



Park Profile - Guatemala San Miguel la Palotada Protected Biotope (El Zotz)

Date of most recent on-site evaluation: July 2002

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Location: Department of Petén in the Maya Biosphere Reserve.

Year created: 1987

Area: 34,934 ha

Eco-region: Tehuantepec humid forest

Habitat: Humid highland forest, dry highland forest, dry forest of the foothills, xerophytic scrub in lowlands, humid forest in hollows, and marshes



Summary

Description

San Miguel la Palotada Protected Biotope (El Zotz) is located in northern Guatemala, in the municipality of San José, department of Petén. It is one of the Maya Biosphere Reserve core zones. El Zotz (meaning “bat” in the Mayan language) is the common name for the protected area, though officially it is called San Miguel la Palotada (Decree N° 4-89, 1989; Decree N 5-90, 1990). The area features several major archaeological sites, the most important of which are El Zotz and El Diablo.

Biodiversity

Regionally endemic species include: Morelet’s crocodile (*Crocodylus moreletii*), black howler monkey (*Alouatta pigra*), black-handed spider monkey (*Ateles geoffroyi*) and ocellated wild turkey (*Agriocharis ocellata*). Felines include the jaguar (*Panthera onca*), puma (*Felis concolor*) and ocelot (*Leopardus wiedii*). Other mammals include bats (*Pteronotus* spp.). Several of the species in the area are included in the IUCN Red List (2001), while the CONAP Red List (2001b) lists *C. moreletii*, *A. pigra*, *A. geoffroyi*, *P. onca*, *F. concolor* and *L. Wiedii* as threatened with extinction.

Threats

ParksWatch classifies San Miguel la Palotada Protected Biotope (El Zotz) as **threatened**, meaning there is a very high risk that the protected area will fail to protect and maintain biological diversity in the near future; remedial action is needed. The main threats include expanding agriculture, forest fires, the illegal use of forest products and poaching. Local communities do not respect the biotope's borders. There are seven communities around the protected area, as well as temporary settlements within the biotope.



View of the Biotope seen from the community of El Cruce. Note deforestation in the foreground.

Description

Physical description

San Miguel la Palotada Protected Biotope (El Zotz) is located in northern Guatemala, in the municipality of San José in the department of Petén and forms one of the core zones of Maya Biosphere Reserve (RBM). The biotope covers an area of 34,934 ha as established by CONAP (CECON 1999), although older technical documents state that it has 49,500 ha. This discrepancy occurred when CONAP recently used a Geographic Information System (GIS) to calculate the area of the protected area.

The biotope is bordered to the east by Tikal National Park and to the north, south and west by the Maya Biosphere Reserve's Multiple Use Zone. There are significant archaeological sites in the area, including several structures and temples such as El Zotz, which features vast structures built in the Classic Period, 600-900 AD (CONAP 1999a), and the Mirador del Diablo (the Devil's Look-out). Outside the biotope, to the south and west, lies a heavily populated area that is putting a great deal of pressure on the forest.

The landscape is one of rolling hills that cross the biotope from southwest to northeast and run as far north as Dos Lagunas Biotope and the Río Azul block of El Mirador-Río Azul National Park. The hills reach a maximum height of 400 meters. To the east, near Tikal National Park, lie the lowlands, which reach an altitude of 150 meters (CEMEC/CONAP 2001; CECON 1999). The soil is Tertiary Era sediment with marine-origin calcareous formations (CECON 1995; Oxlaj 1992). The temperatures range from 20-32° C, and the average annual temperature is 27° C (CECON, 1999). Annual precipitation varies from 1200-1400 mm. There are approximately four dry months, between January to April. Rivers do not flow throughout the year; when they

dry up, remaining water pools in small ponds, which serve as vital resources for the local wildlife.



One of the pools

Vegetation

According to the Dinerstein et al. classification (1995), El Zotz is part of the Tehuantepec humid forest ecoregion. The biotope forest is not pristine. Logging was authorized in the area in 1967, and the local timber industry operated for two decades. There has also been extraction of non-timber forest products; in the 1960s, the local gum tapping industry began. Many areas show signs of altered forest structure, especially areas that were once home to commercially important species such as cedar (*Cedrela odorata*) and mahogany (*Swietenia macrophylla*). These areas are now planted with introduced species such as black olive (*Bucida buceras*). The Center for Conservation Studies of San Carlos University, Guatemala (1999) identified six different kinds of habitat in the protected area: humid highland forest, dry highland forest, dry forest of the foothills, xerophytic scrub in marshes, humid forest in hollows and marshes. A rapid ecological evaluation of Maya Biosphere Reserve classifies the area as an ecological community of medium-diversity (Apesa 1993). At that time, researchers identified 160 plant species of 31 families in the area. A posterior observation of the area noted tree species that were not listed in the 1993 evaluation. Some of the trees lose up to one-quarter of their leaves in the dry season, which according to Pennington & Sarukhán (1998), is typical for the area.

Dry highland forest

This grows in the highest reaches of the biotope, at altitudes at or above 400 meters. Drainage is rapid because of generally thin and porous soil. The upper canopy reaches a height of 20-30 meters. As the altitude lowers, the canopy does not reach as high. The canopy is not very dense, and some of the trees lose their leaves at the height of the dry season. Species found in the area include: ramón (*Brosimum alicastrum*), chicozapote (*Manilkara zapota*), canisté (*Pouteria campechiana*), zapotillo (*P. reticulata*), coloc (*Talisia olivaeformis*), pij (*Gymnanthes lucida*), luín macho (*Drypetes lateriflora*) and *Nectandra coriacea*, among others. The latter three species do not commonly occur in other parts of the biotope (CECON 1999). In some parts of the forest, the undergrowth is dense, due to the amount of sunlight that filters down (personal observation).



View of the canopy. Many trees lose their leaves during part of the year, which is why the canopy is not dense, allowing sunlight to filter down to the undergrowth.

Dry forest of the foothills

This forest grows in areas of medium altitude and forms a transitional ecosystem between highland forest and lowland forest (CECON *op. cit.*). The canopy is not dense and does not reach to the heights of the highland forest canopy, sometimes reaching only 20 meters.



Tree species include mahogany (*Swietenia macrophylla*), *Sebastiana longicuspis* and jobo (*Spondias mombim*). Many species are semi-deciduous. Palm trees include the botán (*Sabal mauritiiformis*).

*Detail of the undergrowth where there is a large quantity of palms (*Sabal* sp.), in some places.*

Humid highland forest

The humid highland forest grows in highland areas, on poorly drained soils. It is one of the most common habitats in the biotope (CECON 1999). The trees are not very tall, reaching heights of 20-25 meters in their upper strata. From field observations, three arboreal strata are distinguishable. The lower stratum, from 4-8 meters, is made up of different species: *Crysophylla stauracantha* is a common species, and in some places, one can find cohune palm trees (*Orbignya cohune*). The intermediate stratum runs from 10-15 meters, while the upper stratum runs from 20-25 meters. The floristic composition is dominated by sapotaceous, such as chicozapote (*Manilkara zapota*), silión (*Pouteria amygdalina*), canisté (*P. campechiana*) and zapotillo (*P. reticulata*). Other species include ramón (*Brosimum alicastrum*), cedar (*Cedrela mexicana*), copal (*Protium copal*), pepper (*Pimenta dioica*) and *Acacia dolichostachya*. Associations can come in many variations, depending on the type of drainage and soil.

Xerophytic scrub in marshes, humid forest in hollows and marshes, and marshes

These habitats occur in areas with a shallow layer of heavy, sticky topsoil that is flooded during the rainy season, and dries and cracks in the dry season. The habitats exist in small and medium-sized hollows. The soil has poor drainage and a sheet of water covers the area during the rainy season. Depending on the terrain, water remains in stagnant pools for varying periods, which in turn determines the plant life composition in that particular area. At times, one type of plant community emerges and then is replaced by another. In areas of humid forest, one can detect low-lying forest vegetation where dominating species include palo tinto (*Haematoxylum campechianum*), pucté (*Bucida buceras*) and palo gusano (*Lonchocarpus guatemalensis*). The canopy rarely tops 11 meters in height (Lundell 1937). In the drier areas, stubby and closed xerophytic bushes dominate. Marshes exist in sunken areas and are common in the southeastern corner of the biotope.

Biodiversity

El Zotz lacks comprehensive research on its biodiversity (CECON, 1999). Observations made during field visits and interviews with park wardens indicate that regionally endemic species include Morelet's crocodile (*Crocodylus moreletii*), ocellated turkey (*Agriocharis ocellata*), howler monkey (*Alouatta pigra*) and red snook (*Petenia splendida*). Species reported by CECON (1999) include Baird's tapir (*Tapirus bairdii*), red brocket deer (*Mazama americana*), jaguar (*Panthera onca*), ocelot (*Leopardus wiedii*), puma (*Felis concolor*) and other felines. There are also large colonies of bats in the biotope, which have yet to be studied. There are also several species in the area that are included on the IUCN Red List (2001). CONAP's (2001a) Fauna Red List and other documents (CONAP, 2000a) include *C. moreletii*, *A. pigra*, *A. geoffroyi*, *P. onca*, *F. concolor* and *L. Wiedii* as highly endangered species. CONAP's Flora Red List (2001b) considers that many of the floral species could soon become endangered.



A view of natural wall covered with cavities that serve as home to thousands of bats. The bats set out in large flocks at night.

Management

The biotope was created in 1987 by a ruling crafted by the Petén Land Commission (CTP, 1987). In 1989, the Law of Protected Areas conferred its official status (Decree 4-89), and in 1990, the Declaration of Maya Biosphere Reserve established the area as a core zone (Decree 5-90).

The biotope is run by the Center for Conservationist Studies (CECON) of the Faculty of Chemical & Pharmaceutical Sciences of San Carlos de Guatemala University (USAC), an autonomous governmental entity. Although the National Council of Protected Areas (CONAP) is not directly in charge, it approves operating plans and master plans. The Institute of Anthropology & History (IDAEH) is responsible for the archaeological sites.

A master plan was drafted for the protected area in 1999, to be applied to the period from 2000-2004. The plan is complex and complete, and is divided into three programs: environmental

management, public use, and administration. Each of the programs is subdivided into subprograms, making 13. The subprograms include a precise list of a series of activities to be carried out in the biotope. The master plan is to be renewed every five years, in addition to annual operating plans. Despite this, most of the programs are not being carried out, and activities are currently limited to maintenance and vigilance.

The master plan establishes seven different zones within the protected area:

1. **Extensive Use Zone:** The goal of the Extensive Use Zone is to maintain the area as pristine as possible, albeit permitting extraction of forest products and access to vehicles of those involved in harvesting. Although the area has not been measured, it is one of the largest zones in the biotope, including the entire southern section and part of the north side of the biotope.
2. **Intensive Use Zone:** The goal of this zone is to facilitate internal transport, education, recreation, and interpretation. The area is located along the road that crosses the biotope from the southeast to the north, covering a 100-meter wide strip around it.
3. **Transitory Agricultural Use Zone:** This zone is the most heavily-transited area in the biotope. The aim of this area is to control the expansion of farming in the area and prevent agriculture from causing a negative impact on the rest of the protected area. The ultimate goal is to help the area recover its original ecosystems. It is located in the western-southwestern corner of the biotope.
4. **Archaeological Zone:** This area is home to the biotope's main archaeological sites. The goal of this zone is to protect the archeological ruins and their natural surroundings. This zone is confined to El Zotz and El Diablo sites.
5. **Ecological Recovery Zone:** This zone covers portions of the biotope where the habitat had been severely altered in the past but has been left to regenerate. The goal of this zone is to halt further degradation of the ecosystem and return the area to its natural state (as much as possible). The zone does not form a continuous area, but covers sites that were once populated, the main ones being those on the western edges of the biotope and along the main road.
6. **Primitive Zone:** The primitive zone includes the least-impacted portions of the biotope. The aim of this zone is to preserve the natural environment and facilitate scientific studies, education, and low impact recreation. It lies in the eastern section of the biotope, bordering Tikal to the east and the Maya Biosphere Reserve's Multiple Use Zone to the north, and the Maya Biosphere Reserve's Buffer Zone for extensive use to the south.
7. **Buffer Zone:** This zone is a 1 km wide strip surrounding the biotope to the north, south and west. The objective is to facilitate monitoring of the borders of the protected area and prevent unauthorized persons from entering.

The biotope has a total of 11 employees. CECON provides eight employees; four park wardens, three maintenance staff, and one administrator that is responsible for all four biotopes run by the CECON's Petén center, which means he does not work full-time in the area. Employees work two shifts –22 days on, eight off. This means that there are only three or four people in the field

at any given time. Patrolling is therefore extremely limited. IDAEH employs three guards for the archaeological sites of El Zotz and El Diablo. These employees also work 22-day shifts, leaving at times just a single guard in the field. There is another employee, but he only conducts site visits to El Zotz several times a year. Both groups have a series of installations in good condition. These installations are located several hundred meters apart. Because of the distance, the groups cannot make visual contact and therefore have difficulty communicating. Workers from both institutions lack equipment, and do not carry weapons. In addition, those people engaged in illegal activities do not respect their authority. The borders of the biotope are defined and marked by signposts and gaps cut into the vegetation. However, the borders are not obvious because inconsistent maintenance and lack of signposting.

The budget for El Zotz is difficult to calculate with precision; it comes from a larger budget covering the four biotopes managed by CECON. In 1991, the budget for San Miguel la Palotada (El Zotz) and Biotope Laguna del Tigre totaled US\$93,000 (CONAP 1999c), mostly provided by a program called “Mayarema.” The agreement signed between CONAP and CECON to carry out that program expired in 1999. In 2002, the University of San Carlos de Guatemala (USAC) provided a \$6,400 grant to finance infrastructure in the protected area. Today the regular budget totals US\$15,000 and covers workers’ salaries. Minor expenses, such as fuel, are covered by a CECON managed fund financed by entrance fees to Biotope Cerro Cahuí, where the institution is headquartered in Petén.

Human influence

There are several access roads into the biotope. The most commonly used road runs from the community of el Cruce a Dos Aguadas, located on the outskirts of the southwestern section of the protected area. The dirt road is hard to travel during the rainy season because the area is marshy and is usually flooded. From the southwestern edge of El Zotz to the administrative center, an 18 km trail runs from highly degraded areas to largely intact forest. Another access route is from the north, along a dirt road that runs from the community of Uaxactún. There is a 20 km trail from the northern limit to the administrative center. This trail passes through high quality forest. This is actually part of the same road that crosses the biotope from southwest to north, and which is dubbed the Camino Real, or “Royal Way.”

There are additional access routes to the biotope. The seven communities located around the protected area are connected to the area by trails that are used to extract forest products and game. There is also a network of trails used by extractors collecting sap from the chicozapote tree (*Manilkara achras*), xate leaves (*Chamaedorea* spp.) and pepper (*Pimenta dioica*). These activities, together with poaching, continue unregulated and represent a major threat to the ecosystem.



*View of the Camino Real, access route to the biotope.
Camino Real crosses the biotope from southwest to north.*

Beginning in 1975 (Barrios 2002, Barrios com. pers.), before the area was declared a biotope, migrants began to settle the area and influence the zone. A logging firm built roads into the area, clearing the way for the entry of migrants who settled around bodies of water and along Camino Real (CECON, 1999). In 1996, a program was started to relocate settlers living within the protected area to outside the area. The program began as an informal program, launched by the area's administrators and park wardens. Over time, as the program's backers gained confidence, CECON and CONAP formally assumed responsibility. Seventeen families were resettled in the towns of San José and Santa Elena, where they were given work and land. Since then, other migrants have settled along the road, although not in large numbers. Nine families currently live (temporarily) in the biotope, and make a living by harvesting forest products. Makeshift villages are found along the Camino Real and are used by these families for temporary lodging when they are in the area. Under the terms of an agreement signed with CECON (Barrios 2002, Barrios com. pers.), these families live entirely off the extraction of xate and do not plant crops within the biotope, although they do have small family plots. The communities of El Cruce a Dos Aguadas, La Pasadita, San Miguel, Yarché, La Milpa, Canchén and Chinhá are on the outskirts of the biotope. These local populations makes intensive use of most of the biotope, which CECON (1999) claims is negatively impacting the area.

Tourism is an ongoing activity, albeit on a minor scale. In 2001, the area received less than 300 visitors (CECON 2001), and based on the number of visitors through June 2002, tourism remains steady, with only a slight increasing trend. Unlike other biotopes managed by CECON, El Zotz does not charge entry fees. The community of San Miguel la Palotada has gauged the area's tourism potential and plans to provide horseback rides to natural and archaeological attractions in the area (CATIE/CONAP 2000). The Guatemalan Tourism Institute rates the biotope as one of the seven top tourist attractions in Petén (IDAEH, 1999). However, a 1999 survey showed just 1% of tourists who visited Petén also went in the biotope (Proselva 2000), which suggests that tourism programs in the area need better promotion.

Conservation and Research

San Miguel la Palotada Protected Biotope (El Zotz) has not attracted many researchers or conservation programs (CECON 1999), although students from the University of San Carlos have conducted thesis research in the biotope and surrounding areas. Currently, there are no ongoing research programs. The biotope's master plan includes provisions to start conservation/research programs and outlines the plans to install the necessary infrastructure.

Threats

San Miguel la Palotada Protected Biotope (El Zotz) is a **threatened** area that runs the risk of failing to protect its biological diversity in the near future. The protected area is at the stage where, unless immediate action is taken, the area could face serious, irreversible damage. The main problems stem from encroaching agriculture, forest fires, illegal extraction of non-timber forest products, poaching, and nearby logging activity. The Center for Conservationist Studies has been unable to stop these activities. There is a lack of institutional coordination between IDAEH and CONAP. There has been no attempt to coordinate with Tikal National Park administrators, further weakening the biotope's protection. The master plan does not address these problems outright, but rather proposes activities that lack legal backing, representing another danger to the biotope.

Current Threats

Conflicts in the master plan

The master plan is a complete document and even includes an analysis of the main problems in the protected area and proposals to solve them. However, the plan presents two problems: first, because of a lack of budget, the plan has yet to be implemented; and second, it tolerates many of the illegal activities occurring in El Zotz.

Although the master plan proposes specific activities, it does not include a long-term financing program needed to carry out the activities. It is not clear how the park authorities are going to secure the US\$170,000 needed to implement the plan from 2000-2004. The 2002 budget did not even cover half the amount projected by the master plan for that year.

On the issue of illegal extraction, the master plan proposes to accept natural resource extraction while working to gradually reduce it. Despite this, it is unclear how or when this gradual reduction will be achieved. The master plan does not attempt to stop illegal activities in the area, but rather proposes to soften their impact by permitting them to continue in an orderly fashion. Even the area's administrators admit that they have little control over the illegal activities and they do not propose any mechanisms to change the situation. The idea of organizing illegal extraction of forest products goes against the fundamental concept of the protected area. What's more, this plan could further endanger the existence of the protected area leading the extractors to believe that they have legal rights over the resources and to continue use the area for extractive purposes.



Signs put up by CECON and CONAP on the southern border of the biotope. The graffiti on the signs is an indication that the regulations and the administrators are not respected.



Illegal extractors have taken over the area. The photo shows one of the illegal occupant's mules grazing in the biotope.

Encroaching agriculture

This problem has historically affected the southwestern third of the protected area. During the years 1997-2000, agricultural encroachment slowed (CEMEC/CONAP 2000a). Today, farming persists in the area and could become a major problem in the future if substantial changes are not implemented. According to Imbach et al., 277 ha were deforested from 1986-1997, which is approximately 0.65% of the total area of the biotope (1999). Because this percentage is relatively small, one might conclude that farming does not actually represent a serious threat. However, because of the ever-increasing population and lack of authority by the administration officials, encroaching agriculture will most likely become a major problem in the near future.



Farmlands planted around the protected area are gradually eroding the forest. The photo shows a recently burned field and the damaged forest. The photo was taken on the western edge of the protected area.

Forest fires

Forest fires are a serious problem in the biotope. In 1998, nearly 2,000 ha were burned down in the southern and southwestern sections of El Zotz (CEMEC/CONAP 1998). The problem occurs year after year, although not on the same scale, as can be seen from the forest fire map prepared by CEMEC/CONAP in the area over recent years (1999 and 2000b). In the southern and western sections the problem is closely tied to the expanding agricultural frontier, caused by slash-and-burn techniques that get out of control and spread beyond the fields surrounding the biotope (CATIE/OLAFO 2000). Forest fires within the reserve are generally caused by illegal extractors and poachers. Field visits confirmed that fires started within farmlands, even when controlled, affected part of the nearby forest.

Illegal extraction of non-timber forest products

Unregulated extraction of forest products occurs within the protected area. Uncontrolled xate (*Chamaedorea* spp.) collection has destroyed most of the wild populations, and it has now become scarce in many parts of the biotope. Extractors also take advantage of the lack of control over the biotope to access the western portion of Tikal National Park, where palm trees are still common. Field visits verified that illegal collectors establish camps in the area and are not hindered by anyone. There also seems to be a serious problem with collectors seeking rubber from the chicozapote (*Manilkara achras*), and those cutting down the pepper (*Pimenta dioica*) trees. Extractors have taken over the biotope to the extent that when CONAP intervened and attempted to curb the activity, CECON installations were burned down. Illegal extraction of non-timber products is one of the most serious threats to biodiversity preservation in El Zotz Biotope, not only because of the scale of the activity, but because extractors also engage in poaching.



One of the huts used by illegal extractors within the biotope

Poaching and depredation of wildlife

Although no specific studies have been conducted to quantify hunting impacts within the biotope, CECON claims that local fauna is being severely depleted. They claim that the animal populations have plummeted. Nearby communities take advantage of the easy access to the area to hunt all kinds of species, ranging from wild game to large felines (NPV 2000). Under the terms of the master plan, CECON is supposed to combat poaching, although the plan seems more lenient regarding the capture and sale of wild animals. In reality, poaching continues unregulated because the biotope does not have the human resources or the equipment to stop it.

Logging near the biotope

The northern and eastern borders of the biotope are surrounded by industrial and community timber concessions. There is a great deal of uncertainty regarding the possible impact these concessions could have on the biotope's biodiversity. It could represent a threat to the protected area.

Future threats

Most future threats are extensions of current threats left unresolved. Should this occur, the biotope would face a critical situation. One other threat exists: nearby oil exploration.

Oil exploration projects in nearby areas

In 1997, the Guatemalan government, via the Energy & Mines Ministry established oil exploration plans in three blocks within the Maya Biosphere Reserve's Multiple Use Zone. The block dubbed A-1-97 by the Ministry lies on the northern edge of the biotope and Block A-2-97 to the northeast. However, public pressure convinced the Executive branch not to sign any contracts for the area for now.

The danger of oil activity in the reserve has been suppressed, although it remains a potential danger. Technically, Block A-2 97 could be jump-started at any time, which would represent a major danger to the northeastern portion of the biotope. Hopefully, public opposition to the project will continue and the government will not award any oil contracts in the area.

Recommended solutions

Conflicts over the master plan

On paper, these problems appear relatively easy to solve. In reality, they require a great deal of commitment by the administrators. To obtain financing, CECON needs to include a specific development program, including subprograms to train personnel to produce proposals. Conversations with the director of the biotope showed there is a real need for training. A specific plan, with objectives, goals to be met, time frame, and reliable evaluation methods to be able to gauge results, is also needed to tackle illegal activities in the area.

Encroaching agriculture

The master plan proposes solutions for the problem of encroaching agriculture. However, it does not establish goals or time frames. These are needed in order to be able to track the problem. In the case of settlers within the protected area, even those with legal land titles, the plan could include a buy out program, evicting the settlers, but compensating them appropriately. Then, the biotope would be free of unauthorized residents. Of course, this program would require funds and would require a strong regulatory framework to prevent further agricultural settlements.

Forest fires

Because part of the problem stems from encroaching agriculture, the risk of forest fires would be reduced by blocking the spread of agricultural fields near the biotope. Forest fires represent a

major threat to the area. Current fire-fighting activities are partially coordinated with the National Forest Institute (INAB). Further coordination with Tikal National Park authorities and the nearby forestry concessions would help improve the situation. Tikal National Park has enough personnel to be able to help in case of an emergency, and concessionaires would find it in their best interest to collaborate in order to ensure that the fires do not spread into their areas.

Illegal extraction of forest produce, poaching and sale of wild animals

Biotope administrators are being dangerously permissive regarding extraction of non-timber forest products and wildlife collection. This problem is closely related to the three previously mentioned problems; therefore, it is necessary to come up with a comprehensive solution that addresses all problems. Political will to enforce the law is needed, as is the capacity to raise the necessary funds to support monitoring and control efforts. The area's administrators are concerned that attempts to enforce the laws will spark violence and prompt revenge attacks similar to last year's events, when CECON's installations were burned.

The well-protected Tikal National Park proves that it is possible to maintain a relatively effective control making it difficult for poachers to enter the area. CECON urgently needs to define its strategy to do the same in the biotope, as failure to do so could result in irreversible damage. CECON officials urgently need to ensure the participation of the national police force's Nature Protection Service (SEPRONA) to run patrols. In the area to the east of the biotope, an effort must be made to coordinate with Tikal National Park administrators to run patrols.

Logging on the outskirts

First, new methods for determining the annual operating plans in the concessions are needed. One way on ensuring a better decision-making process would be to include in the work team an experienced biologist who would decide, prior to the intervention of forestry engineers, which areas would be protected and which could be used. Subsequently, another team of biologists should supervise ongoing work and evaluate the impact on local flora and fauna.

Second, continual evaluation needs to be designed in such a way that information is gathered on global impacts on the forest. To do so, a permanent network of research plots needs to be established that is statistically representative of each of the concession areas. ParksWatch recommends evaluating the both the commercial and non-commercial flora, as well as the fauna, soil, the ecosystems and their dynamics.

Conclusions

San Miguel la Palotada Protected Biotope (El Zotz) is an area of enormous importance for the conservation of the Maya Biosphere Reserve, as El Zotz is one of its core zones. Despite the fact the area currently faces major threats from human activity within the biotope and surrounding areas, there is evidence that the area continues to conserve biological characteristics of vast importance. Reports confirm the existence of large felines as well as other regionally endemic species.

The magnitude of the threats to the biotope is considerable. Biological diversity will be severely affected in the short term if no remedial action is taken. Although no scientific research has been done on this issue, field visits made to the area by ParksWatch indicate that most of the forest is under pressure from human presence. The eastern portion, near Tikal National Park, is best conserved. The western and southern areas, with large communities nearby, are the most deteriorated. Overall, it is difficult to find an area that is not being exploited to some degree; therefore, we believe the biotope is threatened, bordering critical levels. If immediate action is not taken, the area will fail to protect local biological diversity.

Of the areas run by the Center for Conservationist Studies, San Miguel la Palotada (El Zotz) is of vast importance because it is practically an extension of Tikal National Park, which increases the possibility of migration of wildlife populations between one area and another. CECON has not been able to establish authority to stop illegal activities because it lacks the proper budget, it is concerned about losing its image, and it fears possible revenge attacks by poachers and extractors engaged in the illegal activities.

The lack of a budget should be solved immediately and is one of the easier problems to solve, relatively speaking. Administrators should increase their financial capacity and create a department in charge of raising funds specifically for El Zotz. A long-term fundraising plan is also needed. Without this financial support, it will not be possible to deal with the other problems in the area. The budget should be altered and more funds should be sought, because we have found that the threats are more serious and require greater financial support than was estimated in the master plan. Once funds are secured, priority needs to be given to changing the mentality of the administrators. If a firm will to protect the area is not instilled, it will be difficult to set up programs and establish time-frames to do away with poaching and other illegal activities. Effective coordination is needed between CONAP and IDAEH within the biotope, as well as cooperation from Tikal administrators and the forestry concessionaires around the area. Coordination needs to include specific action plans in the case of forest fires and other imminent threats. By incorporating these changes, programs aimed at battling the overexploitation of natural resources outlined in the master plan could be effective and viable. The urgency of the situation cannot be overemphasized. A radical change is needed to ensure the success of long-term conservation of biodiversity in El Zotz.

Bibliography

APESA, 1993. *A Rapid Ecological Evaluation of Maya Biosphere Reserve, Guatemala*. APESA / TNC / PBM-USAID.

Balas, R., 2002. *Personal interview*. WCS director in Guatemala.

Barrios, M. 2002. *Personal interview* Coordinator of the Petén biotopes and delegate for the Center for Conservation Studies.

CATIE/CONAP, 2000. *General Plan for Forestry Management of the Community Concessions of San Miguel la Palotada*. Tropical Agronomic Center for Research & Training (CATIE), the National Council of Protected Areas (CONAP). Turrialba, Costa Rica.

CATIE/OLAFO, 2000. *Prevention and Control of Forest Fires in the Community Concessions of San Miguel la Palotada and La Pasadita, San Andrés, Peten. Final Report*. Tropical Agronomic Center for Research & Training -CATIE- y Conservation Project for Sustainable Development in Central America -OLAFO-. Guatemala

CECON, 1995. *50 Areas of Interest for Conservation in Guatemala*, Conservation Data Center, Center for Conservationist Studies, The Nature Conservancy. Guatemala.

CECON, 1999. *Master Plan 2000-2004. San Miguel la Palotada Protected Biotope (El Zotz)*. Center for Conservationist Studies at San Carlos University, Faculty of Chemical Sciences & Pharmaceutics. Guatemala.

CECON, 2001. *List of Visitors to the San Miguel la Palotada Protected Biotope*. Center for Conservationist Studies at San Carlos University, Faculty of Chemical Sciences & Pharmaceutics. Guatemala

CEMEC / CONAP, 1998. *Map of Forest Fires in the Department of Petén in 1998*. Center for Monitoring & Evaluation of the National Council of Protected Areas. Guatemala.

CEMEC / CONAP, 1999. *Map of Forest Fires in the Department of Petén in 1998*. Center for Monitoring & Evaluation of the National Council of Protected Areas. Guatemala.

CEMEC / CONAP, 2000a. *Changes in Forest Cover in Maya Biosphere Reserve 1986-2000*. Center for Monitoring & Evaluation of the National Council of Protected Areas. Guatemala.

CEMEC / CONAP, 2000b. *Map of Forest Fires in the Department of Petén in 1998*. Center for Monitoring & Evaluation of the National Council of Protected Areas. Guatemala.

CEMEC/CONAP, 2001. *Map of Elevation in San Miguel la Palotada Biotope (El Zotz)*. Center for Monitoring & Evaluation of the National Council of Protected Areas.

CONAP, 1999a. *Selection Criteria for Archaeological Parks Representative of Pre-Hispanic Culture Suggested for Incorporation into the Guatemalan System of Protected Areas*. National Council of Protected Areas. Guatemala

CONAP, 1999b. *Proposal for a Financial Strategy in the Guatemalan System of Protected Areas*. National Council of Protected Areas. Guatemala

CONAP, 2000a. *Guatemalan Fauna in Danger of Extinction*. National Council of Protected Areas, RBM Department of the Multiple Use Zone.

CONAP, 2001a. *List of Species of Fauna in Danger of Extinction (Fauna Red List)*. Ruling ALC 032-99 of the National Council of Protected Areas. Guatemala.

CONAP, 2001b. *List of Species of Flora in Danger of Extinction (Flora Red List)*. Ruling ALC 028-2001 del National Council of Protected Areas. Guatemala.

CTP, 1987. *Ruling N° 139 of August 25, 1987*. Petén Land Commission. Guatemala

Decree 4-89. *Law of Protected Areas*. Congress of the Republic of Guatemala. Guatemala.

Decree 5-90, 1990. *Declaration of Maya Biosphere Reserve*. Congress of the Republic of Guatemala. Guatemala.

Dinerstein, E.; D. Olson; D. Graham; A. Webster; S. Primm; M. Bookbinder; G. Ledec, 1995. *An Evaluation of the State of Conservation of the Land-based Eco-regions of Latin America and the Caribbean*. World Bank and the World Wildlife Fund. Washington.

IDAIEH, 1999. *Protection of Archaeological Sites in Petén. Concept of Archaeological & Tourist Development in Northeast Petén*. Institute of Anthropology & History de Guatemala.

Imbach, A.; Imbach, P.; Ramos, V., 1999. *Monitoring System for Maya Biosphere Reserve. A Pilot Application at a Macro Level*. National Council of Protected Areas, Guatemala.

NPV, 2000. *Report on Operating Activities of Prevention and Control of Forest Fires. Summer 2,000*. Nature for Life Foundation -NPV-. Guatemala.

Oxlaj, J., 1992. *Semi-detailed Soil Studies in San Miguel La Palotada Biotope (El Zotz), Petén, Guatemala*. Center for Conservationist Studies, The University of San Carlos de Guatemala, Guatemala

Pennington, T.; Sarukhán, J., 1998. *Tropical Trees of Mexico*. Institute of Ecology of the Autonomous University of Mexico / Economic Culture Fund.

UICN, 1994. *Red List of Threatened Species. 1994 Categories and Criteria*. International Union for Conservation of Nature and Natural Resources. En <http://www.redlist.org>

UICN, 2001. *Red List of Threatened Species. Species Information*. . International Union for Conservation of Nature and Natural Resources. En <http://www.redlist.org>

Located between the coordinates 17° 07' 30" and 89° 53' 02", 17° 20' 30" and 89° 53' 02", 17°20'30" and 89°44' 42", 17°07'30" and 89°44'42".

Panthera onca is classified as LR/nt, *Alouatta palliata* as VUA1c,B1+2c and *Mazama americana* as DD

The environmental management program features subprograms such as research, monitoring, protection and management of reserves. The public use program has subprograms for tourism, recreation, interpretation and environmental education. Administration has subprograms for training, public relations, administration and construction and maintenance.

Calculation based on Q. 50.000 at an exchange rate of 1 US \$ / Q. 7,80

Calculation based on Q. 1.337.250 at an exchange rate of 1 US \$ a 7,80 Q.