels, where local people in power might decide it is their turn to 'make the deals.' Simply because environmental management becomes more local does not guarantee that all options will be examined and that the best choices will be made."

OETs have the potential to be a useful instrument for conservation. However, after five years, progress on OETs has been minimal (see Table 5.1). An approved OET is needed to rule on land use/development permits and sanctions.

Table 5.1: Approved Land Plans

Approved Land Plans	1998	1999	2000	2001
State of Colima (only state-level OET)		✓		
Area of Los Cabos, BCS				
Coastal lagoon area of Nichupté	✓			
Coast of Jalisco	✓		✓	
Tijuana Ensenada corridor			✓	
Area of San Felipe Puertecitos, BCS			✓	✓
Area of Cuatro Ciénegas, Coah.				✓

[77] Jose Cruz Osorio, Governance Advisor, USAID, personal communication, October 2002.

5.4 Threat: Unsustainable and Illegal Use, Collection, and Trade in Fisheries, Wildlife, and Plants

Illegal trade in threatened and endangered species primarily targets cacti, orchids, butterflies, turtles, reptiles, and parrots. Markets for the illegal trade are the US, Canada, Asia, Europe, and the Middle East. As a signatory to CITES, Mexico does prohibit the export of rare native plants and animals collected from the wild. However, products made from rare and endangered species and their parts are available within Mexico.

The shark fishery and big-leafed mahogany trade illustrate some of the issues in the protection and management of endangered species in Mexico.

WWF and IUCN's TRAFFIC Network found that Mexico (as well as Canada and the US) have inadequate monitoring and management measures for many species of shark. In Mexico, where many shark products are processed for the international market, fishery agencies have instituted a reporting system for catches and landings. To date, however, the country's shark fisheries remain largely unregulated and even the process of obtaining a permit to engage in the shark fishery is frequently evaded.[78] TRAFFIC's report, "Shark Fisheries and Trade in the Americas: North America," recommends that Mexico develop management measures for shark fisheries that take into account local economies and the importance of this fishery to small-scale fisherman.

Mexico's fisheries are being overexploited by unsustainable and illegal fishing practices: overfishing, which can wipe out entire age classes of targeted species; taking fish that species further up the food chain rely on; and industrial fishing and other unsustainable fishing practices such as use of nets, dynamite, and poison.

Big-leafed mahogany, one of the most valuable woods on the international market, is still found in southern Mexico. Although along with Brazil and Bolivia, Mexico had pledged to include it in CITES Appendix III (international trade subject to regulation), Mexico has yet to list its big-leafed mahogany population, while Bolivia and Brazil have listed their populations.

5.4.1 Obstacles

Obstacles to overcoming the threat of unsustainable use and illegal exploitation are:

7. Lack of enforcement capacity.
8. Judiciary not fully aware of environmental regulations.
9. Lack of alternative livelihoods and alternative (sustainable) methods.

Obstacle 7: Lack of enforcement capacity

The EPIQ partnership assessment found that, "the most important policy issue associated with natural resource conservation and management in Mexico may be the lack of enforcement of existing rules and regulations." Limited personnel, financial resources, and equipment constrain PROFEPA's enforcement of environmental regulations. PROFEPA's responsibilities to monitor and oversee the use of wildlife, forests and fisheries, and to monitor for environmental pollutants, are excessive for the budget and staff of the institution. In addition, PROFEPA has policing responsibilities but no police authority—if a violation is found, PROFEPA must call in the police force, and the case is then handled by the judiciary.

[78] TRAFFIC Network North America, http://www/traffic.org.

Limited monitoring and enforcement capacity leaves the UMA system open to corruption. To receive a permit for an UMA, a landowner must submit a management plan and population studies of the specie(s) of interest. It is contingent upon the landowner to provide the population data, yet there is no corroboration required to confirm the data and to monitor adherence to the management plan. In some cases, UMAs are created as "legal fronts" for the exploitation of wildlife.

Mexico's protected area system is a model of success in many ways—it is representative of Mexico's ecosystems, it has secured endowment funds, and many of the protected areas implement sound management practices. However, while the GEF, FMCN, Pronatura, other NGOs and foundations, and the GOM provide budget support, several protected areas are still unable to implement adequate enforcement measures. Without adequate enforcement capacity, protected area staff is unable to prevent illegal entry and use of protected resources. Encroachment by the landless is a growing problem that could be addressed with improved enforcement capacity, including community involvement in enforcement.

In view of the limited enforcement capacity, community-level monitoring and self-policing could be a partial response to this obstacle. However, there are no legal instruments to devolve authority for "policing." Until capacity can be built at local levels, and economic incentives offered, community-level policing is largely ineffective. Economic incentives would strengthen the potential for community-level enforcement; for example, all funds collected from UMAs go to the Federal Treasury rather than to communities. If communities received benefits from UMAs, they would be more likely to conserve and protect the resources of the UMA.

Obstacle 8: Judiciary not fully aware of environmental regulations

With conflicting intersectoral policies, and the rapidly changing legislative landscape in the environment sector, the judiciary may be unaware of current environmental regulations, and even when an environmental case comes to court, the rule of law may not prevail.

Obstacle 9: Limited economic alternatives and access to best practices

Because rural populations have fewer livelihood options and generally more limited access to and awareness of environmentally acceptable practices, they may use natural resources unsustainably. Raising rural incomes, and diversifying opportunities by providing alternative livelihoods helps address the threat of unsustainable and illegal use and practices.

6.0 Actions Needed to Overcome Obstacles, and USAID/Mexico's Response

The working goal statement of the USAID/Mexico Mission Strategy (2004-2008) is "strengthening the enabling environment for systemic change and equitable growth in Mexico." To achieve this goal, the mission identified the following strategic objectives:

1. *Microfinance Strategic Objective (SO)*: Strengthened institutional capacity of the microfinance sector in Mexico. This SO will support the reform of and improvements in the microfinance sector by providing support to MFI federations and to selected MFIs. The SO will also link support to the microfinance sector with remittances. During concept paper development, the mission discussed the possibility of a micro-enterprise SO rather than a microfinance SO. More synergies with the Environment SO would have been available with a Micro-enterprise SO than the current Microfinance SO.

2. *Infectious Disease SO*: More effective prevention and control of infectious diseases in vulnerable populations. This SO will support behavior change and stigma reduction activities involving HIV/AIDS; and will support behavior change to reduce incidence of TB. The SO will empower and build skills so that communities can advocate for HIV/AIDS and TB prevention and treatment.

3. *Democracy and Governance SO*: Economic and social progress advanced by more democratic governance. This SO will support government and civil society initiatives to achieve democratic change. It will promote equitable access to resources and services; encourage greater accountability in the GOM; and will support enhanced rule of law.

4. *Environment SO*: Improved management and conservation of natural resources in targeted watersheds. This SO uses an integrated water resources management (watershed management) approach to conserve critical natural resources, while ensuring local people are involved in and benefit from improved management of resources. Intermediate Results for the Environment SO are IR 1: Enhanced enabling environment for integrated water management; IR 2: Increased use of environmentally sound and economically viable practices and technologies; and IR 3: Community role in natural resource management strengthened.

5. *Training, Internships, Exchanges, and Scholarships (TIES) Initiative Special Objective (SpO)*: Improved higher education response to development through partnership approaches and targeted training in priority sectors. This SpO will support education and internships in priority areas, including natural resource management and environmental science.

The potential synergies between the Environment SO and the Democracy and Governance (D&G) SO are great, and are noted below. There are also potential synergies between the Environment SO and the TIES SpO. The Infectious Disease SO and Microfinance SO do not contribute to biodiversity and tropical forest conservation and synergies are extremely limited.

For the Environment SO, the donor landscape looks much different than when the 1996 Mission Strategy was prepared. In 1998, USAID was the major donor in the environment sector in Mexico; that has now changed dramatically. The World Bank, IDB, and GEF have programs that dwarf USAID's and other bilateral donors, foundations, and Mexican NGOs are now active in the environment sector. USAID's role as catalyst and its capacity to leverage support is highly valued by the conservation community.

The following describes the actions necessary to overcome obstacles identified in Section 5.0, and USAID's response, in the new strategy period, to these actions. The actions identified have been derived from the

EPIQ reports, discussions with USAID/Mexico, and discussions among the 118/119 Assessment Team. The Strategy Concept Paper (May 17, 2002), supporting documents from each SO Team, and LAC Bureau, USAID/G-CAP, and Opportunity Alliance strategy level documents were used to evaluate mission response to the actions.

6.1 Obstacle 1: Forestry's economic viability

Actions Needed

1. *Evaluate uses of and identify markets for undervalued forest species*. The Environment SO will strengthen the role of communities in natural resource management (IR 3), and increase rural community participation in natural resource management (IR 3.1). Community-based natural resource management activities could involve the development and/or strengthening of viable timber-based and non-timber forest product enterprises. The Environment SO will need to support feasibility-type studies to determine uses and production potential, and to identify markets for forest products. Uses of and markets for oak and broad leaf deciduous forest and for many non-timber forest products are largely unknown, and are particularly critical gaps to fill. Helping producers develop more direct links to the marketplace could reduce reliance on middlemen, increasing the profitability of forestry enterprises. The already existing community forestry model (*ejidos* and other community-owned forests) could serve as an entry-point for these interventions. The Environment SO can link to USAID/G-CAP's efforts to promote access to markets for environmentally friendly products and services; to increase knowledge about certification mechanisms; and to facilitate certification for producer associations. IR 3 will emphasize forestry enterprises that have the potential to generate income and employment for forest landowners, while protecting biodiversity and watersheds.

2. *Support the LAC Certification Alliance*. USAID could support the multi-Bureau "Certified Forests Alliance," an initiative to help close the gap in supply and market demand for certified forest products. Certified producers in Mexico face challenges in competitively pricing their products, manufacturing them to consistent quality standards, and professionally packaging and marketing them. The Environment SO could work with the Certification Alliance and LAC Bureau to build and strengthen market linkages and to provide assistance to Mexican forestry enterprises to help them meet market quality and quantity demands, and to help them access higher paying niche markets. This activity is supported under IR 1.3, "increased public-private collaboration" and IR 3.3, "strengthened community alliances with other stakeholders." Currently, approximately 143,000 hectares of Mexican forest are managed as certified forests; and an additional one million hectares are in the process of getting certified (SEMARNAT). Community forestry enterprises (*ejidos* and indigenous community enterprises) could be supported through these types of interventions.

6.2 Obstacle 2: Inadequate information on forest condition, technologies, and markets

Actions Needed

1. *Assist the GOM to develop a cogent national forest inventory*: SO 6 supported SEMARNAT's efforts to develop the national forest inventory; however, additional assistance is needed before the tool can be truly useful. Increased integration and consistency of resource inventory processes can enhance efficiency and effectiveness—enabling the sharing of comparable information across a broader range of users and uses and facilitating the application of results to information needs at state and municipal levels. Targeted informational exchanges through the TIES SpO could help with ground-truthing data,

building data sets, and developing an Internet database. This would support IR 2.2, forest and conservation area management practices promoted and disseminated.

2. *Disseminate lessons learned from experience in Central America and South America to Mexican forest owners*: Through IR 2, "increased use of environmentally sound and economically viable practices and technologies," and IR 2.2, "forest and conservation area management practices promoted and disseminated," the Environment SO can provide lessons learned in the region in tropical silviculture (improved management of mahogany would be a particularly important area to support). The Opportunity Alliance is one avenue of support for this: it will promote the adoption of forestry practices to reduce over-exploitation of forest cover in Central America and southern Mexico. USAID/G-CAP intends to collaborate with USAID/Mexico to share and disseminate successful models.

6.3 Obstacle 3: USG failure to sign the Kyoto Protocol

Actions Needed

1. *Support a change in USG global climate change policy*: This action is beyond USAID/Mexico's capacity to effect.

6.4 Obstacle 4: Inadequate data to assess the economic impact of climate change and to guide policy and mitigation

Actions Needed

1. *Support economic valuation of climate change scenarios*: Currently UNAM and CONABIO are conducting studies to determine economic impacts of climate change on a variety of ecosystems. Although such studies are not within the scope of the Environment SO; through IR 1.1, "key government institutions implementing supportive policies and technical practices," the Environment SO can support "operationalizing" the findings of economic impact studies.

2. *Target forest management interventions as a means of mitigating potential climate change impacts*: Although for the most part, data on economic impacts of climate change for specific ecosystems are unavailable, some habitats will experience warmer, drier climates, which will lead to greater fire susceptibility. The Environment SO can continue to support fire management and monitoring activities, and strengthen the understanding of the role of fire in ecosystem maintenance and health. This would support IR 2.4, "climate change vulnerability and adaptation practices promoted and disseminated." Using the Opportunity Alliance approach, and in partnership with USAID/G-CAP, the Environment SO can support the dissemination of specific practices for fire management and monitoring. A strategic approach to fire management, rather than discrete interventions, should be the objective. The Environment SO can encourage retention of forested areas and sustainable use of forests (IR 2.2), thereby retaining the carbon sequestration function of forests.

3. *Target other ecosystem-level (especially coastal, wetland, and agro-ecosystem) interventions to mitigate effects of climate change*: This action can best be accomplished through the participatory land use planning instrument—the OET. In the development of OETs, climate change scenarios should be considered, especially when designating areas for settlements, for tourism infrastructure, for sewage treatment systems, and for agriculture. The Environment SO can encourage increased civil society participation in the land use planning processes. (This can be a link with the Democracy and Governance SO, as discussed below.) This action supports IR 2.4, IR 3.1, rural community participation, and IR 3.2, "increased urban community participation in natural resource management." IR 2.3, "water and

watershed management practices promoted and disseminated" can support climate change mitigation measures, especially in coastal environments.

6.5 Obstacle 5: Intense pressure to develop, often at the expense of the environment (large-scale government projects)

Actions Needed

1. *Strengthen community and NGO advocacy and empowerment*: The Plan Puebla Panama, the *Escalera Nautica*, tourism development along the coast and inland, and infrastructure development throughout the country are all signs of a growing economy; however, short-term economic gain often occurs at the expense of the ecological systems needed to sustain such gains. Strong political will and private sector interests drive GOM development planning. Stakeholder/beneficiary communities, environmental and indigenous peoples' NGOs, and environmental agencies in the GOM must ensure that development occurs in a fashion that considers the environment and the cultures of the local people; balances environmental concerns with development; and mitigates for environmental impacts. Development programs should demonstrate that they can address these requirements. The Environment SO will increase the technical and management capacity of NGOs (IR 1.2), to enhance the national enabling environment for integrated water management (IR 1). Under IR 1.2, the Environment SO should capitalize on its relationship with NGOs to strengthen the capacity of civil society organizations to advocate for "smart growth." The D & G SO's IR 1, "more accountable policymaking and implementation," will support civil society engagement in the political process; D & G Sub-IR 1.2 will support civil society organizations to increase citizen participation in government decision making; and D & G Sub-IR 1.3 will strengthen citizen oversight of GOM spending and programs. The Environment and D & G SOs can build on these synergies to encourage civil society participation in the design, implementation, and monitoring of GOM development plans.

   The Environment Team intends to engage the GOM more in this strategy period than the previous, and under IR 1.1, the Team will work with key government institutions to support policies and practices. The Environment Team has the opportunity to work with civil society and with the GOM to strengthen mechanisms for collaboration among all levels: civil society, municipal, state, and central government—to ensure that only development that accounts for environmental concerns proceeds.

2. *Support models of sustainable development*: Advocacy for "environmentally friendly" development will receive more support where there are successful on-the-ground models. The Environment Team can work through the Opportunity Alliance, which will focus on the Usumacinta border region, since this area will likely be disproportionately impacted by Plan Puebla Panama infrastructure development. The Opportunity Alliance will support interventions that will integrate economic production and markets of southern Mexico with Central America. Illustrative Opportunity Alliance activities include sustainable tourism and sustainable watershed management practices—this could open up opportunities to support beneficiary payments for environmental services (see below). This action is supported by IRs 2 (IRs 2.2 and 2.3) and 3 (IR 3.3).

6.6 Obstacle 6: Enabling environment for conservation is weakened by limited intersectoral coordination and gaps in turning policies into action

Actions Needed (to improve coordination)

1. *Support the harmonization of environmental laws and legislation*: As described above, for some GOM policies and initiatives, integration among sectors has been limited. The Environment Team will engage

the GOM at the national level to enhance the enabling environment for integrated water management (IR 1). However, the Environment Team should also build on its relationship with diverse GOM institutions to encourage greater collaboration among sectors. The objective of this action is to support a coherent government framework for natural resource management and biodiversity conservation.

2. *Support NGO advocacy efforts aimed at Mexico's Congress*: Through IR 1.2, the Environment Team will strengthen technical and managerial capacity of NGOs. Supporting the capacity of NGOs as advocates at high political levels for stronger environmental legislation and inter-sectoral integration will give strength to the Environment Team's efforts to harmonize legislation (above). This action can be linked to the D & G SO's efforts in IR 1.1, more accountable policy making.

Actions Needed (to transform policies into actions)

3. *To move the decentralization process forward, support models of devolution of authority in natural resources management*: Decentralization is proceeding, although, as described above, at a slow pace. The Environment Team can build on synergies with the D & G SO's IR 1.1 to support the implementation of models of natural resources management decentralization. The Environment Team can encourage devolution of authority in the natural resources management sector through IR 3. Using the OET instrument and a watershed approach may provide an appropriate framework for a decentralization model. The URI's Coastal Resource Center, supported under the previous strategy, and ZOFEMAT provide models of decentralized governance and participatory planning for coastal and marine resources. To encourage the decentralization process, the Environment Team should strengthen local-level capacities (IR 3.2) to enable local government and people to take on responsibilities.

4. *Develop valuation data for environmental services*: This is being undertaken by CONABIO and UNAM, and the World Bank is supporting economic valuation of environmental goods and services. Although such efforts are beyond the management capacity of USAID/Mexico, targeted assistance (informational exchanges, internships) could be provided in collaboration with the TIES SpO (supports IR 1.1). Action 3 under obstacle 9 addresses the next step in environmental services valuation: using environmental service provision as an economic incentive for sustainable use and conservation.

6.7 Obstacle 7: Lack of enforcement capacity

Actions Needed

1. *Support capacity building for PROFEPA*: As discussed above, PROFEPA has responsibility to enforce environmental regulations, but has limited capacity, staff, and resources to effectively implement enforcement. Capacity building for PROFEPA can be conducted under the Environment Team's IR 1.1, supportive policies and technical practices. Possibilities for public-private partnerships to support enforcement efforts could be explored in support of the Environment Team's IR 1.3.

2. *Promote economic incentives as a method to strengthen community level surveillance and enforcement*: Communities need to receive tangible benefits from their investments in more sustainable natural resource management. Specific potential economic incentives for community conservation need to be identified, e.g., directing a portion of the revenue from ANPs to communities, income generation from environmental services, or other watershed level interventions. This action is also applicable to the use of marine resources. The Environment Team, through IRs 2.2 and 2.3, and IR 3.1 could explore incentives to strengthen community compliance and community level "policing." Natural resource users should become natural resource protectors.

3. *Continue to support enforcement in ANPs*: As described above, the ANP system in Mexico is a great achievement. However, there are still ANPs that are financially constrained and can provide only limited enforcement of their boundaries and of natural resources use. The Environment SO could remain engaged in strengthening and supporting the ANP system, through IR 3.3, strengthened community alliances with other stakeholders—some ANPs may need to rely, to some degree, on community enforcement measures. In addition, within the broader framework of the watershed or corridor (working in collaboration with USAID/G-CAP) or coastal/marine environment (Mesoamerican Reef Initiative), the Environment SO can remain engaged in the ANP sector.

6.8 Obstacle 8: Judiciary not fully aware of environmental regulations

Actions Needed

1. *Continuing education for the judiciary in environmental law*: This is an ideal link between the Environment SO and the D & G SO: the D & G SO's IR 1.2, "enhanced rule of law" to support civil and criminal justice reform and increased professional standards for more equitable justice. "Continuing judicial education" is a potential illustrative activity for the D & G SO. In addition, the EPIQ report, "The USAID/Mexico Environment Program: Partnership and Program Assessment" recommends that the Environment Team explore joint support to the Centro Mexicano de Derechos Ambientales for judicial education, law enforcement training for PROFEPA, advocacy, and anti-corruption training. This action applies to training in legislation covering terrestrial, wetland, coastal, and marine resources.

6.9 Obstacle 9: Lack of alternatives to unsustainable or illegal use of natural resources

Actions Needed

1. *Support income generating interventions that have minimal or no environmental impact*: This directly supports the strategic objective, "improved management and conservation of natural resources in targeted watersheds." The Environment Team's development hypothesis states that, "much of Mexico's environmental degradation and loss of biodiversity are driven by rural poverty" (Draft Mexico Environment Strategy, November 12, 2002). The Environment SO should promote economically viable alternative livelihoods and technologies for the rural poor. Interventions may include (from EPIQ Partnership Assessment): increasing the sustainability and profitability of existing agriculture and livestock activities to deter inclination to move into intact ecosystems; nature-based income generation and employment opportunities in response to the growing market for ecotourism and outdoor recreation; income generation and employment based on sustainable extraction, use, and sale of non-timber forest products (honey, xate, chicle, furniture of vines and pole wood); sustainable sport hunting and fishing and game meat and fish harvest for local consumption; off-farm income and employment opportunities in services and basic commodities as an alternative to subsistence farming; and environmental service payments for forest and watershed management.

   The EPIQ partnership assessment states that alternative development activities "…are intended to leave local people economically better off, and those promoting them must have a sound understanding of financial reality." Often efforts to promote alternative livelihoods fall short of expectations, but with a strategic approach, strengthening links to markets and quality standards, with adequate technical assistance and follow up, the Environment SO is well-positioned to overcome the pitfalls. Alternative income generation/livelihood development should be linked to biodiversity conservation and watershed management, i.e., assistance is being provided for alternative income generation because traditional income generation activities are degrading natural resources and affecting biodiversity conservation.

2. *Support sustainable use of resources*: The Environment Team can support community-based sustainable use activities within the framework of the *ejido* system and community forestry enterprises (IRs 3, 3.1, and 3.2), as described in Section 2.7. The Environment Team can also support diversification of forest uses and forest certification—especially for *ejido* and indigenous community forestry enterprises, and could strengthen the UMA system. Communities and *ejidos* have already started to diversify beyond forest products, adding ecotourism, and water production and bottling. Other value-added products being investigated include furniture making and non-timber forest products (chicle latex in Yucutan). The Environment SO can build on regional synergies with G-CAP: G-CAP's SO, "increased diversification of the rural economy" can help the Environment SO to relieve pressure on natural resources along the border area of Mexico, Guatemala, and Belize. All income generation and natural resource use interventions should include a sustainable use component.

3. *Promote water as a tangible benefit of biodiversity conservation and as a model of income generation from an environmental service*: Through IR 2, and using an integrated water resources management approach, the Environment SO could promote water resource conservation, enhanced water supply and water quality, and community-level water provision activities. These interventions should be linked to biodiversity conservation and broader watershed management concepts. In conjunction with G-CAP, the Environment SO can strengthen its support for income generation from environmental services: G-CAP will test and disseminate income generation models from environmental services provision and bio-prospecting agreements. The previous SO 7 (Energy SO) can provide lessons learned in building community alliances with other stakeholders (IR 3.3) and increasing public-private collaboration (IR 1.3)—critical pieces of the environmental services provision puzzle. People will conserve what is valuable, and if rural people receive benefits for providing "environmental services" they are more likely to conserve natural resources. This action will require that the Environment Team increase its engagement with the GOM.

4. *Improved Protection of Endangered and Threatened Species*. Increased local control of natural resources could provide a mechanism to help protect TES (IR 3). However, mechanisms for TES protection are complex, and beyond the scope of USAID/Mexico.

7.0 USAID's Future Role in Conservation in Mexico: Opportunities for Greatest Impact

1. *Watersheds, Filters, and Focus*: Mexico is rich in biodiversity throughout its terrestrial, coastal, and marine environments, and threats are widespread. For this strategy period, the Environment Team—and the entire Mission—has devoted considerable effort to assessing geographical focus and site-based parameters in which to work. (A southern focus prevailed in the Mission Strategy Concept Paper, but the Mission is still deciding if there will be an overall geographic focus. Site-based options investigated include ANPs, watersheds, corridors, and ecoregions.) The Environment Team will support a watershed approach, a focus that also received strong support in the EPIQ assessments. The Environment Team aims to integrate biodiversity conservation, community natural resource management, improved use of renewable energy and clean production, and a strengthened enabling environment, all within the framework of watershed management.

   The Environment Team will need to determine which watersheds to work in. The EPIQ options report suggests using filters to determine these target watersheds. Other Environment Team documents have provided a variety of versions of the filters. Most of the filtering mechanisms suggest high biodiversity value and threats to biodiversity as among the top two to three criteria.

   The 118/119 Assessment Team concurs with using biodiversity importance/threat criteria as the top criteria, with the caveat that biodiversity is rich throughout the country, and threats are spread throughout (as described in Sections 3, 4, and 5), and therefore, these criteria act as a large-sieved filter. Other criteria such as the potential for successful intervention, local will, potential for replication, USAID comparative advantage and previous experience, and other possible filters will help focus the site selection process further.

   Regardless, of the geographic region and/or the site-based approach taken (landscape, watershed, corridor, or ANP), biodiversity conservation should remain in the forefront of the Environment Team's interventions. The biodiversity emphasis is especially important in Mexico because—as shown in Section 3.0—the country is one of the richest in biodiversity in the world. The biodiversity emphasis builds on USAID/Mexico's comparative advantage (a history of working with ANPs and adjacent communities) and on synergies with G-CAP. The Environment Team's strategy (November 12, 2002) and results framework does have a biodiversity conservation focus, in conjunction with renewable energy and clean production, potentially focusing on water and sewage treatment.

2. *Support the GOM's Framework*: The Environment Team not only works within the Environment SO framework, but also contributes to the GOM's conservation framework—primarily the NBS (see Section 1), the cornerstone of biodiversity conservation in Mexico. USAID and other donors have made significant contributions to the NBS, especially in its first two strategy areas: conservation of biodiversity and knowledge of biodiversity. Less progress has been made in the third and fourth areas—appraisal and valuation of biodiversity, and diversification of uses of biodiversity. USAID can support the fourth strategy line of the NBS, "diversification of uses" (of biodiversity) in line with IRs 2 and 3. Achieving tangible benefits among community-level stakeholders is critical and links the Environment SO's IRs together. To derive increased community benefit from natural resource management, new or improved uses of natural resources, and new relationships with markets may need to be developed. In addition, USAID can support strategy line 3, "valuation of natural resources," (specifically provision of water) in support of the SO's integrated water management focus.

   Although Section 6 describes mostly site-based interventions for increasing community benefits, the Environment Team should also further strengthen the GOM's conservation efforts. USAID can use its

comparative advantage as a catalyst to "ramp up" the impact of its site-based community benefit work. The Environment Team can spearhead an effort—with NGOs, GOM, private sector, communities, and other donors—to bring together lessons learned and consolidate policies and successful programs that provide environmental services and increase community benefit from natural resources, thus supporting the NBS's third and fourth strategy lines. This effort would give USAID an opportunity to provide important, well-leveraged strategic support.

3. *Expand engagement with government*: As proposed in the Environment Team's framework and strategy, there will be greater GOM engagement in this strategy period than in the last. The 118/119 Team concurs with this direction. Through engagement with government, USAID can significantly increase its leverage. The EPIQ options report recommends that USAID should encourage SEMARNAT, SAGARPA, SEDESOL, INI, CONAFOR, CONANP, GEF—as well as other donors—to find means to ensure more than piecemeal support for protected areas. Support for the decentralization process will also require the Environment Team to engage with government at multiple levels. Typically, the conservation community (including donors) has worked with NGOs, and has only peripherally engaged the government. However, to move ahead on mainstreaming environment, to ensure that site-based activities are not merely "islands of conservation," and to ramp up impact, increased collaboration with all levels of the GOM will be necessary. The Environment Team (previous SO 7) already has strong ties to the renewable energy and clean production sectors of the GOM.

4. *Strengthen the focus on incentives as a binding force for the Environment Team's framework*: The Environment SO's framework would be strengthened by a greater focus on increasing benefits to communities. The Environment SO's strategy states that "USAID envisions…continued work to conserve critical natural resources while assuring that local people are involved in and benefit from efforts to improve management of resources they depend on." Specific activities may include the introduction of best practices, land use planning, monitoring and evaluation, and institutional strengthening. The strategy expands on the above, with an emphasis on water and watershed management, expanded delivery of public services at the community level, decreased vulnerability to natural disasters, integrated rural trade and diversification of rural economies, and clean production and renewable energy, among others. The "glue" that binds the various potential activities together is the **increased tangible benefit to communities**. Rural people—who manage risk with great caution, use traditional practices to gain their livelihood, and have access to few options—are unlikely to change behaviors without tangible incentives—economic or otherwise.

   Specifically related to IR 3, the Environment Team is aiming to increase rural/urban community participation in natural resource management (IRs 3.1 and 3.2) to strengthen the community role in natural resource management (IR 3). IRs 2.2 and 2.3 will disseminate forest, conservation area, water, and watershed management practices to increase the use of environmentally and economically sound practices (IR 2). Achieving IRs 2 and 3 will require an explicit focus on community benefit and/or economic opportunity—and not only community participation, strengthened community role, and dissemination/promotion of best practices. Deriving community benefit (from natural resources) and linking community benefit to improved management and conservation of natural resources are highly complex modes of operation, requiring both a wide range of expertise and a long-term perspective.[79] This should not discourage a community benefit emphasis, but does require the Environment Team to take into account its complex nature. Mexico's community forestry enterprise model could be an entry point for incentive/community benefit interventions.

[79] Experience from Enterprise Works and Technoserve—see Annual Reports, 2000 and websites—and various specialty coffee, cocoa, herbs, spices, non-timber forest products, and ecotourism activities reflect the complexity and timeline—see Jason Clay's book for "Twenty Lessons Learned."

5. *Environment and Democracy & Governance Synergies*: The D&G SO is supporting a study that will enlighten both SOs on the possible synergies and intersections of the two programs. Although the study is currently ongoing, the 118/119 Team believes that a useful intersection for the SOs may be found in the ZOFEMAT program's model for sustainable development. The model is based on good public administration, provides for the benefit of local communities, and works through federal, state, and municipal governments.

6. *Capacity-building opportunities*: USAID has emphasized and successfully undertaken capacity building in its assistance program. Additional areas for capacity building remain, most of which have been discussed in Section 6 and in the EPIQ options report:

    a) PROFEPA is mandated with enforcement responsibilities, but has limited capacity (in terms of staff and equipment, but also technical skills) to effectively fill this role.
    b) For effective decentralization of components of natural resource management, local-level capacity will have to be strengthened in natural resources-based planning, management, use, monitoring, and enforcement—with a focus on municipal-level government.
    c) For increased rural community participation in natural resource management, capacities of community-based organizations and enterprises must be strengthened. Areas to target would include business development services, the concept of producing for specific markets, community-level natural resource management, and methods for community enforcement and monitoring of natural resource use and management.
    d) The EPIQ options report recommends capacity building and institutional strengthening for the newest and smallest NGOs working at ANP sites.
    e) Targeted capacity building, in collaboration with the TIES SpO, could be directed at strengthening capacity for forest inventories; natural resource database development, use, and maintenance; natural resources valuation; and developing economic data for GCC scenarios.
    f) There are also opportunities for South-South capacity building, with Mexico taking the lead in disseminating information on aspects of sustainable natural resource management.

Annexes

Annex 1: Statement of Work

STATEMENT OF WORK FOR
PREPARATION OF A SECTION 118/119
BACKGROUND ASSESSMENT STUDY FOR USAID/MEXICO

1. Purpose:

The purpose of this request is to obtain a background assessment of biodiversity and tropical forests in Mexico pursuant to requirements of the Foreign Assistance Act (FAA) Sections 118 and 119 and related USAID guidance. The assessment shall be presented in a report to USAID/Mexico entitled "Biodiversity and Tropical Forest Conservation, Protection and Management in Mexico: Assessment and Recommendations." The report shall be completed no later than 1 November 2002.

2. Background

In development of a new Country Strategy (FY 2004-2008), USAID/Mexico is required to conduct a background assessment to ensure that its new plan is concordant with the conservation of the country's biological diversity and forest resources. This assessment is mandated under Sections 118 and 119 of the Foreign Assistance Act (FAA) that require:

> **Section 118**- Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-- (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified;
>
> **Section 119**- Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-- (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

To respond to these FAA requirements, USAID has developed more specific guidance for the conduct of such assessments, which is set forth in a cable with the subject "Guidance For Preparation Of Background Assessments On Biological Diversity And Tropical Forests For Use In CDSS Or Other Country Plans," found in full at www.usaid.gov, ADS Series 200-2003 References, Additional Help: 200-203, File Name: 200sbh_070201_cd24, and attached hereto.

Mexico ranks as the 4th most biodiverse country in the world and is surpassed only by China in the number of distinct ecosystems that it supports. The diversity of Mexico is not limited to any one of type of ecosystem, but encompasses marine, desert, temperate and tropical forests as well as fresh water aquatic resources. This rich natural resource base also is intricately linked in the economic system of the country and supports a human population that is the 4th densest in the world. The USAID program in Mexico, during its more than ten year existence, has focused much effort on biodiversity and forestry, but increasingly the governance, health, energy and microfinance sectors are gaining importance in the overall program. The new strategy being developed will address all these sectors and will focus on the linkages and synergies between them, with particular attention to water and climate change.

Mexico as a nation has dedicated a great deal of effort to the development of laws and programs that are working toward the overall conservation of priority biological resources. Examples of the government's efforts include the formation of: the Commission on the Knowledge and Use of Biological Diversity (CONABIO), recognized worldwide as a top biological information organization; the National Commission on Natural Protected Areas (CONANP), in charge of the management of the nations 127 declared protected

areas; and an integrated Ministry of the Environment (SEMARNAT) that manages national policy for air, land and some water resources in the country. Mexico is also an active participant in several international environmental agreements. Mexico was the first country to sign the Convention on Desertification and is a Party to this convention as well as those dealing with Climate Change and Biodiversity Conservation, and has been working in concert with other nations on international forestry accords. Internally, Mexico has worked to develop and improve its national statistical base on biodiversity and water resources, to measure its contributions to greenhouse gases and to inventory its forest resources on a regular basis. Despite these actions, Mexico has one of the highest rates of deforestation and land degradation and is one of the leading GHG emitters in the developing world. Current climate change models predict that Mexico will suffer increased drought, catastrophic floods and fires in the future that will further impact its forest and biological resources. Understanding how global climate change, as well as other future changes will impact the richness of Mexico's natural resource base is vital.

This assessment will be aided by the enormous amount of data that already has been gathered by institutions, government and other conservation organizations in Mexico and from the work already accomplished by USAID and other donors. Given this resource, this assessment will primarily be summarizing this breath of the existing information that exists. The Program and Partnership Assessment and Strategic Options Development Analysis carried out under USAID's EPIQ activity by International Resources Group (IRG) for SO6 and SO7 at the start of FY02 will serve as the foundation for this report in compliance with Sections 118 and 119. The program analysis included *inter alia* an assessment of the present relationship between USAID and its partners, their progress in reaching the intermediate results for achieving the current SO 6-Critical Ecosystems and Biological Resources Conserved and an overview of what the major conservation programs have been doing in Mexico. The study also identified a series of strategic options for USAID assistance in the area of biodiversity conservation and natural resources management for the environment program. Also available are priority setting assessments from international NGOs, including Conservation International and World Wildlife Fund that have been synthesized to advise The Nature Conservancy's planning process last year. In addition, the GOM 2000 National Forest Inventory and other priority setting work conducted by the GOM upon the beginning of the new sextenio will be valuable sources of information. Finally, CONABIO's rich database and existing analyses will be a valuable source of information.

This proposed study will build from the foundation of these recent assessments and synthesize this information on the current status the biological and forest resources of Mexico and the recognized principal pressures impacting them. It will include impacts of the actions and potential actions of the overall Mission program, not just environment. Particular attention should be paid to developmental plans, particularly large-scale plans such as the Plan Puebla-Panama and tourist development of the coasts, and in other sectors in which the Mission works. Much of this information exists and is available on numerous websites, including www.dec.org (USAID's Development Experience Clearinghouse), www.worldbank.org, www.iadb.org, etc. The goal here should not be to provide lists of species, but to approach this as a way of linking critical biological and forest resources to help prioritize eco-regions and watersheds, determine common conservation challenges affecting them and begin to identify potential roles for all sectors of the Mission's program in addressing these issues. Attention should also be given to the quality of the existing data, and any critical gaps should be noted.

3. Detailed Statement of Work

The study should result in a written report that follows relevant USAID guidance on Section 118-119 analysis, which is attached to this SOW. This background report will provide an overview that will follow the illustrative outline presented in the attachment, and will synthesize existing data and information on the status of biodiversity and tropical forests in Mexico. It will provide an overall description of Mexico's biodiversity and tropical forestry assets, evaluate their current status and identify the pressures and threats

affecting those resources. This will primarily involve synthesis and presentation of data and analyses already done by major non-governmental organizations active in the country (TNC, WWF, CI, etc), other donors (GEF, World Bank, IADB, NADB, CABEI) and the Government of Mexico itself (particularly important for this will be the database and analysis of.) since the beginning of the administration of President Fox in a manner that will be accessible for all sectors working on the Mission Strategy. Of particular interest will be information from other sectors programs that impact biodiversity and forestry management options and outcomes, such as tourism, energy, microenterprise and agriculture. More specifically, and with reference to the Agency-wide guidance in the attachment, the assessment will compile available information on the following major themes:

- The **Policy, Regulatory and Institutional Framework** for biodiversity and tropical forest resources including: a review of the policy and legislative basis, with attention to decentralization, for the protection of biodiversity and tropical forest resources; Mexico's participation in international treaties and agreements related to conservation; a description and overview of the Mexican Government institutions involved in the sector (CONABIO, CONAFOR, CONANP, SEMARNAT, etc) or whose programs directly impact this sector, such as the Ministry of Agriculture, the Ministry of Tourism, Ministry of Trade and the Ministry of Indigenous Affairs; and, an overview of current national level plans to address policy issues related to biodiversity and tropical forest resource conservation.

- An overview of the **Non-Governmental Organization** (NGO) community involved in biodiversity and tropical forest management activities including a list of the major organizations and institutions, the highlights of their program priorities and an approximate level of finance of their programs.

- A description of the biodiversity and tropical forest conservation activities and commitments as well as descriptions of other major efforts that will impact these resources by other **Donors, Foundations and Multilateral Organizations** operating in Mexico, the highlights of their program priorities and an approximate level of finance of their programs. Particular emphasis shall be placed on plans for the Plan Puebla Panama, and on plans (or lack thereof) for environmental assessments pursuant to planned large-scale infrastructure investments. Because Mexico has a variety of operational partnerships with **other U.S. Government Agencies** related to the environment sector, this section will also list and briefly describe programs related to or impacting biodiversity and tropical forests that are supported by these other agencies.

- Provide an overview of the major biodiversity and tropical forest conservation activities of the **Commercial Private Sector** to help identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities most engaged in management and use of Mexico's tropical forests and tracts near protected areas, including, *inter alia*, major logging companies, tourism developers, commercial agriculture, and other land development concerns.

- Provide an overview table and map of the **Status and Management of Protected Area System** in Mexico including: an inventory of all declared and proposed areas (national parks, wildlife reserves and refuges, forest reserves, sanctuaries, hunting preserves and other protected areas) including marine and coastal areas. The inventory will identify the institution responsible for the protection and management of each decreed area, its date of establishment, area, and the protection status of each (i.e., staff in place, management plan published, etc.). In addition to this summary of the current protection and management status of each park, an overview of the major threats and challenges facing protected areas in Mexico, including vulnerability of areas to predicted changes in climate, and a brief summary of any recognized economic potential of these areas (including productive assets, environmental services and recreation and tourism opportunities) should be provided.

- An overview of the **Status and Protection of Endangered Species** in Mexico, including its coastal zones. This section should not emphasize species counts, but look at the relation of endangered species and important habitat conservation areas and issues, and evaluate the pressures on those areas, including vulnerability to predicted changes in climate, and current efforts to mitigate pressures, including the participation and compliance with CITES and other international efforts.

- An overview of the **Status of Conservation outside the Protected Area System**, focused on the different natural resources ecosystems common to Mexico, including forest resources, rangeland resources, arid/semi-arid resources, coastal/marine ecosystems, wetlands and the sustainability of the agricultural landscape. This section can build upon the PRODERS program under CONANP and should include a general discussion of the economic, ecological and social importance of these ecosystems, with particular attention to critical environmental non-commercial services they provide (watershed protection, erosion control, fuel wood, soil and water conservation and amenity and recreation). Emphasis will be placed on the status of wetlands and desert/arid lands in Mexico and any threats affecting them, including vulnerability to climate change. It will also summarize how current land tenure arrangements affect conservation in Mexico.

- An overview of the **Impacts of Major Development Projects and Plans** on biodiversity and tropical forest conservation particularly focused on the Plan Puebla Panama and tourist development in key coastal areas and other regions where USAID works. This would include summary of current policies and regulatory frameworks for environmental review and permitting of these projects and plans.

- An overall assessment of Mexican programs for **Ex-Situ Conservation and Conservation of Economically Important Species and Germplasm** including, as feasible, a list of the programs being undertaken to conserve endemic and endangered organisms at zoos, botanical gardens, captive breeding programs, etc. and a summary list of existing conservation databases. It will also provide an overview of gene banks and the status of their activities to support sustained production as well as protection of commercially important native plant and animal species. Also under this section indigenous property rights and bioprospecting as related to conservation of biodiversity and forest should be considered.

On the basis of the activities specified above, the Consultant(s) will prepare a summary **Biodiversity and Tropical Forest Conservation, Protection and Management in Mexico: Assessment and Recommendations**. This assessment will follow the attached Agency guidance and include an analysis of the needs for building national capacity, both public and private, and an aware and informed public constituency for biodiversity and tropical forest conservation. It will identify particular issues affecting the protected area system and natural resources protection and management in general. The Consultant(s) will include recommendations regarding USAID's future role in conservation in Mexico and where U.S. comparative advantages and capabilities are likely to have the greatest impact. As possible, these issues and recommendations should be prioritized to identify those requiring the most immediate attention.

4. Timing

The Biodiversity and Tropical Forest Background Assessment Study will be carried out to inform the final strategy development in October and November . The draft report shall be delivered to no later than November 1, 2002 for USAID/Mexico comments which will be provided within five working days. The final report shall be delivered no later than November 15, 2002.

5. Illustrative Level of Effort

USAID anticipates that the assessment can be completed in approximately 5 weeks by a team of three people, one International/Regional Biodiversity/Forestry Expert and two Mexican Biodiversity/Forestry Experts. You may wish to adjust. All personnel shall be fluent in English and Spanish and shall have extensive prior technical experience in the field.

6. Relationships and Responsibilities

The Contractor(s) shall report to the USAID/Mexico Environment/Energy Team Leader or his designee. The Contractor will be responsible for identifying and obtaining the majority of the reference materials needed for this study with only minimal interventions on the part of the USAID/Mexico Environment Team. USAID/Mexico will provide a letter of introduction to the GOM Agencies and other institutions being called upon to collaborate in providing information for this study. The Mission will also provide country clearance for the contractor and access to the U.S. Embassy for the Contractor and make its environment library readily available for reference review.

7. Deliverables

There shall be three Deliverables under this contract:

1. Workplan and Schedule: The Contractor shall provide USAID with a Workplan and Schedule within 5 days of contract inception. The Workplan and Schedule shall be 3-5 pages long, and shall include a week-by-week listing of major activities by location (US, Mexico City, other), including any planned site visits, and shall highlight planned interaction with USAID on no less than a weekly basis. The Workplan and Schedule shall also include a preliminary report outline.

2. Draft Report: The Contractor shall submit a Draft Report at the end of the fourth week of the contract. The Draft Report shall follow the generic outline provided in the attachment to this SOW, as refined during the course of the contract in consultation with USAID. The Report shall not exceed fifty pages, in English, with suitable annexes and pertinent figures (maps, institutional charts, tables) and references. Among the expected appendices is a briefly annotated bibliography of the most important current reference materials related to the topic and a contact list for each of the organizations discussed in the Report.

3. Final Report: USAID will provide its comments on the Draft Report within 5 working days of receipt of the Draft. The Contractor will then have 5 days to incorporate the comments and submit the Final Report.

The Contractor will furnish both electronic file versions of all submissions (first draft and final report) and five copies, including one photocopy ready version of the Final Report.

Annex 2: FAA Sections 118/119

Foreign Assistance Act, Part I, Section 118 - Tropical Forests

Sec. 118.\73\ Tropical Forests.

\73\ 22 U.S.C. 2151p-1. Sec. 118 was added by sec. 301(3) of Public Law 99-529 (100 Stat. 3014). See also footnote 71.

(a) Importance of Forests and Tree Cover.--In enacting section 103(b)(3) of this Act the Congress recognized the importance of forests and tree cover to the developing countries. The Congress is particularly concerned about the continuing and accelerating alteration, destruction, and loss of tropical forests in developing countries, which pose a serious threat to development and the environment. Tropical forest destruction and loss--

(1) result in shortages of wood, especially wood for fuel; loss of biologically productive wetlands; siltation of lakes, reservoirs, and irrigation systems; floods; destruction of indigenous peoples; extinction of plant and animal species; reduced capacity for food production; and loss of genetic resources; and

(2) can result in desertification and destabilization of the earth's climate. Properly managed tropical forests provide a sustained flow of resources essential to the economic growth of developing countries, as well as genetic resources of value to developed and developing countries alike.

(b) Priorities.--The concerns expressed in subsection (a) and the recommendations of the United States Interagency Task Force on Tropical Forests shall be given high priority by the President--

(1) in formulating and carrying out programs and policies with respect to developing countries, including those relating to bilateral and multilateral assistance and those relating to private sector activities; and

(2) in seeking opportunities to coordinate public and private development and investment activities which affect forests in developing countries.

(c) Assistance to Developing Countries.--In providing assistance to developing countries, the President shall do the following:

(1) Place a high priority on conservation and sustainable management of tropical forests.

(2) To the fullest extent feasible, engage in dialogues and exchanges of information with recipient countries--

(A) which stress the importance of conserving and sustainably managing forest resources for the long-term economic benefit of those countries, as well as the irreversible losses associated with forest destruction, and

(B) which identify and focus on policies of those countries which directly or indirectly contribute to deforestation.

(3) To the fullest extent feasible, support projects and activities--

(A) which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and

(B) which help developing countries identify and implement alternatives to colonizing forested areas.

(4) To the fullest extent feasible, support training programs, educational efforts, and the establishment or strengthening of institutions which increase the capacity of developing countries to formulate forest policies, engage in relevant land-use planning, and otherwise improve the management of their forests.

(5) To the fullest extent feasible, help end destructive slash-and-burn agriculture by supporting stable and productive farming practices in areas already cleared or degraded and on lands which inevitably will be settled, with special emphasis on demonstrating the feasibility of agroforestry and other techniques which use technologies and methods suited to the local environment and traditional agricultural techniques and feature close consultation with and involvement of local people.

(6) To the fullest extent feasible, help conserve forests which have not yet been degraded, by helping to increase production on lands already cleared or degraded through support of reforestation, fuelwood, and other sustainable forestry projects and practices, making sure that local people are involved at all stages of project design and implementation.

(7) To the fullest extent feasible, support projects and other activities to conserve forested watersheds and rehabilitate those which have been deforested, making sure that local people are involved at all stages of project design and implementation.

(8) To the fullest extent feasible, support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing, including reforestation, soil conservation, and other activities to rehabilitate degraded forest lands.

(9) To the fullest extent feasible, support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation, including research in agroforestry, sustainable management of natural forests, small-scale farms and gardens, small-scale animal husbandry, wider application of adopted traditional practices, and suitable crops and crop combinations.

(10) To the fullest extent feasible, conserve biological diversity in forest areas by--

(A) supporting and cooperating with United States Government agencies, other donors (both bilateral and multilateral), and other appropriate governmental, intergovernmental, and nongovernmental organizations in efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis;

(B) whenever appropriate, making the establishment of protected areas a condition of support for activities involving forest clearance of degradation; and

(C) helping developing countries identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas.

(11) To the fullest extent feasible, engage in efforts to increase the awareness of United States Government agencies and other donors, both bilateral and multilateral, of the immediate and long-term value of tropical forests.

(12) To the fullest extent feasible, utilize the resources and abilities of all relevant United States Government agencies.

(13) Require that any program or project under this chapter significantly affecting tropical forests (including projects involving the planting of exotic plant species)--

(A) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and

(B) take full account of the environmental impacts of the proposed activities on biological diversity, as provided for in the environmental procedures of the Agency for International Development.

(14) Deny assistance under this chapter for--

(A) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner which minimizes forest destruction and that the proposed activity will produce positive economic benefits and sustainable forest management systems; and

(B) actions which significantly degrade national parks or similar protected areas which contain tropical forests or introduce exotic plants or animals into such areas.

(15) Deny assistance under this chapter for the following activities unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development:

(A) Activities which would result in the conversion of forest lands to the rearing of livestock.

(B) The construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands.

(C) The colonization of forest lands.

(D) The construction of dams or other water control structures which flood relatively undegraded forest lands.

(d) PVOs and Other Nongovernmental Organizations.--Whenever feasible, the President shall accomplish the objectives of this section through projects managed by private and voluntary organizations or international, regional, or national nongovernmental organizations which are active in the region or country where the project is located.

(e) Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

(1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(f) Annual Report.--Each annual report required by section 634(a) of this Act shall include a report on the implementation of this section.

Foreign Assistance Act, Part I, Section 119 - Endangered Species

Sec. 119.\75\ Endangered Species.--

(a) The Congress finds the survival of many animal and plant species is endangered by overhunting, by the presence of toxic chemicals in water, air and soil, and by the destruction of habitats. The Congress further finds that the extinction of animal and plant species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. Accordingly, the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems, and through the protection of wildlife habitats should be an important objective of the United States development assistance.

\75\ 22 U.S.C. 2151q. Sec. 119, pars. (a) and (b) were added by sec. 702 of the International Environment Protection Act of 1983 (title VII of the Department of State Authorization Act, Fiscal Years 1984 and 1985, Public Law 98-164; 97 Stat. 1045).

(b) \75\ In order to preserve biological diversity, the President is authorized to furnish assistance under this part, notwithstanding section 660,\76\ to assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and parks; to enact and enforce anti-poaching measures; and to identify, study, and catalog animal and plant species, especially in tropical environments.

\76\ Section 533(d)(4)(A) of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1227), added ``notwithstanding section 660" at this point.

(c) \77\ Funding Level.--For fiscal year 1987, not less than $2,500,000 of the funds available to carry out this part (excluding funds made available to carry out section 104(c)(2), relating to the Child Survival Fund) shall be allocated for assistance pursuant to subsection (b) for activities which were not funded prior to fiscal year 1987. In addition, the Agency for International Development shall, to the fullest extent possible, continue and increase assistance pursuant to subsection (b) for activities for which assistance was provided in fiscal years prior to fiscal year 1987.

\77\ Pars. (c) through (h) were added by sec. 302 of Public Law 99- 529 (100 Stat. 3017).

(d) \77\ Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

(1) the actions necessary in that country to conserve biological diversity, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(e) \77\ Local Involvement.--To the fullest extent possible, projects supported under this section shall include close consultation with and involvement of local people at all stages of design and implementation.

(f) \77\ PVOs and Other Nongovernmental Organizations.-- Whenever feasible, the objectives of this section shall be accomplished through projects managed by appropriate private and voluntary organizations, or international, regional, or national nongovernmental organizations, which are active in the region or country where the project is located.

(g) \77\ Actions by AID.--The Administrator of the Agency for International Development shall-

(1) cooperate with appropriate international organizations, both governmental and nongovernmental;

(2) look to the World Conservation Strategy as an overall guide for actions to conserve biological diversity;

(3) engage in dialogues and exchanges of information with recipient countries which stress the importance of conserving biological diversity for the long-term economic benefit of those countries and which identify and focus on policies of those countries which directly or indirectly contribute to loss of biological diversity;

(4) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity;

(5) whenever possible, enter into long-term agreements in which the recipient country agrees to protect ecosystems or other wildlife habitats recommended for protection by relevant governmental or nongovernmental organizations or as a result of activities undertaken pursuant to paragraph (6), and the United States agrees to provide, subject to obtaining the necessary appropriations, additional assistance necessary for the establishment and maintenance of such protected areas;

(6) support, as necessary and in cooperation with the appropriate governmental and nongovernmental organizations, efforts to identify and survey ecosystems in recipient countries worthy of protection;

(7) cooperate with and support the relevant efforts of other agencies of the United States Government, including the United States Fish and Wildlife Service, the National Park Service, the Forest Service, and the Peace Corps;

(8) review the Agency's environmental regulations and revise them as necessary to ensure that ongoing and proposed actions by the Agency do not inadvertently endanger wildlife species or their critical habitats, harm protected areas, or have other adverse impacts on biological diversity (and shall report to the Congress within a year after the date of enactment of this paragraph on the actions taken pursuant to this paragraph);

(9) ensure that environmental profiles sponsored by the Agency include information needed for conservation of biological diversity; and

(10) deny any direct or indirect assistance under this chapter for actions which significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas.

(h) \77\ Annual Reports.--Each annual report required by section 634(a) of this Act shall include, in a separate volume, a report on the implementation of this section.

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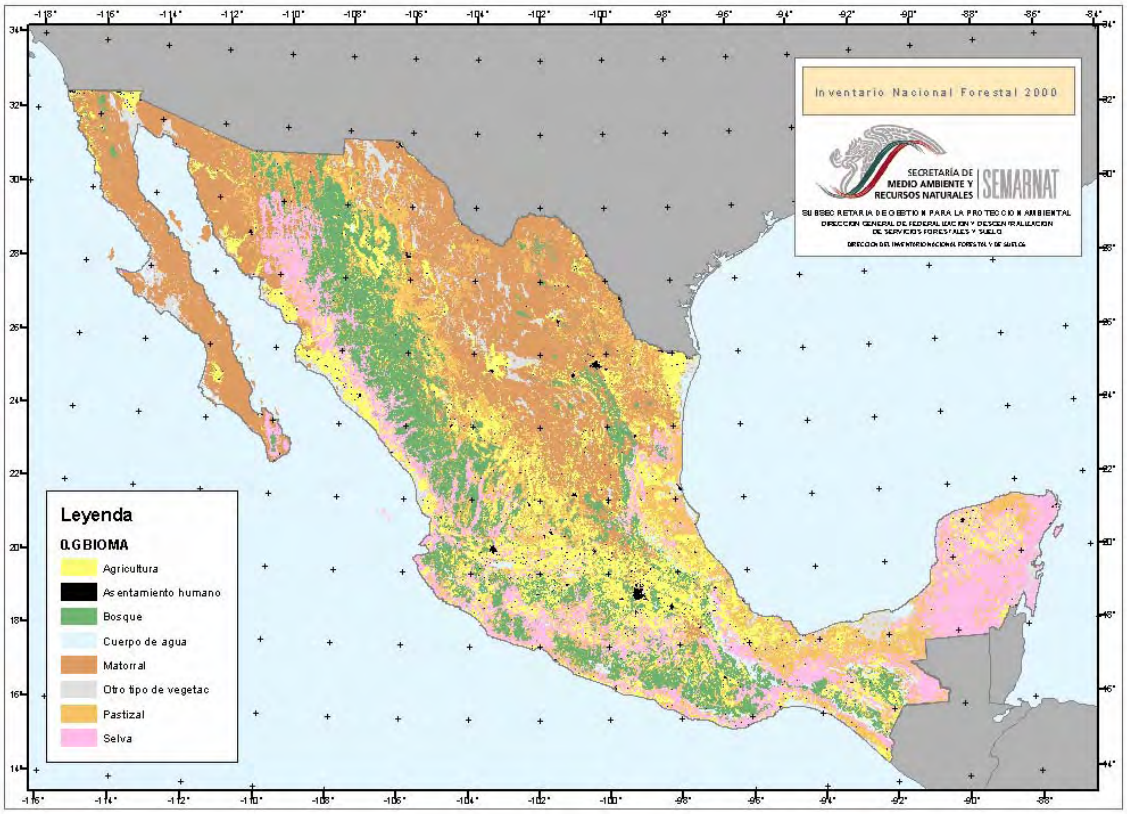
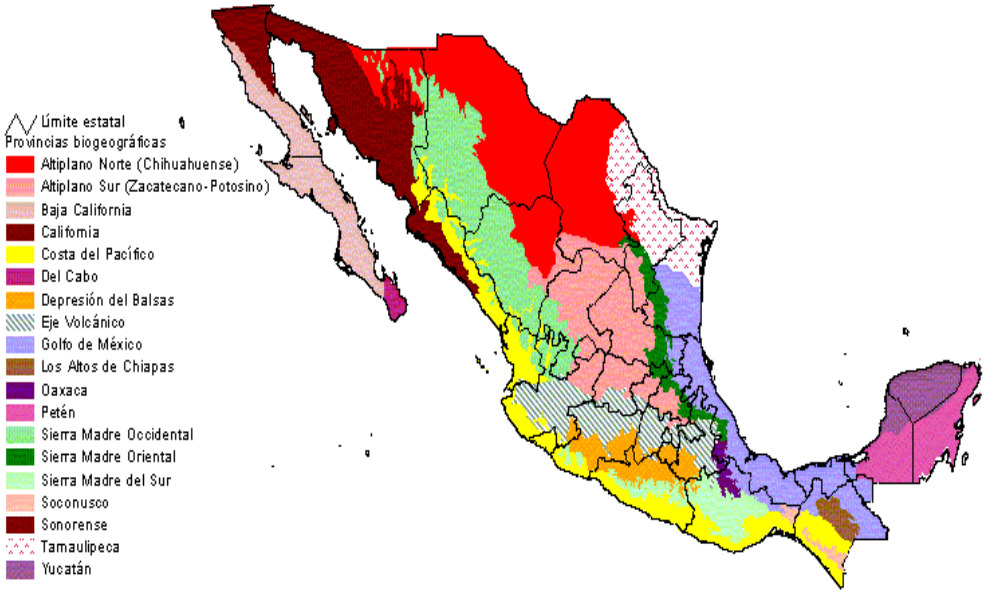
Annex 5: Mexican Biome Maps

Mexico: Biomes



Mexico: Biogeographic Regions



Annex 6: IUCN/Red Book List of Vulnerable Species

Summary Statistics of Threatened or Extinct Animals and Flora in Mexico

Category	Animals	Flora
Extinct	21	0
Extinct in the wild	6	2
Subtotal	27	2
Critically endangered	56	30
Endangered	89	61
Vulnerable	114	130
Subtotal	259	221
Lower Risk/Conservation Dependent	12	7
Lower Risk/Near Threatened or Not Threatened	104	19
Data Deficient	33	20
Total	435	269

Threatened Species by Taxonomic Group for Mexico

Species	Number Threatened
Mammals	70
Birds	39
Reptiles	18
Amphibia	4
Fishes	88
Molluscs	4
Other Inverts	36
Plants	221
Total	480

The tables were derived from the IUCN Red List of Threatened Species website (http://www.redlist.org/info/tables/table5.html, http://www.redlist.org/info/tables/table6.html, and http://www.redlist.org/info/tables/table7.html.

The full list of threatened species native to Mexico is provided as a 70-page table in the Mexican law, *Norma Oficial Mexicana* NOM-059-ECOL-2001, which may be downloaded from either of the following web pages on SEMARNAT's website:

http://www.semarnat.gob.mx/dof/marzo02.shtml

http://www.semarnat.gob.mx/marco_juridico/biodiversidad.shtml