Park Profile - Guatemala
Laguna del Tigre National Park

Date of last field evaluation: June 2003
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Location: Municipality of San Andrés, department of Petén, in Maya Biosphere Reserve
Year created: 1990
Area: 289,912 ha
Ecoregion: Tehuantepec Humid Forest
Habitat: High forest, Holm oak forest, transition forest, savannahs and wetlands

Summary

Description
Laguna del Tigre National Park is located in northern Guatemala, in the municipality of San Andrés, department of Petén. Created in 1990, it is the largest national park in Guatemala and the largest protected wetlands in Central America. The vast area is periodically flooded, which creates unique characteristics such as vast savannahs and transition forests. The national park, together with Laguna del Tigre Protected Biotope, is included in the List of Internationally Important Wetlands of the Ramsar Convention. It is also included in the convention’s Montreux Register of threatened wetland sites.

Biodiversity
Researchers have yet to fully study Laguna del Tigre’s biodiversity. The master plan notes 188 species of birds, 90 species of Lepidoptera, and 17 species of amphibians (CONAP, 1999). Although there are few systematic studies of mammals, estimates suggest that the park is home to up to 130 species (Zarza & Pérez, 2000). The park is home to the largest numbers of Morelete’s crocodile (Crocodylus moreletii) found in Guatemala. In addition to C. moreletii, the area is home to other regionally endemic species such as the black howler monkey (Alouatta pigra) and Central American River Turtle (Dermatemys mawii). Felines include jaguar (Panthera onca), puma (Felis concolor) and margay (Leopardus wiedii). Various species in the area are included on the IUCN Red List.

Threats
The national park is critically threatened and will most likely fail to protect and preserve its biological diversity in the immediate future unless urgent steps are taken. The main threats include the presence of permanent human settlements, new settlements, encroaching agriculture and livestock herding, forest fires, the oil industry, and lawlessness, which have combined to weaken institutional control over the area.
Description

Physical description

Laguna del Tigre National Park is found in northern Guatemala, in the municipality of San Andrés, department of Petén. It is one of the core zones of the Maya Biosphere Reserve (MBR), the country’s most important tropical forest area. The park is bordered to the north, east and west by the MBR Multiple Use Zone, and to the south by the San Pedro and Sacluc Rivers, and by the MBR Multiple Use Zone (CEMEC/CONAP, 1999a).

The eastern and northern borders lie just a few kilometers from the edge of the Mexican states of Campeche and Tabasco. The national park, which covers 289,912 hectares, is the largest in Guatemala. The legally established borders lie within 17° 11’ 41” and 17° 48’ 53.2” Latitude, and 90° 58’ 2.8” and 90° 2’ 44.2” Longitude (Decree 5-90, 1990). Large areas of the southern territory outside the park borders have been radically changed, and a considerable land area has become fragmented by human activities such as cattle ranching, agriculture, and oil drilling.

The soil in the protected area is carstic, shallow and dotted with a fragile structure (CONAP, 1999). The topography is flat, except for the southeast part, where there are small, rolling hills and sporadic gullies. The higher parts, no higher than 300 meters (CEMEC/CONAP, 2000a), lie in the eastern region, dropping in altitude as one moves west.

The climate is warm and humid, with well-defined seasons, a rainy season from July to December and a dry season from January to July (CONAP, 1999). Rains are heavier than in
the eastern section of Maya Biosphere Reserve, with annual average precipitation of 1629 mm (CONAP, 1999). Temperatures average 30º C (CDC/CECON, 1995), with an average of 35º C in the dry season and 25º C in the rainy season (CONAP, Ibid).

Laguna del Tigre serves as a link between Maya Biosphere Reserve and Sierra del Lacandón National Park. It has unique landscape features, such as lakes, wetlands that cover most of the park, and cliffs along the upper banks of the San Pedro River. There are several archaeological sites in the national park, including Peru, where there are ruins dating from 250-900 AD (Escobedo, 2003, personal communication), the classic period of the Maya civilization.

The area has very important archeological areas, like the site called “Peru.” This photo shows a current excavation in the site.

The park has been included on the List of Internationally Important Wetlands of the Ramsar Convention since 1990 and was included in the convention’s Montreux Register in 1993 (Ramsar, 2001).

Biodiversity

Flora

According to the classification by Dinerstein et al. (1995), the park lies within the Tehuantepec humid forest ecoregion. Studies carried out on the vegetation in Laguna del Tigre show it is heterogeneous and made up of a large number of families adapted to the various environments. The trees generally do not surpass 40 cm in diameter, except for areas of high forest. Trees generally grow from 5-15 meters in height, although there are some areas where trees can reach heights of 30 meters (Rodas, 1999). The master plan for Laguna del Tigre states that the predominant habitat is transition forest between wetlands and high forest, covering an area of around 50% of the protected area (CONAP, 1999). Around 27% of the park is made up of floodable savannahs and marshes, while the rest is covered by high forest, a small oak grove (*Quercus oleoides*), and ecosystems that have suffered impacts from human activity. Tree diversity varies from one area to another, with 143 species in the eastern section and 83 to the west (CONAP, 1999).

A large portion of the national park has been altered by human activity and the forest is being replaced by pastureland and agricultural land, or affected by forest fires. The least affected area lies to the north, while the central section has been fragmented by encroaching human settlements, as has happened in much of the south and some of the areas to the west.
High forest

This type of forest is not very common in the national park. It appears mainly in the southeastern zone, although there are small groves to the east and west (ProPetén, 1998). Under the master plan (CONAP, 1999), only 6% of what is institutionally known as Laguna del Tigre Conservation Unit (Laguna del Tigre National Park and Laguna del Tigre Protected Biotope, a protected area of 45,900 ha surrounded by the park) is covered with high forest. This is a leafy and exuberant forest; the trees often have large buttresses and tend to grow on hills or minor slopes. In the canopy, which usually tops out at 25 meters, one occasionally spots trees up to 30-35 meters in height. In denser areas, there is an intermediate stratum 12-15 meters high, and undergrowth reaches 6 meters. The ramón (Brosimum alicastrum) is a common species, often growing alongside zapotillo (Fouteria reticulata), sílón (P. amygadalina), canisté (P. campechiana) and chicozapote (Manilkara zapota) (CONAP, 1999). Within this forest, some trees lose their leaves during the dry season. This is especially common on hilltops, where conditions can be extremely dry (Schulze and Whitacre, 1999) due to the fact they are exposed to light, air, and have good drainage. The undergrowth in the upper reaches often feature a large number of palm trees such as cohune palm (Orbignya cohune), bay-leaf palm (Sabal morrisiana), xate (Chamaedorea sp.) and bayal (Desmoncus ferox).

Transition forest

Most of the national park is covered by transition forest, with large groves in the central, eastern and northwestern sections. The transition forest covers around 50% of the protected area (CONAP, 1999), although a large portion of it has been fragmented or has suffered some negative impacts because of human activity. A transition forest is a formation of groves of high and low forest and savannahs, mixed without any defined pattern (CONAP, Ibid.). This habitat is closely linked to water sources, as much of the area is flooded for at least part of the year. Flooding conditions determine plant composition. Areas with heavy, sticky soils that do not drain well are flooded during the rainy season; they dry and crack at the start of the dry season. Typical low forest appears under those conditions, with clusters of pucté (Bucida buceras) mixed with other species such as logwood (Haematoxylum campechianum), cojché (Nectandra membranacea), oaks (Coccoloba sp.), and palm trees such as the bay-leaf palm (Sabal morrisiana) and escobo (Chrysophila argentea) (CONAP, 2001a). Areas where water remains for longer periods feature savannahs with typical vegetative associations, while in well drained areas, high forest formations appear.

Floodable savannahs and wetlands

Savannahs cover large areas of the northern section of the park, covering around 15% of the protected area (CONAP, 1999). Here, the vegetation is determined by extreme climactic conditions, with flooding in the rainy season and extreme aridity in the dry season (Pennington & Sarukhán, 1998). In the western area of the park, the savannahs gradually give way to marshlands as one heads south, towards Laguna del Tigre Protected Biotope. The presence of water means that the northwestern savannahs –dominated by the jimbal, a type of bamboo that has not been studied a great deal, although apparently it is Bambusa longifolia– are gradually replaced by wetlands. The wetland marshes, which are studded with clusters of cibal (Cladium jamaicensis), are permanently damp, by surface water or water a few centimeters below the surface. The wetlands, which cover around 12% of the surface of the national park, also appear to the southeast, surrounded by an area of transition forest. The landscape in both formations is flat, with plants growing up to a height of 1.5-2 meters. These
habitats have a long history of forest fires. Apparently, fires in the savannahs are gradually extending its area (Méndez et al., 1998).

![View of a savannah area. In the foreground, one can see jimbal (it is assumed that this plant is Bambusa longifolia).](image1)

**Holm oak forests**

There is a small forest of Holm oak trees (*Quercus oleoides*) in the southeastern section of the protected area, covering an area of 2,367 hectares (CONAP, 1999). It is an area prone to flooding where together with the oak, lowland forest species such as pucté (*Bucida buceras*) and logwood (*Haematoxylum campechianum*) grow. Cattle ranching and forest fires have had a major impact on the oak forest, and have practically destroyed it.

![View of the oak](image2)
Fauna

Researchers have yet to fully study the biodiversity of Laguna del Tigre National Park. The master plan notes 188 species of birds, 90 species of Lepidoptera and 17 species of amphibians (CONAP, 1999). Although there are few systematic studies of mammals, evidence suggests that the park is home to up to 130 species (Zarza & Pérez, 2000). In the protected area, there have been sightings of jaguar (*Panthera onca*) (Balas, 2003, personal communication), as well as Baird’s tapir (*Tapirus bairdii*), red brocket (*Mazama americana*), collared peccary (*Tayassu tajacu*) and black howler monkey (*Alouatta pigra*). Laguna del Tigre posts the highest numbers of Morelet’s crocodile (*Crocodylus moreletii*) in Guatemala (Castañeda et al., 2000). The park is one of the most important nesting areas for the scarlet macaw (*Ara macao*) in Maya Biosphere Reserve. Some 80% of the nests of this species registered in Guatemala are to be found in the southeastern section of the protected area and nearby areas (Balas, 2003, personal communication).

![Morelet’s crocodile (*Crocodylus moreletii*), photographed in the southeastern portion of the park.](image)

Endangered fauna in the area include Morelet’s crocodile (*Crocodylus moreletii*), a regionally endemic species included on the CONAP Red List (2001c). The scarlet macaw (*Ara macao*) is included in Appendix I of CITES. The Central American river turtle (*Dermatemys mawii*), jaguar (*P. onca*), howler monkey (*A. pigra*) and red brocket (*M. americana*) are included in the IUCN Red List (2003). The CONAP Fauna Red List (2001b) includes several felines and other mammals found in the area as well as highly endangered species. The CONAP Flora Red List (2001d) includes many of the species found in the area, which could soon be endangered due to the ongoing, unregulated trade.
Laguna del Tigre National Park was created on January 30, 1990 by Decree 5-90. The decree set the geographical borders of the protected area, and declared the park to be one of the core zones of Maya Biosphere Reserve. During the first years after it had been set up, the park was nominally run by the National Council of Protected Areas (CONAP), although the entity did not have any presence in the area. In 1996, CONAP set up a permanent institutional presence, which sparked major conflicts with communities who had illegally settled in the area. In 2000, the entity tried to run the area together with an association called Cûnan K’aax, although shortly afterwards the organization withdrew. Since 1996, CONAP has maintained a weak presence in the area and never exercised full control over illegal activities. These illegal activities are growing stronger every day and are carried out with complete impunity in the national park.

The protected area is currently staffed by 40 park wardens, three cooks, a director and a deputy director. The park also features the permanent presence of six officers from the Nature Protection Service of the National Civil Police (SEPRONA). In addition, CONAP patrols the southeastern section of the park and surrounding areas with administrative backing from the Wildlife Conservation Society (WCS) and the army. The 40 park wardens and six SEPRONA officers staff six guard posts around the protected area. Field personnel work 22-day shifts and have eight days off, which added to vacations and dismissals, means there is a marked dearth of personnel at control posts throughout the year.

The area has master plan, active through 1999-2003. However, the plan has been plagued by problems and has yet to see compliance. In addition, it has components that are legally questionable—the plan permits human presence and activities in the area that are incompatible with conservation and contrary to the Law of Protected Areas.

The master plan divides the park into four zones: intangible zone, recovery zone, transition zone, and zone for special use. In addition, around the edge of the park the plan has created a zone dubbed an area of influence. The master plan does not provide the coordinates for any of the zones, just the general area of location.

1. Intangible Zone

The intangible zone is located in the eastern and western sections of the national park, in two blocks that are separated from the other zones in the park. The master plan does not establish precise borders or the total surface area, although a large section of the western area lies within Laguna del Tigre Protected Biotope, which is included within the Laguna del Tigre Conservation Unit, for which the management plan was written. The Intangible Zone is designed to protect ecological systems and processes. In this area, the plan prohibits
extractive activities, hunting, any oil activity, settlements and access roads, except for park management purposes. The plan permits limited public use and research in the area.

2. Recovery Zone
This zone has suffered the impact of human activities, but the effects are considered potentially reversible. It lies in the northern section of the area, in the area covered by the largest savannahs. The aim of the zone is to prevent the savannahs from expanding further because of forest fires. The following activities are banned: hunting, extraction of wildlife, timber and non-timber products, oil industry, human settlements and the entry of people not linked to park administration personnel. The plan allows research activities and aims to start a fire management program to prevent uncontrolled forest fires.

3. Zone for Special Use
Most of the human settlements lie in this zone; the ecosystems are fragmented and degraded. It lies in the southern and western sections of the park, with no precise borders established in the plan. The zone aims to make human activities more compatible with the park’s goals through stabilization, reduction and order. This area permits human presence under the conditions that permanence agreements have been signed. Also permitted are the use of non-timber products, forestry, and hunting. Agriculture and livestock herding are not specifically permitted, but are not prohibited, either. No new human settlements may be established in the area.

4. Transition Zone
There is human activity in this area, but due to its importance to ensure the continuity of the ecological system, it is to be eliminated in the short term. The zone is located in the central section of the park, bordering to the west and east by the intangible zone, to the south by the special use zone and to the north by the zone of recovery. The goal of the area is to halt degradation by relocating encroaching settlements or by making their activities compatible with the area’s goals. The plan permits the controlled use of non-timber products for subsistence, regulated hunting and human presence. The plan prohibits the extraction of wildlife for commercial ends and the establishment of new settlements. The plan makes it obligatory to establish firefighting brigades, and oil industry activity must include mitigation measures.

5. Zone of Influence
This covers all the areas bordering the national park. Its creation aims to consolidate the ecological continuity of the ecosystems represented outside the national park, maintain the area’s links with the other core zones of the Maya Biosphere Reserve, prevent land prospecting, minimize the impact of the oil industry, minimize forest fires and tighten up border control. The master plan describes and establishes strategies for each of the zones of influence, located in the northern, southern, eastern and western areas of the park.
This sign is found in the town of Naranjo, on the southern limit with the park. It indicates which activities are permitted in the park. Nonetheless, ironically, the law is not followed and this is one of the most threatened protected areas in Guatemala.

Infrastructure to protect the area is very basic, although there are some formal constructions. Field personnel are fitted with minimal equipment, although they lack gear necessary for their work (Rodas, 2003, personal communication). Park wardens do not carry weapons, which is why they occasionally run joint patrols together members of the Nature Protection Service of the National Civil Police (SEPRONA) and the army. There is little control over illegal activities, and these activities occur throughout the national park.

The administrative headquarters of the park. This infrastructure is poorly constructed, lacks equipment and personnel.

The protected area has a budget of US$182,800 for 2003, of which around half goes to paying personnel salaries, and the rest goes towards operating expenses and equipment. If one were to distribute this budget amongst the total park surface, the amount assigned for the protection of Laguna del Tigre is the lowest of all the national parks in Maya Biosphere Reserve.
Human Influence

The park can be reached by a paved road, several dirt tracks, and by river. Access from the south is via a paved road that runs down to the San Pedro River. From there on, a dirt track, which can be used all year-round, runs into the heart of the protected area, to the oil installations based in the area, and to the CONAP guard post called Guayacán. Access from the southeast is via the road that runs from the town of San Benito to Paso Caballos. The entire southern stretch is accessible via the San Pedro River, while one can enter from the west and north from Mexico through illegal trails hacked through Guatemalan territory. The ease and number of these access routes make it very difficult to control human activity.

Several communities exert great pressure in and around the national park. Despite the fact that official data recognizes 13 communities, over 40 villages and communities have set up in the national park over the past five years. Land grabs and land prospecting are completely out of control, and the park has deteriorated a great deal due to the fact the area is ungovernable. CEMEC/CONAP (2003) satellite images show that forest fires in 2003 may have affected up to 80% of the surface of the protected area. ParksWatch evaluations indicate that around one-quarter of the territory has been heavily deteriorated by human activities, and the risks to the park are growing on a daily basis. Large-scale and powerful cattle ranchers engage in land prospecting and speculation, and push out smaller illegal settlers into other parts of the protected area. There is clear evidence that corrupt politicians and municipal officials are taking part in land speculation.
Conservation and research

A non-government organization called ProPetén is running a monitoring program to study the nesting habits of the scarlet macaw (*Ara macao*) in the southeastern section of the national park. The Wildlife Conservation Society (WCS) is monitoring the same species in a larger area, which includes part of the park.

This photo shows the high forest, which is part of Laguna del Tigre’s special ecosystem that is critically threatened.

Threats

Laguna del Tigre National Park is critically threatened and runs a high risk of failing to protect and maintain the area’s biological diversity in the immediate future unless urgent steps are taken. The main threats include lack of governmental control, land grabs and the presence of permanent human settlements, plus expanding agriculture and cattle ranching, forest fires, extraction of fauna and flora, the oil industry and the almost complete lack of institutional control over the area. In some areas of the park, the master plan permits activities such as livestock herding and farming, which could aggravate the problem as it implies a violation of the law. Oil exploration and production pose a serious pollution risk. Oil activities have also promoted additional settlements and agriculture in Laguna del Tigre. Personnel are scarce and lack the means to control the conflict-ridden area, as organized groups have taken over the zone to carry out all kinds of activities, including drug cultivation and trafficking.

Current Threats

Lawlessness

The national park is an area that appears to be lacking governance. The National Council of Protected Areas has become overwhelmed by the major problems it faces, including drug trafficking and plantations, illegal migrants and the presence of armed groups that have taken over parts of the area. The existence of organized groups, some led by corrupt politicians and municipal officials, are involved in takeovers and land speculation, which is completely out of control. The lack of government presence in the area means that the national park is failing to meet its goals, something that is used by groups that oppose protected areas as an argument to demonstrate the need to permit high-impact economic activity within these areas.
In some communities, CONAP is unable to maintain a presence without support from strong army patrols (Castellanos, 2003, personal communication). Land grab bids are frequent, and the situation has reached such a scale that many parts of the park are marked out to identify plots of land for sale. The problem is worsened because there is a complete lack of control of the oil industry and of its ferry, which is used by anyone entering the park and not just the petroleum company. Government officials refuse to tackle the problem, leaving CONAP’s regional office to deal with it, despite the fact it has neither the budget nor the means to do so. This has sparked chaos on such a scale that that today it would be very difficult to solve, and is a major threat, possibly the biggest threat, to Laguna del Tigre.

**Land grabs and permanent human presence**

This serious problem is swiftly eroding the park. Settlers have taken over the area and there is no control over their activities. Farming and cattle ranching are growing concerns, and fires have burned large portions of the protected area.

*Settlements are found along the road leading to the petroleum wells. In this photo, the virgin forest has been converted for use as pastureland for cattle.*

The problem stems from the lack of interest shown by authorities in conserving the park since it was created. Up until 1996, CONAP did not even maintain a presence in the area. In 1997, the entity tried to evict the communities of Santa Amelia and Paso Caballos, which reacted by taking state officials hostage for several days (Fagan, 2000). The violent reaction of the settlers highlighted CONAP’s institutional weakness and lack of a long-term vision. In the end, the entity was forced to accept permanent human presence in the area instead of enforcing the law and putting those responsible for these incidents on trial. This marked the beginning of a series of negotiations that resulted in legalizing the national park as a home to over 3,000 people, according to official figures (Ramos et al., 2001). ParksWatch evaluations carried out in the area suggest that this number is conservative, and that the population is much higher.

There are currently 13 communities in the park with CONAP’s consent (CONAP, 2001b). An additional six communities have yet to negotiate their presence in the area and another 40 villages that have gradually settled the area with no control whatsoever. In a bid to regulate communities’ activities, CONAP and the communities have signed *agreements of intent* to limit the number of inhabitants and in some cases establish zoning plans for the territory and strategic plans for the communities. Despite claims that these agreements are signed to limit the impact and keep the population down (CONAP, 2001b), few communities comply. The legal status of these *agreements of intent* is dubious at best, as they do not establish any time
frames for eventual resettlements, and accept activities prohibited by the Law of Protected Areas (Decree 4-89). During interviews carried out by ParksWatch to prepare this report, CONAP officials admitted that most of these agreements have been practically shelved.

An aerial view of two of the areas that have been invaded: one is seen in the foreground and one in the background.

Fires

Fires are a major threat to the national park. In 1998, around 50% of the protected area was burned down (CEMEC/CONAP, 1999b), while in 2003 fires swept across nearly 80% of the park (CEMEC/CONAP, 2003). Apparently, the fires help the savannahs to expand and have made for less heterogeneous diversity of plant species (Méndez et al., 1998), and are now almost exclusively made up of jimbal (*Bambusa longifolia*). Fauna diversity has also been affected to a great degree by fires. Studies on Morelete’s crocodile (*Crocodylus moreletii*) in Petén suggest fires in the jimbal groves prevent the species from reproducing as fire affects their nesting sites (Castañeda, 1998). Other reptile and bird species could also be affected by the fires.

A grazing pasture has been completely devastated by fire; most likely, this was done purposefully in order to plant an exotic grass species for the cattle.

There are many causes of forest fires, all of them linked to uncontrolled human activity. Hunters start fires in the northern and western savannahs every year in the search for easy
game (Castellanos, P., 2003, personal communication). Fires are also set to open up land for agriculture and livestock herding and are causing major damage in large areas of the center, south, east and west of the national park. Fire is also a means of sabotage—there are people interested in seeing the park fail in order to develop the area for unsustainable economic activities that are incompatible with conservation (Albacete, 2003a).

The strategy to combat forest fires includes direct work with the Municipality of San Andrés, which is coordinating a program to control and prevent fires inside the national park (CI, 2002). The municipality has apparently created a forest fire committee, which in 2001 signed prevention and control agreements with communities inside the protected area (CI, 2002). However, during the fires that swept the area from March to May 2003, it was clear that if these agreements do in fact exist, they are not very effective. During a field visit carried out by ParksWatch, we found many of the fires were started by the communities living inside the national park. The 2003 fires made it obvious that the System to Prevent and Control Forest Fires, an institution created by the government in 2001, failed to function, in addition to the lack of a real program to prevent fires in the protected area (Albacete, ibid.).
Expanding agriculture and cattle ranching

This is affecting the central, eastern and parts of the southwestern sections of the protected area. Over 9,000 ha were being used for farming and livestock herding in 2001, approximately 3% of the national park (Maás, 2001). A report by Conservation International (2001) shows the rate of deforestation in the park fell from 1997-2001. There are no sources to indicate what the 2003 rate was, although field visits made by ParksWatch show that slash-and-burn methods continue to be a major problem around the road that goes through the park to the oil wells, as well as some parts of the eastern and western sectors.

An illegal settlement that has been settled without any regard for the law; the settlers have even put fences and signs on their illegally acquired land.

The total number of deforested hectares and reports that deforestation rates have dropped could create a false impression that the problem of encroaching agriculture has been controlled and that it does not pose a serious threat to Laguna del Tigre. The truth is that the agricultural and ranching frontiers have caused serious fragmentation throughout the protected area. An analysis carried out by ParksWatch of CEMEC/CONAP (2000b) satellite photos and subsequent field visits concluded that the area fragmented by these land use changes is much greater than official data suggest. Our analysis shows that at least one-quarter of the park is affected by agricultural and cattle ranching. This fragmentation is not concentrated in a single area, but is spread out, mostly in the center-southern and southeastern sections, where plots of cropland and grazing pastures intermingle with patches of forest. Activities run by inhabitants in the area are generally unregulated, which means the habitat continues to be fragmented. Unless an immediate solution is found, this problem, together with land grabs and forest fires, will most likely cause the protected area to fail in the short term.
Cattle ranching is a growing problem in the area. Large landowners are taking over the national park. They go to desperate campesinos and offer to buy the land from them if they will deforest it and plant pastureland. This photo shows one of the large pastures that have been established in Laguna del Tigre National Park.

**The oil industry**

In 1985, before the national park was created, the government of Guatemala signed a hydrocarbon contract in an area of 10,190.34 ha (POG, 1998), located in the middle of what is today the national park and Laguna del Tigre Protected Biotope. In 1992, after the area had been declared a national park, the government signed another contract that covered practically the entire protected area (MEM, 1997). Today, the national park is greatly affected by the direct and indirect impacts of the oil industry.

Aromatic poly-cyclical hydrocarbon traces have been detected in some of the bodies of water in Laguna del Tigre, indicating oil pollution (Theodorakis & Bickham, 2000). The problem of pollution could be affecting the entire San Pedro River (CONAP, sf), which marks the southern border of the national park. Scientific evidence suggests that hydrocarbons could be causing stress and damage to the DNA of fish in lakes near the oil wells (Theodorakis & Bickham, ibid.). Other direct damage from oil industry activity in the area includes air and ground pollution, as well as deforestation to establish oil wells and build access roads (POG, 1998). Méndez et al (1998) found an abnormal drop in sightings of birds in a sample carried out a kilometer from one of the wells, which suggests negative effects on the local bird population.
The pipeline crosses a number of bodies of water that will be severely contaminated in the case of a rupture or other leak.

Oil industry activity has had a devastating indirect impact on the protected area. The opening up of a road and a pipeline has spurred settlements in a large section of the central area of the park, which has led to slash-and-burn and habitat fragmentation. In field visits carried out by ParksWatch, we found that several kilometers have been deforested on both sides of the road, often stretching into the horizon. The report on Management Guidance Procedures produced by the Ramsar Convention office in 1998 described deforestation as affecting a strip 100-200 meters wide all along the road (POG, 1998, p. 18) and in some cases up to 2 km. This evidence clearly shows that deforestation statistics have risen alarmingly within a few short years.

In addition, the firm operating in the area (Anadarco, with French financial backing) has done everything in its power to avoid taking the blame for many of the impacts associated with its activities and to be able to operate without restrictions. The ferry that crosses the San Pedro River is used freely, as the oil company refuses to employ any control mechanisms, despite the fact the ferry forms part of its operations. The master plan establishes time frames to monitor river traffic. However, practically no checks had been made as of April 2003. Trucks loaded with cattle, private vehicles and pedestrians cross the river on the ferry without anyone asking them where they were going or why.

The oil company has installed a ferry to cross the San Pedro River (in the south), and now the ferry’s use is completely unregulated. Every day, trucks with illegal timber, drugs, illegal immigrants, and cattle use the ferry to enter or leave the park. A truck loaded with cattle leaving the national park is seen in this photo.
Oil industry activity in Laguna del Tigre National Park has played a key role in the existence of other problems such as land grabs, permanent human settlements, the expanding agricultural frontier, and forest fires. Perhaps even more seriously, oil drilling in the area represents a clear violation of the law. The contract awarded in 1992 is illegal: it goes against the Law of Protected Areas (Decree 4-89). Despite this, every attempt to pinpoint responsibility has been met with impunity (Albacete, 1998). Today, the area under the original contract is not being developed because seismic readings were unfavorable. However, the area already under development has continued to grow. In a field inspection in March 2003, we found a new oil well had been drilled in the area.

**Extraction and poaching**

Like in other areas of Maya Biosphere Reserve, the problem of forest products extraction and poaching are difficult to control, due to the many access routes existing into the protected area and the lack of personnel. Park wardens have repeatedly denounced illegal deforestation, but have not been able to do much to curb it except for occasional patrols run together with the army and police. Illegal fishing and hunting are common, and in villages, there is practically no control. In interviews with residents of Cruce de Santa Amelia, we found out that fishing is an everyday activity. No one heeds seasonal fishing bans or regulations regarding species. The master plan suggests that species that seem to be most affected by poaching include collared peccary (*Tayassu pecari*), due to its migratory habits, and the paca (*Agouti paca*) and great curassow (*Crax rubra*) due to their slow rate of reproduction. The crocodile (*Crocodylus moreletii*) population could be shrinking because of the same problem (Castañeda, 1998).

There are countless access routes to the protected area, they are spread out all along the Mexican border to the north and west, as well as along the southern border along the San Pedro and Escondido Rivers. The road running from the south up to the oil wells and to the northeast grants greater access to a large area within the national park. Within the protected area, hunting is done as much for subsistence as it is for commercial and sporting purposes. The master plan accepts subsistence hunting in the Special Use Zone, and establishes seasonal bans and controls that go unheeded. The problems caused by hunting are compounded by the destruction of habitats and forest fires, some set by the hunters themselves. One of the species that has been decimated by poachers is the scarlet macaw (*Ara macao*), which is then sold commercially and in seriously threatened from poaching (Méndez et al, 1998).

**Lack of personnel and budget**

The protected area is in a precarious situation in terms of personnel and budget. The 40 park guards who work in Laguna del Tigre are stationed in the various jurisdictions into which the park has been divided for its control and vigilance. Guards work 22-day shifts, and in practice are never all present at the same time in the area. Add vacations and dismissals, at times the area is staffed by just one or two employees. Even with the entire personnel on hand, each park guard has to cover some 7,000 hectares, giving the area the smallest staff of all the national parks in Maya Biosphere Reserve (Albacete, 2003b). The fact the area is so conflictive and that the western and northern borders lie very near the Mexican frontier make controlling the park with so few employees impossible. The presence of six officers of the National Police and occasional army patrols does little to help the situation. With just US$0.63 per hectare, the budget for the protected area is also the lowest of any national park within the reserve (Albacete, ibid.) The lack of budget and personnel make it impossible to control Laguna del Tigre, which has become an area where all kinds of illegal activities go on and enjoy total impunity.
Conflicts with the master plan

No one complies with any of the measures established in the master plan. Zoning and regulations are written down on paper, but they are not met in practice. Laguna del Tigre is a paper park that is in reality disappearing rapidly. Even if there were the political will to change the situation, applying the current master plan as is would leave a great many of the problems.

The fact the master plan permits human presence and related activities within a national park raises the question of its legal status, as it goes against the spirit of the Law of Protected Areas (Decree 4-89). Even so, it could be considered an acceptable management concept if it proved within a reasonable time-frame to be effective in 1) reverting the park’s rapid degradation, and 2) returning the park to its original state.

Today, most of the measures proposed to reduce the threats to Laguna del Tigre have turned out to be failures. Hardly any effort has been made to relocate settlers, no one is monitoring the oil industry, and agricultural and grazing land is expanding on a daily basis. Field inspections and flights over the area by ParksWatch show that the park is losing its forest cover, as do official statistics. Land speculating continues with total impunity and there is no control over settlers. Every year, new herds of cattle are moved into the protected area. In the light of this, it is evident that the measures proposed by the master plan are not effective in ensuring the area’s conservation. The allowed activities within the master plan do not meet any conservation objective, and they can no longer be justified. Extractive activities within a national park are prohibited by law, and it is clear that the park has become increasingly degraded because of the permanent human presence. In this context, the master plan has merely become yet another illegal aspect to add to the list of illegal activities ongoing in the area.

Future Threats

Most future threats stem from the possibility that current threats will continue or worsen. If immediate solutions are not provided, it is probable that the national park will fail as an area set aside to protect biological diversity.

Recommended Solutions

Some of the problems in the area could be solved by improving patrolling and vigilance, which means the park has to improve its ability to raise funds. This would be effective mostly for activities such as extraction, poaching, forest clearing, fires and new land grabs. There can be no control in the park as long as governmental presence is absent. More members of the National Police need to be stationed in the park or park guards should be granted the power to carry weapons and make arrests. Two policemen per control post are ineffective and are merely symbolic, they have made no real difference in the situation of the protected area.

The park needs to have at least one park guard per 3,000 hectares, a number that been sufficient in Tikal National Park (ParksWatch, 2002), although Tikal faces fewer problems. Using Tikal as the standard, this means more than doubling the number of personnel, bearing in mind the regulation of the National Council of Protected Areas establishes that guards are to be organized in groups working 22-day shifts. There would have to be more personnel with the power to make arrests and carry weapons.
It is imperative that CONAP ensures compliance with the law, above all in cases where people are usurping the protected area or harming the country’s natural heritage. Although this will create social conflict due to the fact CONAP has been excessively permissive since 1997, it is the only way to recover the entity’s authority over the area, something which today has been practically lost.

**Lawlessness**

Lawlessness in the area is the reason for the failure of the park, and urgently needs to be solved. The case of Laguna del Tigre is so serious that army cooperation is being sought to re-establish order. However, army cooperation and patrols are still insufficient (Castellanos, 2003, personal communication). CONAP officials in Petén have proposed a practical strategy to regain authority in the area. This strategy is good starting point, although now it has neither the budget nor the political backing necessary to put it into practice. CONAP’s strategy is based on backing from the army and well-trained and equipped forces from the Nature Protection Service. CONAP officials are looking to ensure a permanent army presence in the central section of the park to establish generalized control. If an authority with these characteristics cannot be established on a permanent basis in the area to ensure the park’s conservation, it will be practically impossible to re-establish CONAP’s authority in the area.

Additionally, it is imperative that CONAP regulates and imposes clear guidelines for the oil company and the inhabitants of the area until they are evicted. Steps to be taken include reporting and follow-up of illegal activities, starting with major land speculators who are gradually taking over the area.

**Land grabs and permanent human presence**

There are only two ways to tackle this problem. Either the government should modify the borders of the park, excluding those areas occupied by human settlements, or it should radically change the way it tackles the problem, setting short term goals for voluntary or forced eviction of the illegal settlers. This second option includes a change in the relationship with communities in the area, where CONAP should impose its authority and sanction with greater severity any failure to comply with agreements, regulations and laws, while the eviction process is initiated. It also needs to have the will to tackle heavily-armed, large-scale illegal settlers with the full force of the law.

Both the change in borders as well as eviction of communities and large-scale illegal settlers are tough solutions, as they imply a radical procedure that will spark opposition. However, if the situation continues as it has done until now, it is highly probable that the national park will lose all its biophysical characteristics in the short term. If this radical shift in tactics does not come about, at some point the officials who are promoting activities of dubious legal status or who are failing to comply with their obligations will probably face charges in a court of law for their acts of negligence.

The modification of the park’s borders could wield an advantage in that relocation programs could be met, that the entity could regain an institutional control over the area and manage to save at least part of the national park. On the other hand, it would also create a precedent that could undermine the entire Guatemalan system of protected areas by showing that an area, which was impossible to govern, was superior to the legal system. The case of Laguna del Tigre cannot be compared with Sierra del Lacandón National Park, which had inhabitants before the protected area was established (ParksWatch, 2003). In Laguna del Tigre’s case, all the inhabitants are illegal settlers who entered the region after it was decreed a protected area. In addition, some of them forced the State to accept their permanent status by force, which
should not have been permitted. In these circumstances, a move to modify the park’s borders would set a precedent that could unleash an exponential increase in the number of land grabs in the Maya Biosphere Reserve. In addition, this solution would have to go hand-in-hand with a different relationship with communities based in the area of influence, which would have to face the brunt of the law in the case where illegal activities are ongoing. In other words, sooner or later the government will have to face the problem.

Any effort to forge a new relationship with the communities will surely trigger conflicts. It is a solution that requires political will and firm action, although it could go forward alongside a program to buy-back degraded land and gradually recover the national park. A limiting factor is the lack of a budget, not only to purchase land, but for general control and vigilance needed to uphold the law. This decision, which is tougher and more conflictive at the outset, would mark the only way to send a clear signal that there is the capacity and will to conserve Guatemala’s protected areas.

**Oil activities**

Monitoring the oil industry needs to be exhaustive, strict, and independent. Any sign of pollution or any other direct impact should be reported to the corresponding authorities and sanctioned according to law. CONAP needs to establish precise regulations for oil operations in the area, and denounce and punish any failure to comply. As part of these regulations, CONAP needs to clearly establish expenses to be covered by the oil company for any operation carried out by CONAP or any other agency involved in monitoring, control or restoration of ecosystems which have suffered any impact caused by the oil industry. The government needs to seriously evaluate the costs and benefits of continued oil operations in the area, as the extraction of a non-renewable resource only guarantees short-term earnings and is causing irreparable damage to the park.

**Conflicts with the master plan**

Current zoning in the national park is ineffective in halting new claims to land and controlling ongoing activities. It is of dubious legal status and could further undermine the precarious situation in the area.

Laguna del Tigre’s master plan must comply with the goals established for the national park, and match the conditions established in the master plan for the entire Maya Biosphere Reserve. At present, the plan does not meet either of these conditions, and urgently needs to be changed. The new plan needs to set out clear, verifiable goals. It must convincingly justify any permissive attitude toward human presence and associated activities. It must clearly define how permitting the settlements and/or activities will help to lower the overall negative human impacts and improve the conservation status of the park. It must outline the specific results it hopes to achieve and establish an efficient monitoring system in order to employ corrective measures when needed.
Conclusions

Laguna del Tigre National Park is an extremely important area because it still conserves natural heritage and because it is an essential link between the eastern and western ecosystems of the Maya Biosphere Reserve. It is the country’s largest national park with biophysical characteristics that make it unique in Guatemala’s Maya jungle. Despite the fact it faces serious threats due to ongoing human activity within and around the park, there is still time to revert the situation, at least in a large portion of the park. Continuous efforts and urgent measures will guarantee conservation of biological diversity in at least part of the area, while it is still possible to turn the situation around in areas that have suffered major impact from human activity. Reports on flora and fauna show the park is home to stable populations of endangered species, although there is little information available on the degree of pressure and degradation they may be suffering.

Due to human pressures, the national park is critically threatened and runs a high risk of failing to protect and maintain the area’s biological diversity in the immediate future unless urgent steps are taken. It is crucial that the State reestablishes its authority in the area and that it proposes an immediate solution to the presence of human settlements and associated impacts, in order to be able to curb the threats the park faces.

Field inspections carried out by ParksWatch indicate powerful pressure is being brought to bear on most of the park and requires urgent attention. Key threats include lack of government, human presence and associated activities such as agriculture, livestock herding and forest fires, as well as oil industry activity. There is a major lack of personnel, especially considering the number and degree of major conflicts in the area. Two priority actions need to be taken. First, the issue of lawlessness must be tackled with a firm hand. To do this, CONAP will need to garner the participation of those with the highest political positions in the country, and the entity will need other organizations to help it achieve this. Second, the entity must take urgent action to solve the problems caused by the presence of human settlements in the area. The current situation of both problems is unsustainable. To tackle them, CONAP will need to increase the number of park personnel and forge alliances with the National Police and other state security forces.

Once actions are underway to solve the lawlessness of the area and solutions are put in practice to deal with human presence, CONAP must deal firmly with the oil industry and apply the full weight of the law where necessary. At the same time, a new relationship needs to be worked out with the communities until they can be evicted. In this case, the law needs to be stricter to report officials or illegal settlers who harm the area, and provide continuous follow-up to denouncements to ensure that the law will be applied.

In 2004, CONAP needs to be put together a new five-year master plan. Now is the time to propose greater participation and look for ways to set clear goals and objectives that can be met, measured, and corrected if necessary. Current permissiveness is unacceptable; in no way does the plan justify how the permitted activities contribute positively to the area’s conservation, nor does it clearly set out expected results or a way to gauge the management’s success or failure. In addition, it is evident that steps proposed in the plan to tackle the most pressing problems have failed.

The administrators of the protected area have a tough task ahead of them. What happens now will determine if this immensely important Guatemalan natural area is conserved or is lost forever.
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