

~~SECRET~~  
Not for  
Distribution..  
Do Not Copy

THE SIERRA DE LAS MINAS BIOSPHERE RESERVE IN GUATEMALA:  
INSTITUTIONAL RESPONSE TO DEFORESTATION AND THREATS TO  
BIODIVERSITY

By Jim Manolis

A Report to Dr. George Honadle  
Forest Resources 5703  
Natural Resources Management in the Third World

10 March 1992

## TABLE OF CONTENTS

Introduction	1
PART I. Background	2
Demographics	2
Economy	3
Social Welfare and Land Distribution	5
Dominant Political Forces	6
A Short History	8
Topography, Physical Characteristics and Biodiversity	12
A Major Problem: Deforestation and Biodiversity Loss	13
PART II. The Sierra de Las Minas Biosphere Reserve: Institutional Response to Deforestation and Biodiversity Loss	15
Physical and Biological Attributes	16
Zoning of the Reserve	17
Threats and Problems	18
Management Goals and Objectives	20
Institutional Involvement	21
Guatemalan Stakeholders	21
International Stakeholders	23
PART III. Assessment and Recommendations	25
Barriers to Success	25
Keys to Success	28
Literature Cited	35
Maps, Figures and Tables	38

## Introduction

Guatemala is a country of extremes. While it is a center of biological and cultural diversity, and has the largest economy in Central America, it also has the worst record of violence, human rights abuses, and poverty in the region. Its natural resources, particularly forests, are rapidly eroding in response to a complex of factors involving a highly inequitable land distribution, over-exploitation, and excessive population growth. (Gardner, 1990; Dewert and Eckersley, 1990; Weinberg, 1991: 43-57). However, due to international pressure and an environmental movement in the country itself, Guatemala is taking its first steps towards conservation of biodiversity, within the context of sustainable development. One step is the designation of the Sierra de las Minas Biosphere Reserve, signed into law in October, 1990 (Lenhoff, 1991:1). Biosphere reserves are increasingly seen as models for harmonious and sustainable use of nature, where conservation problems, along with problems of poverty and underdevelopment, are addressed. However, most of the problems are only solved on paper -- in the real world, reserve projects are confronted with innumerable problems, and it remains to be seen if they will truly fulfill their intended purpose.

In Part I of this paper, I will describe the Guatemalan context in which The Sierra de las Minas reserve is enmeshed. In part II, I will describe the reserve in detail -- its biology, institutions involved

in, it, the problems it encounters, and the management plans designed to alleviate them. In part III I will make an assessment of the work that has been done on the Sierra de las Minas Biosphere Reserve, and try to elucidate key factors that will be important for its success, recognizing the institutional and social forces described in parts I and II.

### Part I. Background

To fully understand the context of a project like the Sierra de las Minas Biosphere Reserve, one must consider the demographic and economic characteristics of the country, the overall natural resource base, and the political and institutional forces that drive the country and affect natural resource decisions.

#### Demographics:

The major demographic feature of Guatemala is an exceedingly high growth rate. In 1980, the growth rate reached 3.6% , and the population had doubled in thirty years. (Calvert, 1985:29, see table1.) A very high growth rate continues: it was at least 2.77% in 1990 and at that time the population reached 9.2 million. (WRI/UNEP/UNDP, 1990: 254). While the population is becoming increasingly urban, the majority of Guatemalans live in rural areas and are employed in agriculture. In 1960, 77% of the population was rural, by 1990, this figure dropped to 58%; the proportion of the work force in agriculture in 1960 was 67%, and in 1980 it was 57%. (WRI et al, 1990: 270). A majority (55%) of the population is Indian, 40% is Ladino (Spanish/Indian mix), and the remaining 5% is



comprised of German, Chinese, Belgian, and Lebanese immigrants and nationals (Fauriol, 1988: 11).

### Economy:

Basic economic indicators will be covered and then recent trends in the economy will be analyzed.

First, per capita income (GNP) was \$947 in 1987. This actually moderate to high for a developing country, but still it is fifteen to twenty times less than the GNP of "developed" nations. (WRI et al 1990: 244). The distribution of GDP follows (1981 data) : services 53%, trade 27%, agriculture 25%, manufacturing 16%, mining 2%, construction and utilities 4% (U.S. Army 1983: 90). While agriculture comprises only 25% of GDP, it employs over half the work force and is seen as the most important part of the economy (U.S. State Department, 1986). Major food crops include maize, beans, wheat, rice, and potatoes (Painter, 1987: 9). However, the major cash crops are coffee, sugar, cotton, meat, and bananas, with coffee and sugar providing over half of foreign currency income. "Non-traditional goods" made up 26.36 % of foreign currency income in 1990, which included such goods as broccoli, melon, snow peas, asparagus, and other non-agricultural products such as wood, oil, and clothing. (see figure 1, Guatemala News watch, March 1991). The major markets for these products were the United States, 35%; Central America, 20%; Germany, 7%; Japan, 3%. (US State Department 1986).

In the past, the Guatemalan economy was one of the strongest (by traditional indicators) in Latin America. During the 1950's, 1960's, and 1970's it experienced considerable growth (U.S.

Army, 1983: 86) , and during the period of 1967-1977, the percent increase in real GNP was 6.2 % . However, since the early 1980's it has been experiencing major difficulties, and during the 1977-1987 period, the growth rate dropped to .1% (WRI et al 1990: 244).

The recent declines can be largely explained by price trends for coffee, sugar, and cotton. Prices hit cyclical lows in 1981 and 1982 (U.S. State Dept. 1986) and they have remained low to the present (WRI et. al, 1990: 250). One author commented that "The continued dependence on foreign currency exchange earned through the export of key agricultural products (cotton, coffee, sugar) and the vagaries of international pricing will continue to play havoc on the national economic picture" (Fauriol 1988: 12). Certainly, the present 1991-92 recession will not help matters in Guatemala.

Other problems contribute to the situation in Guatemala -- balance of payment difficulties in other Central American countries have decreased their ability to buy Guatemalan manufactured goods, and foreign banks, product suppliers, and commodity purchasers have reduced credit availability to Guatemala. (U.S. State Dept. 1986). While Guatemala has traditionally had few problems with debt, its total external debt doubled between 1982 and 1987, when it reached \$2.7 billion. Long term public debt as a percentage of GNP reached 34% at this time. (WRI et al 1990: 246). These figures are actually fairly low for a developing country, but the fact that debt is on the rise is another negative economic signal.

Increased political violence in the early 80's inflicted a great deal of harm on the tourist industry. However between 1988 and 1989, the tourism industry jumped 46.8%, and in 1989 it brought in

\$108.9 million in foreign currency and made up 5.4% of the total.<sup>1</sup> (Guatemala News Watch, April 1991). Most likely, tourism has been affected by the present recession, but no data could be found on this.

Another small component of the Guatemalan economy is development assistance: in 1985-1987, the average annual official development assistance was \$153 million, which contributed 1.8% to GNP. (WRI et al, 1990: 244). The majority of this assistance came from the U.S. (Guatemala Watch, 1991a).

### Social Welfare and Land Distribution:

Traditional economic indicators say little about actual welfare. Even when the Guatemalan economy was running strong, a small proportion of Guatemalans actually benefited from it. A 1982 UNICEF study reported that Guatemala had the lowest 'physical quality of life' in Central America, and the third lowest in Latin America after Haiti and Bolivia (as cited in Painter, 1987: 3). Infant mortality and child death rates (< 5yrs) remain high: 59 and 99 deaths per 1,000 live births, respectively, for the 1985-1990 period (WRI, 1990:258); and only 25% of the rural population has access to safe drinking water, one of the lowest rates in the world (WRI, 1990: 260). In the 1970's, more than 40% of the rural labor force was landless, and an additional 50% were nearly landless. By the early 1980's, approximately 60% of the rural populace earned less than US\$ 80 per year, and 90% had no land or not enough to meet basic

---

<sup>1</sup>I am skeptical about this figure -- it seems like a big jump for one year. Guatemala News Watch is produced by the Guatemalan Economic Development Foundation, and certainly they would want to promote tourism, perhaps by exaggerating the present tourist activity.

needs (U.S. Army, 1983: 57). A 1982 USAID study reported that Guatemala has the most unequal land distribution in Latin America. (as cited in Painter, 1987: xv). Two percent of the farms contain 65% of the farmland, and these are the largest farms, all over 45 hectares, and 482 farms ( 1%) are over 900 hectares (see table 2, Painter, 1987: 10).

### Dominant Political Forces :

According to James Painter, three main groups hold the political and economic power in Guatemala:

1) A Guatemalan Ladino Elite, whose wealth is based largely on coffee and other agro-exports. They own the majority of land as discussed above. Professor Piero Gleijeses, of the John Hopkins School of advanced international studies comments on the view of the Joint Chamber of Agriculture, Commerce, Industry, and Finance (CACIF), that serves as the main voice of the private sector : "CACIF's view of the world remains simple and uncompromising. 'I got through my work and efforts what I wanted; no one can touch it and others can starve at my door.' " (Painter, 1987: 30).

2) The Guatemalan Military, which has been expanding its own economic base into many parts of the economy. The military can also be viewed as the most powerful force in government: "In Guatemala, the armed forces have in fact provided , and embodied, the only real models of governance . . . reflecting Guatemala's turbulent

development, the nation's political experiences have generally been abruptly terminated by the action of the final arbiter of society -- military authority." (Fauriol, 1988: 5-6). Increasingly, the military has been involved in the economy. A 1983 AID study claimed that 60% of the department of Alta Verapaz was owned by the Army, and by year end of 1985, the army had effective managerial and economic control over the national airline, the main international airport, the public telecommunications system, the state owned electricity company, Chanel 5 TV station, two defense factories, and at least twenty parastatal agencies run under the army's civilian affairs unit. (Painter, 1987: 29-30).<sup>1</sup>

3) A variety of US transnational corporations and banks. The United Fruit Company of Boston was one of the dominant economic forces through much of this century:

By the 1950's, although coffee remained the principle export crop, UFCo dominated a broad sector of the Guatemalan economy. It's domination of the transport and communications infrastructure earned it the nickname "El Pulpo" (the octopus) both for it's stranglehold on the economy and the many tentacles of it's involvement. (McClintock, 1985: 25).

Today, UFCo is not as dominant as it once was, as it was broken up in an anti-trust suit in US courts. However, Del Monte bought up much of it's land, and it is the largest private employer in Guatemala (Weinberg, 1991: 53). In 1985, 483 branches and subsidiaries of US transnationals were operating in Guatemala, including 90 of the top

---

<sup>1</sup>No sources for this information were given by Painter, so they may be viewed with some speculation.

500 US companies. Tax policies often favored these operations: legislation passed in 1975 provided for a 100% tax exemption for five years (Painter 1987).

Painter suggests that these power forces often work together in maintaining the status quo. This has very much limited the ability of the government to make changes through laws and policies: "Political modernization has occurred through constitutional trappings generally viewed as abstract legal necessities, rather than guidelines of political behavior " (Fauriol 1988: 5-6). An example of this is attempts at tax reform. Guatemala has one of the lowest tax bases in the Americas, less than 9% of GDP in 1981 (See table 3), and tax reforms (usually attempts to raise taxes) have usually failed to overcome the opposition of the wealthy (US Army, 1983: 86). One of the reasons for the 1983 coup against Rios Montt was private sector annoyance at his 10% value added tax on non-essential consumer goods. This tax was reduced to 7% by Mejia Victores soon after he took over. (Painter 1987: 33).

### A Short History

It is not surprising that such entrenched forms of domination have resulted in violence and political turmoil. Essentially, repression, resistance, and revolt have been continual since Spanish conquest in 1524. <sup>1</sup>During the early colonial period, Indians were subjected to forced labor, and Spanish militias were maintained

---

<sup>1</sup>This short and admittedly sketchy history will be largely taken from McClintock, 1985. Other sources will be indicated.

largely to suppress revolt. Guatemalan independence, in 1821, did not improve the situation:

The social order remained largely as before, and the instruments of government through which the Indian was obliged remained much the same. The subjugation of the Indian peasantry to the descendants of the conquistadors, to later waves of European immigrants, and to the mixed-race, Spanish and Indian *ladinos* would remain at the core of the Guatemalan social structure (McClintock, 1985: 3)

In the late 1800's, wealthy liberals took power, gave Indian and Church land to entrepreneurs, and promoted export agriculture, primarily coffee. It was during this time that Guatemala first received "security assistance" from the United States, in the form of training for police. Forced Indian labor continued in the form of "debt bondage", and continual revolts were suppressed. During the reign of Jorge Ubico (1931-1944), greater state control and very sophisticated internal security systems materialized. He was overthrown in 1944 after university students demanded reform and Guatemalan businessmen supported them in the form of a general strike.

In the aftermath, a new constitution was drafted, and a unique period (some would say "communist" and "revolutionary") in Guatemalan history would follow. For the first time, attempts at democracy were made, and a civilian president (Juan Jose Arevalo 1944-50) was elected. The next elected president, Jacobo Arbenz (1950-54) made some serious reform efforts, -- laborers were allowed to organize, and in 1952, an agrarian reform law was enacted. By 1954, expropriation orders had been issued for 2.7 million acres, and half the land was actually handed over to peasant

cooperatives and small landholders. However, these actions led to Arbenz's demise. In June of 1954, Arbenz was overthrown with the help of US military invasion. Historians will continue to argue over what the main factor was that precipitated the US action -- whether it was the "communist threat" or US business interests that were threatened by agrarian reform. Fauriol (1988: 33) confers that the latter was significant, since expropriation orders had been issued for 387,000 acres of UFCo land during the months that preceded the coup. After the overthrow, the new dictatorship reversed the agrarian reform efforts. (Weinberg 1991: 46).

In the years that followed, the Guatemalan economy experienced growth, and at the same time, various revolutionary guerrilla movements gained power (see figure 2 ). Essentially, Guatemala has been in a state of civil war for thirty years. Certainly, both sides have committed many vicious acts, and it was commonplace for innocent villagers to be threatened with death if they didn't take a side. (Snetsinger, 1992). In 1978, over 100 Kekchi Indians were massacred in the village of Panzos --they were petitioning local officers for the return of land seized by the military. This action mobilized much of the guerrilla movement and a massive counter-insurgency campaign ensued in the early 1980's. Dubbed the "scorched earth" campaign, over 20,000 Indians were killed , 250 villages were completely destroyed, and over one million people were displaced. " General Oscar Mejia Victores, Guatemala's last Military Ruler, summed up the ultimate goal of the counter-insurgency program 'We must get rid of the words 'indigenous' and 'Indian'"(Weinberg 1991: 47).



Today, both guerrilla and counter-insurgency activities are much reduced, but certainly continue (Snetsinger, 1992). In 1991, the Guatemalan Human Rights Commission reported 83 forced disappearances, and 764 extra judicial executions, while the Human Rights office of the Archbishop reported 123 cases of torture, 231 forced disappearances, 205 murders, and 551 extra-judicial executions (Guatemala News Watch, Dec. 1991).

Despite this bloody history, there is a ray of measured hope -- since 1986, Guatemala has had a "nascent democratic" government with elected presidents (Fauriol 1988), and during 1991, several peace talks (but so far insubstantial) occurred between the URNG Guerrillas and the Guatemalan government. (Guatemala News Watch, Dec. 1991). However, after the election of Jorge Serrano Elias in January of 1991, one writer commented:

. . . as a President with a small popular base of support and no majority in Congress, Serrano is essentially a one man show who would have a hard time standing up to the power of the military on matters of substance, even if he were inclined to do so. As the economy drags on, most activists fear that the newly-elected government will prove unable to govern the country, and the Army will continue to call the shots in Guatemala. (Rossdeutcher and Loeb 1991).

### Topography, Physical Characteristics, and Biodiversity

Guatemala is a very diverse country in terms of topography, natural resources, and biology. There are three main regions of the country: The Peten region, the Highlands, and the Pacific Coastal Plain. (See map1) The Peten is a vast lowland area in the north, underlain by limestone and making up the second largest expanse of broad-leafed forest in Central America (Gardner, 1990b: 6). An extensive series of mountain chains make up the highlands, running largely west to east and northwest to southeast. Mount Tajumulco, the highest mountain in Central America, rises to 13,816 feet, and six active and twenty-four dormant volcanoes are scattered through out the chain. This is a very unstable geological area and the 1976 earthquake took close to 30,000 lives.

The prevailing northeast trade winds bring very moist air to the Peten region and the northern exposures of the mountains, creating extensive rainforests and cloudforests. The southern slopes are drier and slope down toward the pacific in a fertile piedmont and coastal plain. The greatest areas of coffee, cotton, and sugar production are in this region, although the northern department of Alta Verapaz is also a very productive coffee area. (Calvert 1985:8)

Biologically, Guatemala is the most diverse country in Central America: 174 mammals, 666 birds, 204 reptiles, 99 amphibians, and over 8,000 plant species inhabit the region. (WRI 1990: 300; Gardner 1990b: 6). Many species are endemic, and botanists P.C. Standley and J.A. Steyermark write: "The exceedingly varied types of soil,

topography and diverse geological history. . . have given Guatemala the richest flora in all Central America, with an estimated total of 8,000 species of vascular plants. Of this number, many are endemic, confined to particular canyons and volcanoes. Many genera and species of the United States and Mexico reach their southern limits of distribution in Guatemala, and a large number of South American genera either reach their northern limits of dispersal here or are unknown elsewhere in other parts of Central America." (As cited in Defensores de la Naturaleza, 1986.) Guatemala also has necessary habitat for at least 133 threatened and endangered species, including howler and spider monkeys, ocelot, jaguar, tapir, harpy eagle, scarlet macaw, and Guatemala's national bird, the resplendent Quetzal. (Gardner, 1990a:2).

#### A Major Problem: Deforestation and Biodiversity Loss

As could be expected, the combination of inequitable land distribution, violence, poverty, an exploding population and a shaky economy all contribute to serious ecological problems in Guatemala. Many of the problems are interconnected, and center around deforestation. By 1990, at least 60% of the total forest cover had been lost, and deforestation continues at a rate of at least 2% per year, higher than the average of 1.3 % for Latin America. (WRI, 1990: 292). The causes of deforestation are largely typical for Latin America. Expanding populations of rural people, already pushed onto marginal land, are forced to cut forests to grow food for subsistence. One Peace Corps volunteer witnessed a farmer planting on such a

steep slope that he needed a rope to keep from sliding down the mountain (Faust 1992). The government's policy of "agrarian transformation" actively colonizes forest land, where 30,000 hectares of forest are delivered per year to campesinos. These lands are quickly cultivated to exhaustion, and are then abandoned for cattle pasture. (Dewart and Eckersley 1990: 9)

High ranking army officers often take over such land for ranching operations, and a map of "Counterinsurgency zones" taken over by the military was almost identical to a previous map of potential cattle raising areas. (Dewart and Eckersley 1990: 9-10) Cattle grazing land increased 2,125% between 1960-1978. (Painter 1987: 10 ). Herbicide spraying, both in "war on drugs" campaigns and in attempts to reduce hiding areas of Guerrillas, has inflicted considerable damage. (Weinberg 1991: 53). In addition, the military clears the forest for 300 yards on either side of new roads in order to prevent ambushes in insurgency areas (Gardner 1990a:12).

Logging is also on the rise: between 1986 and 1987, the export of wood products reportedly rose 142% (Dewart and Eckersley 1990: 11). Three domestic and four transnational companies operate in the country, and one author suggests that they regularly bribe government officials and in order to cut in "protected areas" (Gardner 1990a: 12).

While good information on deforestation rates and direct causes is sketchy, it is certainly occurring as in much of the tropics, contributing to losses of biodiversity and other problems such as soil loss and watershed destabilization.

## Part II

The Sierra de las Minas Biosphere Reserve: Institutional Response to Deforestation and Biodiversity Loss

In the 1980's, an environmental movement began to emerge in Guatemala, and international conservation groups helped pressure the government to address issues of deforestation and loss of biodiversity. (Weinberg, 1991). Various new agencies were created, including a national protected areas council (Consejo Nacional de Areas Protegidas, or CONAP), and a conservation database and research organization ( Centro de Estudios Conservacionistas, or CECON) (Defensores la Naturaleza 1992; Moser 1992). In February of 1990, President Cerezo signed a protected areas law, declaring 44 "special protection areas" to be considered for inclusion in a national park and reserve system. In October of 1990, a region in the Sierra de las Minas mountains in east central Guatemala was formally declared a biosphere reserve. A private organization, Fundacion Defensores de la Naturaleza, was appointed the coordinator and administrator of the area. (Defensores, Promotional sheet, date not stated). In order to take a close look at institutional and organizational response to deforestation and biodiversity loss in Guatemala, this section of the paper will focus on the new reserve -- its ecological importance, the pressures acting on it, and the institutions involved in its development. Section III will attempt to assess the progress and plans for the reserve within the broader context of Guatemalan politics, and make suggestions for

strengthening institutional and technical aspects of conservation in the reserve.

### Physical and Biological Attributes:

<sup>1</sup>The Sierra de las Minas Biosphere Reserve encompasses 322,500<sup>2</sup> acres (129,000 hectares) of extremely steep mountainous country in east central Guatemala (see maps). The reserve is long and fairly narrow, essentially covering a cross section of one ridge. Elevations range from 150 meters to 3015 meters, and this variation results in eight distinct life zones. It is one of the most biologically diverse areas of Guatemala, containing large tracts of tropical humid and cloud forests. The area is seen as essential habitat for the endangered national bird of Guatemala, the Resplendent Quetzal. 400 other species of birds inhabit the area, including the endangered harpy eagle, and 20-40% of these species are neotropical migrants. (US Forest Service 1991). The area is also known to be one of the most important reserves of tropical conifer germplasm in the world. 17 species and three genera of conifers are found here, and some of these, such as *Pinus caribea* varieties, are used for reforestation programs in many parts of the world. The germplasm in the reserve

---

<sup>1</sup>Much of the information on the reserve is taken from "Fundacion Defensores de la Naturaleza -- Reserva de la Biosfera Sierra de las Minas: Plan Operativo." Several other sources are noted. I will admit that some mis-interpretations are possible -- I have never had formal training in Spanish.

<sup>2</sup>I suspect that this figure refers only to the core area of the reserve, and the total area of the reserve is actually much larger. One account stated that 90,000 hectares of the core area is privately owned and equals 2/3 of the total core area. (Defensores promotional sheet, date not stated).

may be important for breeding and improvement efforts (Defensores 1992; Perry, 1991).

The reserve is also a very important source of water. 63 rivers run down the north and south slopes of the main ridge, and the southern rivers provide water for agriculture in the Motagua Valley-- the driest part of Guatemala. Export crops such as coffee, tobacco, tomatoes, melon, cardamom, and rice are grown around the reserve (Defensores, 1992).

#### Zoning of the Reserve:

The generally accepted or suggested scheme for biosphere reserves is depicted in figure 3, after Batisse (1986) as cited in Gregg, 1991. The idea is to have a strictly delineated core area that is minimally disturbed. Surrounding the core area is the buffer zone, which may support experimental research, recreation, silvaculture and agriculture, scattered settlements, and other fairly low intensity uses. Moving further out is the transition or cooperation zone, which supports regionally characteristic uses and is the main area for involving local people in sustainable patterns of development, and for implementing extension and education programs which will both help improve their lives and generate enthusiasm for the reserve. This area is usually not mapped, but it may contain delineated research and demonstration areas.

Map 3 shows the zoning of the Sierra de las Minas Biosphere Reserve. This map is fairly rough, and it is difficult to tell exactly what the zones correspond to on land (compare to land use and

vegetation map), but it appears that the nuclear or core area largely consists of forest. It may be that delineated boundaries of zones will be worked out as more information is gathered, and the zones on the map are given just to illustrate the concept of biosphere reserves (The map was taken from an annual report of Defensores de la Naturaleza, definitely not intended for scientific purposes). Curiously, the zoning of the Sierra de las Minas reserve differs in one respect from the generally accepted conceptual scheme for biosphere reserves, by its inclusion of the Zona de Uso de Sostenido (sustainable use area) in the area immediately around the core area. Perhaps this area could be considered a sub-unit of the buffer zone. It may very well be that much of the buffer zone is degraded and needs to be reclaimed and restored. Though the zonation map doesn't designate a transition zone, it is evident that the area around the buffer zone has been considered, as the land uses in this area were mapped.

#### Threats and Problems:

Despite the extraordinary riches of the reserve, the area is far from pristine and many factors threaten its ecological integrity (See land use and vegetation map). Population pressure and deforestation is a major problem. On the north side of the reserve, Q'ekchi and Pocomchi Indians have been forced off their more fertile lands down slope (by "political instability"), and are practicing unsustainable slash and burn agriculture on higher and higher reaches of the reserve. Note the fingers of orange moving up slope into the green areas on the land use map. The red areas are inholdings of squatters



("Asentamientos humanos"-- sitting humans). The grey areas indicate eroded land, although I could not determine whether this is caused by agriculture or logging . The south side of the reserve is threatened by expanding cattle ranching (violet) and agriculture, non sustainable forestry practices, illegal hunting, and soil erosion.

Logging has also taken its toll. A major problem is that 55% of the reserve is privately owned, and all logging concessions that were issued before the reserve was declared are still valid. (Defensores de la Naturaleza, promotional sheet, and "Plan Operativo" 1992). I do not know the extent to which logging has taken place, but fairly major portions of the forest on the land use map are either "open" or "dispersed" (cross hatched and stippled areas), and this could very well be from logging. A huge pulp mill in the nearby village of El Rancho is scheduled to be reopened (it was closed in 1986 because of financial problems), and this would certainly increase the logging pressure in the region (Gardner 1990a: 7, Faust 1992).

Aside from the direct threats to the reserve, an overarching problem is simply a lack of funding, knowledge, and expertise to be used in conservation and sustainable development efforts. Reportedly, there are only 15 biologists working in Guatemala, and the resource guards working on the reserve have no higher than a third grade education (Gerdes 1992). Despite this, significant work has been done, through a combination of international and Guatemalan effort.

### Management Goals and Objectives of the Reserve:

In response to the general problems discussed above, Defensores de la Naturaleza has developed overall goals and strategies to overcome them. The general goals of the reserve follow:

- 1) Protection of the Forests and Biodiversity in the Reserve.
- 2) Maintenance and Management of Water Production.
- 3) Sustainable use of Natural Resources.
- 4) Promotion of Scientific Investigation.
- 5) Education of the Guatemalan public.

Major strategies to carry out these objectives include:

#### 1) Marking of boundaries, zonation, and mapping.

At present there are 18 resource guards working on the reserve; boundary marking and identification of special areas of concern are major activities. Establishing agreements with private landowners or purchasing private land is occurring, and 3 check points on roads have also been established. Construction of trails and design of public access areas are planned.

#### 2) Public relations, education, extension, and development of sustainable uses of the reserve.

This involves educating local people about the importance of the reserve, involving them in management plans, and giving them assistance in sustainable agriculture and other sustainable uses of the reserve. A major part of this is curtailing slash and burn agriculture, and helping the indigenous population to gain land tenure where they can develop sustainable practices. Demonstration plots will be set up, and training workshops and exchange experiences will be conducted. Development of tourism as a

sustainable use, sustainable forestry, marketing of conifer seeds, and germplasm conservation are also important components. Careful diagnosis of the socioeconomics of the area is planned, along with coordination all interested parties.

### 3) Scientific Investigation and Monitoring.

This includes research on tropical ecology and sustainable uses, and monitoring of biodiversity and human impacts on the reserve.

### 4) Effective administration and management.

This includes developing effective and careful plans, supervision and evaluation of staff, administration of funds, and management and development of physical resources.

## Institutional Involvement:

It is probably evident that accomplishing the objectives of the reserve will be very difficult and exceedingly complex. It involves many "stakeholders,"<sup>1</sup> and effective coordination and communication between them is paramount. I will cover two main groups of stakeholders: Guatemalan groups and International groups.<sup>2</sup>

### Guatemalan Stakeholders:

The organization with primary responsibility for management of the reserve is Fundacion Defensores de la Naturaleza. This is a

---

<sup>1</sup> "A stakeholder is defined as an individual or a group which can have an impact, either positive or negative, on a given situation. That is, a stakeholder either has access to resources that are needed to carry out an activity, or has resources that can be mobilized to prevent the activity from being performed" (Honadle and Cooper 1989).

<sup>2</sup> Detailed information on the stakeholders, their relative roles, and their administrative and governmental organization was hard to find. I am relying primarily on the "Plan Operativo" (Defensores 1992) and a conversation with Kathy Moser, Nature Conservancy Director of Country Programs in Guatemala, Honduras, and Nicaragua, for much of this information.

private non-profit conservation organization founded in 1983 (Defensores, promotional sheet). It is charged with writing the management plans, paying 8 of the resource guards, and coordinating all of the other institutions involved in the project.

The primary government agency involved is Consejo Nacional de Areas Protegidas (CONAP). It pays 10 of the resource guards and apparently provides other funding and assistance. This is a fairly new agency, and has had some problems with turnover of directors, reportedly because they have received death threats for initiating limits on logging and other resource uses. However, as far as management of protected areas goes, it does preside over other government agencies ( at least on paper) (Moser 1992).

A planning council for the reserve includes one representative from each of these agencies and groups: 1) DIGEBOS (Direccion General de Bosques y Vida Silvestre, or the forestry and wildlands agency), which is or will be involved with logging and sustainable forestry on the reserve. This is an older and more production oriented agency than CONAP, and according to Moser (1992) it tends to hold more power in the government. 2) INTA, the Instituto Nacional de Transformacion Agraria (Institute of Agrarian Transformation) is involved in relocating squatters and in colonizing forested areas in general. It tends to be an underfunded and ineffectual organization in government. (US Army, 1983). 3) CECON the Centro de Estudios Conservacionistas (Center of Conservation) at the University of San Carlos, is primarily involved in gathering information and maintaining a conservation database. It produced the land use map included in this report. 4) CDUR, the Consejo de

Desarrollo Urbano y Rural (Council on urban and rural development) is also involved, although I could not determine the extent of its involvement. 5) Private landowners who have property in the reserve. 6) Local indigenous people. 7) Authorities from the four subnational departments that make up sections of the reserve. 8) The private sector in the region.

Other Guatemalan stakeholders, though not directly involved on the planning council, would be the military and the business community in general. Various Guatemalan businesses have provided financial support to Defensores de la Naturaleza.

#### International Stakeholders:

International involvement has been and will continue to be very important in the development of the reserve. The following NGO's and agencies are involved: 1) The Nature Conservancy takes a leading role, both in terms of funding and technical assistance. Peg Khoring, from the Minnesota Nature Conservancy, has worked for over a year as the Guatemala in country director of TNC. She works directly with Defensores de la Naturaleza in the Sierra de las Minas Biosphere Reserve Project. 2) USAID provided funding (\$ 100,000 to the Nature Conservancy in Guatemala) (Nakatsuma 1992) and gave money to CONAP for institutional development (Moser 1992). 3) The World Wildlife Fund is working on a human integration project which helps farmers develop sustainable agricultural practices in the buffer zone and transition zone of the reserve. 4) CARE is also involved in developing sustainable land use practices in the reserve. 5) The UNESCO Man in the Biosphere Reserve Program

helps the many (over 270) biosphere reserves in the world to network and share information. (Gregg 1991.) 6) The Swedish Children's Rainforest group (Barnens Regnskog) raised money for the purchase of private land in the reserve (Moser 1992). 7) CATIE, a tropical agricultural research center in Costa Rica, is providing technical assistance on sustainable agriculture (Nakatsuma 1992). 8) Biologists in the Superior National Forest of Minnesota are proposing a Superior/Sierra sister forest project, where they would provide funding and technical assistance, particularly as it relates to monitoring of neotropical migratory birds. 9) Many businesses, including Xerox, Kellogg, Esso, and Suburu have provided funding for various aspects of the reserve project.

### Part III

#### Assessment and Recommendations

To assess the reserve project and make recommendations, it will be necessary to look at what the barriers are to long term success of the reserve. Many of these barriers are not specific to the reserve itself, but are broad societal problems discussed in section I. Success could be defined as maintenance of biodiversity in the reserve along with sustainable human use.

#### Barriers to Success:

It is obvious that the political and social context of Guatemala make Conservation efforts such as the Sierra de las Minas Project particularly difficult. A review of the broad barriers to success follow:

#### 1) A non-supportive and adversarial political/economic climate.

A. Specific reserve problem: private landowners own much of the reserve and have logging concessions on it.

In a country that is dominated by its army and a wealthy private sector, reforms can often be impossible, and efforts to make changes may be terminated by threats of violence or even violence itself. The threats to CONAP directors are indicative, and in 1981, Mario Dary, the founder of Guatemala's first reserve system was murdered. It was suspected that lumber interests with ties to the

military were responsible for the killing (Weinberg 1991). While the government has been making some important conservation moves, it remains to be seen if these are more "rhetoric than reality" (see Morell and Pozanski 1985). With such a low tax base and little hope of raising it, it would be surprising if the government would take conservation seriously in the near future, especially in the context of a weak economy. Reserve projects will have to depend on private and international sources. However, the fact that CONAP was created, and is providing funds for ten resource guards on the reserve gives some measure of hope. Also, a law that protects private land in the reserve from logging interests was recently upheld in Guatemalan courts, another promising sign.

2) Increasing population, poverty problems, and inequitable land distribution:

A. Specific reserve problem: encroachment and deforestation by local people.

In the long term, conservation efforts will be futile if these problems are not addressed.

3) Lack of funding, expertise and knowledge:

A. Specific reserve problem: lack of knowledge of the reserve, and skill and funding to carry out management strategies and objectives.

This is largely a result of little governmental support, but also results from a lack of training in biology and natural resource fields in Guatemala. Of course funding is a problem in just about any endeavor.



While these barriers may seem intractable, I believe there is hope and that steps have been and can continue to be taken to alleviate them. It is important to recognize that measures or steps need to be taken on different levels. Some of these are local reserve level steps -- ones that can be carried out in the reserve itself or by staff of Defensores de la Naturaleza (but still may depend on support from outside sources). Others must involve many other actors both in Guatemala and the international community.

The main management strategies listed in the management plan (Defensores, Plan Operativo 1992) are basically reserve level steps, but may depend on support from the outside. A review of these strategies follows:

- 1) Boundary marking, zoning, and mapping.
- 2) Public relations, extension, and sustainable development of natural resources.
- 3) Scientific monitoring and research.
- 4) Effective administration, planning and management.

I believe that these strategies are sound and carrying them out will be a major step towards the long term success of the reserve. The management plan is quite detailed and practical. However, it does leave out a few reserve level steps that I see as important, and it does not cover measures that must be taken on other levels. Of course, the intention of the management plan was not to cover all the bases -- it is probably astute in suggesting practical and possible measures that are viewed as acceptable in the broader Guatemalan

society. Here, it may benefit from having somewhat "fuzzy" stated objectives, otherwise it would be seen as too threatening to the status quo and its efforts would be undermined.

In the following section, I will list some factors that I see as keys to the success of the reserve. I will not limit myself to practical or politically possible steps that can only be taken at the local reserve level. When possible, however, I will try to suggest ways that local level steps can eventually lead to long term change.

### Keys to success

1) International attention and financial support. Gradwohl and Greenberg (1988: 64) list this as one of the key ingredients of successful reserves. By looking at the list of international organizations involved, it is evident that Defensores de la Naturaleza, along with the Nature Conservancy, has been effective in garnering international support. This gets at two of the barriers described above. Most obviously, international support can provide funding and technical assistance. In addition, the more international attention (not necessarily just financial support) the reserve has, the more likely the government is to uphold the laws that protect it. In the long run it might help encourage the government to take conservation seriously, and it may also help prevent violent actions toward members of the Guatemalan conservation community.

International connections with conservation and rural development groups should be maintained and strengthened when

possible.<sup>1</sup> The Sierra/Superior Sister Forest Project is an example of this. It will provide funding, technical assistance, staff for a year, and the opportunity for further assistance in the future. This type of program also helps build a sense of global community, and awareness (for Americans) of conservation and development problems in the third world. Awareness in the US is important, because American foreign policies and aid programs (including military aid) can have a great effect on what happens in Guatemala. Americans need to lobby harder for U.S. policies and actions that will support conservation efforts in Guatemala (ultimately, land reform, as I discuss in key number 8, below), along with alleviating poverty and human rights violations. Perhaps more sister organizations and sponsors can be recruited, such as Audubon clubs and other environmental groups.

Another avenue is research. Universities and international research organizations such as CGIAR (Consultative Group on International Agricultural Research) and ICRAF (International Center for Research in Agroforestry) should be encouraged to do research on the reserve. ICRAF is greatly expanding its operations worldwide, and agroforestry is definitely one of the sustainable practices that may be utilized in the buffer and transition zones of the reserve.

---

<sup>1</sup>Of course, the groups should be selected with care -- some groups, such as large donors, can do more harm than good.

2) A truly concerted effort in developing sustainable uses of resources in the reserve, with full participation of the local people. Emphasis should be on improving their lives in ways that they choose.

This is one of the strategies of the management plan, and it appears that Defensores de la Naturaleza is headed in the right direction by making it a priority. I am emphasizing it here because many reserves do not fully carry plans like these out, because they are such new and difficult endeavors. (Gregg 1991). Much skill and knowledge will be needed to successfully achieve sustainable development. One author comments:

Much of the institutional focus will be on buffer zone and transition zone management. This an area that is both new and lacking in knowledge and, at the same time, old and commanding a wealth of knowledge. The new part involves walking a tightrope -- insuring adequate economic opportunity in the area surrounding the reserve to alleviate the need for people to encroach on the reserve to obtain a livelihood, while simultaneously not creating a growth pole or magnet that draws people into the area. The old part involves much of the accepted wisdom on rural development management. The lessons learned over the past two decades about participation, decentralization, local revenue administration, integrated rural development and administrative control, local organization, land tenure, gender considerations, small scale enterprise, social learning and the processes of rural development management all hold some of the keys to effective transition zone management. It is not necessary to reinvent the wheel. (Honadle, 1989).

His points should be taken seriously, and many of the avenues of rural development he mentions will have to be explored. The work of Roland Bunch (1982), Robert Chambers, (1987) and Oakley (1991) are particularly useful. However, such efforts must be

evaluated very carefully for their political feasibility. Programs that emphasize participation and organization of rural people may be hedging on very sensitive ground in Guatemala. During the 1970's and early 80's, rural leaders were often murdered by security forces. Many were even murdered immediately following the 1976 earthquake, when they were simply trying to organize relief and rebuilding efforts (McClintock, 1985).

### 3) Stabilization of Population in the area.

This is certainly tricky -- perhaps that is why it was left out of the management plan. However, it must be recognized that sustainable development cannot accommodate infinite growth, particularly in a sensitive region like that of Sierra de las Minas. Improving the lives of local people may help reduce the birth rate, as many demographers demonstrate ( and is evidenced by much lower birth rates in developed countries). However, it is highly unlikely that such declines would materialize before severe damage is incurred on the reserve. A concerted but very careful and sensitive family planning effort is called for. This is probably politically unfeasible at this time, but it must eventually reach the national agenda in Guatemala and the local agenda around the reserve.

### 4) Effective cooperation and coordination among all stakeholders.

This is addressed in the management plan, particularly by the inclusion of many of the stakeholders on a planning council. It was difficult to gather how this planning council works and how disagreements are settled. However, I would suspect that there are

some power differentials among the institutions involved, and informal dynamics may preside over formal ones (eg CONAP has formal jurisdiction over the reserve). Institutional mapping (Honadle, 1989) or stakeholder analysis in a workshop setting (Honadle and Cooper, 1989) may be useful to help develop coordination and cooperation.

5) Networking with other Biosphere Reserve projects.

A considerable number of MAB biosphere reserves are being developed, and many of them are faced with similar problems. While international communication is costly and difficult, there are several reserves in Mexico and Central America that are viewed as fairly successful, and much could be learned from them. Gregg, (1991) and Gregg, Krugman and Wood (1987) are good resources on biosphere reserves.

6) The laws that protect the reserve must be upheld.

It could not find detailed information on the law that established the reserve. However, when the law was recently challenged in court by private landowners wishing to extract timber on their land in the reserve, the highest court ruled in favor of maintaining the reserve (Lennhoff, 1991). This is surprising considering the little credence traditionally given to laws and policies in Guatemala (see p. 7 of this report) I suspect that the great deal of international attention given to the reserve may have influenced the outcome of the trial.

7) Promote the watershed value of the reserve.

This value probably has the greatest measurable and short term economic impact, particularly in the dry Motagua Valley on the south side of the reserve. Business leaders can understand the importance of water more than the importance of biodiversity, particularly if their crops depend on it. If the reserve has any hope at all, it may depend on this.

8) Establish effective land reforms throughout Guatemala

Of course, this is the most politically difficult measure to take, and I'm not saying that anybody in the Guatemalan conservation community should jump on the land reform bandwagon in the immediate future. However, the problems of poverty, ensuing deforestation and encroachment have their roots in inequitable land distribution, and it is difficult to see how very small parcels of marginal land can sustainably provide for the needs of a growing population of poor people. One author states:

. . . it is unlikely that Guatemala will be able to meaningfully confront its ecological crisis until its 'democracy' has enough breathing space to challenge military development plans and institute a meaningful agrarian reform without fear of provoking a return to the nightmare. For this change to come about, those nations which have aided, and continue to aid, the Guatemalan Security Forces, including the US, Israel, and Germany, will have to come to terms with the role that this aid has played, and still plays in perpetuating environmental destruction and injustice (Weinberg 1991: 57).

If land reform is to occur, it will most likely have to be a result of pressure from the outside, and that is unlikely in the near future.

It is evident that many challenges face the directors of the Sierra de las Minas Biosphere Reserve Project. Prospects for long term success do not look good when one considers the amalgamation of forces that maintain the status quo in Guatemala. However, the project is off to a good start and appears to be rising out of a troubled sea. Whether it sinks or sails will be contingent on the hard work of local people around the reserve, conservation biologists, rural development specialists, and the winds of the global political scene.



### Literature Cited

- Bunch, Roland. 1982. Two Ears of Corn: A Guide to People Centered Agricultural Improvement. Oklahoma City: World Neighbors.
- Calvert, P. 1985. Guatemala: A Nation in Turmoil. Boulder and London: Westview Press.
- Chambers, Robert. 1987. Sustainable Rural Livelihoods, Environment, and Development: Putting Poor Rural People First. Institute of Development Studies.
- Defensores de la Naturaleza (unknown date). Promotional sheet distributed by the Nature Conservancy, Latin American Division.
- Defensores de la Naturaleza. 1986. Promotional pamphlet.
- Defensores de la Naturaleza. 1992. Fundacion Defensores de la Naturaleza Reserva de la Biosfera Sierra de las Minas: Plan Operativo. Guatemala.
- Dewart, T. and M. Eckersley. 1990. The Political Roots of Deforestation. Report on Guatemala 11 (spring 1990): 9-11).
- Fauriol, G.A. and E. Loser. 1988. Guatemala's Political Puzzle. New Brunswick: Transaction Books.
- Faust, T. 1992. Personal Communication. Former Peace Corps Volunteer in Guatemala.
- Gardner, Florence. 1990a. Guatemala: A Political Ecology. The Environmental Project on Central America -- Green Paper number 5.

- Gardner, Florence. 1990b. Broccoli in the Rainforest: Guatemala's Environmental Crisis and the Agro-Export Program. Report on Guatemala 11, #3 (fall) 6-8)
- Gerdes, D. 1992. Personal Communication. USFS biologist working on Superior/Sierra Sister Forest Proposal.
- Gradwohl, J. and R. Greenberg. 1988. Saving the Tropical Forests. London: Earthscan Publications.
- Gregg, W.P, Krugman, S.L., and J.D. Wood.(eds.) 1989. Proceedings of the Symposium on Biosphere Reserves, Fourth World Wilderness Congress, September 14-17, 1987. Atlanta: US Park Service.
- Gregg, W.P. 1991. MAB Biosphere Reserves and Conservation of Traditional Land Use Systems. Pages 274-294 in M.L. Oldfield and Janis B. Alcorn (eds.) Biodiversity: Culture, Conservation, and Ecodevelopment. Boulder, San Francisco, Oxford: Westview Press.
- Guatemala News Watch. Monthly Newsletter of FUNDESA, the Guatemalan Development Foundation.
- Honadle G. and L. Cooper. 1989. Beyond Coordination and Control: An Interorganizational Approach to Structural Adjustment, Service Delivery, and Natural Resource Management. World Development 17(10): 1531-1541
- Honadle, G. 1989. Putting the Brakes on Tropical Deforestation: Some Institutional Considerations. A Discussion Paper prepared as a part of the Tri-Directorate Initiative on Deforestation. Washington DC: Office of Rural and Institutional Development, Bureau for Science and Technology, US Agency for International Development.
- Lenhoff, Andreas. 1991. Newsletter of Fundacion Defensores la Naturaleza. Nov. 1. p1.
- McClintock, M. 1985. The American Connection Volume II: State Terror and Popular Resistance in Guatemala. London: Zed Books.

- Morell, D. and J. Pozanski. 1985. Rhetoric and Reality: Environmental Politics and Environmental Administration in Developing Countries. in H.J. Leonard (ed.) Divesting Nature's Capital, NY: Holmes and Meier, 1985, p137-76.
- Moser, K. 1992. Personal Communication. Director of Country Programs in Guatemala, Honduras, Nicaragua, The Nature Conservancy Latin America Division.
- Natkatsuma, A. 1992. Personal Communication. Guatemala Mission Environmental Officer, USAID.
- Oakley et. al. 1991. Projects With People. International Labor Office, Geneva.
- Painter, J. 1987. Guatemala: False Hope, False Freedom. London: Catholic Institute for International Relations, Latin American Bureau.
- Perry, Jesse P. 1991. The Pines of Mexico and Central America. Portland: Timber Press.
- Rosdeutscher, D. and D. Leob. 1991. Swing to the right brings Jorge Serrano Elias to power. Guatemala Watch, 12(1) spring 1991.
- Snetsinger, S. 1992. Personal Communication. Friend who traveled extensively in Guatemala in 1991 and talked with villagers.
- United States Army. 1983. Guatemala: a country study. Richard F. Nyrop, ed. Washington D.C.: The American University, Foreign Area Studies.
- United States Department of State. 1986. Background Notes, Guatemala.
- United States Forest Service. 1991. Sister Forest Project -- Sierra/Superior: A Conservation Strategy for Neotropical Migratory Birds. Project Proposal to the Tropical Forestry Program, USDA Forest Service. Superior National Forest, Duluth, MN.
- Weinberg, B. 1991. War on the Land: Ecology and Politics in Central America. New Jersey: Zed Books.

World Resources Institute, UNEP, and UNDP. 1990. World Resources 1990-1991. New York: Oxford University Press.