



Park Profile – Mexico Lacantún Biosphere Reserve

Date of last onsite visit: August 2003

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Location: Chiapas, part of Selva Lacandona

Year created: 1992

Area: 61,874 hectares

Ecoregion: Tehuantepec Moist Forests–
Mexico, Guatemala, Belize

Habitat: Moist evergreen tropical rainforest



Summary

Description

Lacantún Biosphere Reserve is located in eastern Chiapas, in the region known as the Selva Lacandona. This tropical forest, along with Montes Azules Biosphere Reserve, makes up the most biologically diverse region in Northern Mesoamerica and is a priority conservation zone in Mexico. Lacantún, Montes Azules, Chan – Kin and Sierra la Cojolita Communal Reserve form the principal corridor connecting Mexico’s Selva Lacandona to Guatemala’s Selva Maya.

Biodiversity

Lacantún’s biological richness is comparable only to that of its neighboring protected areas, where (per unit area) Mexico’s highest biodiversity is concentrated. This reserve’s tropical moist rainforest is in a pristine, almost entirely intact state (although, precise data or exact inventories do not exist supporting this claim) and it harbors species such as harpy eagle (*Harpia harpyja*), king vulture (*Sarcoramphus papa*), scarlet macaw (*Ara macao*), jaguar (*Panthera onca*), Baird's tapir (*Tapirus bairdi*), Central American spider monkey (*Ateles geoffroyi*), Central American river turtle (*Dermatemys mawii*) and the American crocodile (*Crocodylus acutus*).

Threats

Lacantún Biosphere Reserve is **critically threatened** and urgent solutions are required to assure its protection and to maintain its biodiversity. During our field visit we identified the following threats as the most pressing: land invasions, forest

fires, illegal logging of precious woods, wildlife species trafficking, and lack of administrative structure to manage the natural resources.

Description

Physical description

Lacantun is located in eastern Chiapas, municipality of Ocosingo, in the region known as Selva Lacandonda. The protected area is 61,873 hectares, and its altitude varies between 120 m to 500 m. Annual precipitation is between 2,500 and 3,000 mm and the average annual temperature varies between 26 and 28 °C. The reserve is part of the Grijala-Usumacinta hydrological region, whose average annual drainage is 85 trillion m³ (INE, 2000).

There are several rivers within the reserve including the Agua Azul, Lacanjá, Aguilar and Cortés.

Lacantún Biosphere Reserve is in the Lacantún River Basin. Lacanjá River forms its western border and separates the reserve from Montes Azules Biosphere Reserve. To the east, the reserve borders the Frontera Corozal community and to the north, the archeological site, Bonampak Natural Monument.



Location of Lacantún Biosphere Reserve in Chiapas, Mexico

The reserve's predominate vegetation is moist evergreen tropical forest, which makes up 98% of its vegetative coverage. Trees of this forest can reach 60 meters in height. As a result of this extensive rainforest coverage, Lacantún is important habitat for flora and fauna, some of which are considered endangered species.

Biodiversity

Few studies have been conducted in Lacantún Biosphere Reserve and for this report we cite research conducted in other areas of Selva Lacandona, since they all form part of this continuous ecosystem. For example, we cite research from neighboring areas like Montes Azules, Bonampak and Yaxchilán. From the research conducted in the zone, it has been determined that all the areas share the same biological richness and that the protected areas are functioning together as a true biological corridor (March and Flamenco 1996).

Fauna

The current insect registry lists 1,135 species for the Selva Lacandona region (Moron 1992). In a scientific article published by Rodiles *et al.* (1999), 44 fish species were reported for Lacanjá River. Scientist Miller (1998) registered 112 fish species for the Usumacinta River Basin, which includes Lacantún. Some of the species considered endemic to the Usumacinta region include: *Ictiobus meridionalis*, *Potamarius nelsoni* and *Cichlasoma bifasciatum*. Species with restricted distribution in the Lacanjá River include the tropical gar (*Atractosteus tropicus*), bagre lacandón (*Potamarius nelsoni*), and the cichlids (*Cichlasoma irregulare*) and (*Cichlasoma bifasciatum*). It should also be noted that in the same studies scientists discovered two exotic, commercial species in Lacanjá: tilapia (*Oreochromis niloticus*), and the grass carp (*Ctenopharyngodon idella*). Lastly, they reported finding a rare species, *Cichlasoma urophthalmus*, outside of its natural range (Morales-Román and Rodiles-Hernández, 2000).

Not much is known about the region's reptiles and amphibians. The most often cited reptile research for the Selva Lacandona is Lazcano-Barrero *et al.* 1992. They registered 77 species—23 amphibians and 54 reptiles. Specifically, the registered 28 snake species, 21 toad and frog species, 18 iguana and lizard species, six turtle species, and two species each of crocodiles and salamanders (Lazcano-Barrero *et al.* 1992). It should be noted that some amphibians and reptiles are considered indicator species because they are only found in pristine, undisturbed forests. The following species are considered indicators: *Centrolenella fleischmani*, *Rhinophrynus dorsalis*, *Anolis capito*, *Corytophanes cristatus* and *Spelnomorphus cherriei* (Lazcano-Barrero *et al.* 1992). Reptiles included on Mexico's endangered species list (Norma Oficial Mexicana de Ecología 059 del 2001, NOM-ECOL-059-2001) and IUCN's 2003 redlist include the American crocodile (*Crocodylus acutus*), Morelet's crocodile (*C. moreletti*), and the Central American river turtle (*Dermatemys mawii*) (DOF 2002). There are several reptile species designated under "special protection" including the iguana (*Iguana iguana*), snapping turtle (*Chelydra serpentina*) and the common slider (*Trachemys scripta*), as well as the Rio Grande leopard frog *Rana berlandieri*.



Amphibian fauna

There are 341 bird species in the Montes Azules area (González-García 1993), which is one of the most diverse bird areas in the entire Lacandona region. Another area that is equally rich in species is Yaxchilán Natural Monument, with 235 species in an area of only 2,621 hectares (Puebla-Olivares *et al.* 2002).

There are also several bird species present in the reserve that indicate high quality habitat, including the scarlet macaw, king vulture, harpy eagle, and great curassow (*Crax rubra*). The González-García 1993 study of endangered bird species is often cited. However, ParksWatch compared this study with more recent publications and found that since 1993, when only two bird species were considered endangered (the scarlet macaw and harpy eagle), five additional birds are now considered endangered (NOM-ECOL-059-2001; Carreón 2003). The species are the solitaire eagle (*Harpyhaliaetus solitarius*), the king vulture (*Sarcoramphus papa*), muscovy duck (*Cairina moschata*), the black hawk-eagle (*Spizaetus tyrannus*) and the ornate hawk-eagle (*Spizaetus ornatus*).

There are 112 mammal species in Selva Lacandona, of which 17 are Mesoamerican endemics (Medellín, 1994), including the Mexican black howler monkey (*Alouatta pigra*), Mexican hairy dwarf porcupine (*Sphiggurus mexicanus*), several bat species (*Myotis elegans*, *Dermanura watsoni*, *Tonatia evotis*,) and two marsupials, Central American woolly opossum (*Caluromys derbianus*) and the Mexican mouse opossum (*Marmosa mexicana*) among others.

Mammalian diversity in Lacantún is threatened by human and subsistence activities. The species included on Mexico's threatened and endangered species list NOM-ECOL-059-2001 include four of Mexico's cat species: the jaguar (*Panthera onca*), ocelot (*Leopardus pardalis*), and the margay (*Leopardus wiedii*) are considered endangered; the jaguarundi (*Herpailurus yagouarondi*) is considered threatened. Other threatened species include the

Central American spider monkey (*Ateles geoffroyi*), Baird's tapir (*Tapirus bairdii*), river otter (*Lontra longicaudis*), water opossum (*Chironectes minimus*), tayra (*Eira barbara*), northern naked-tailed armadillo (*Cabassous centralis*) and Linnaeus' false vampire (*Vampyrum spectrum*) (IUCN, 2003).

Flora

Martínez *et al.* (1994) reported a total of 3,400 vascular plant species for the Selva Lacandona but they estimate at least 4,300. Three hundred ninety-two woody species have been described: 194 trees, 126 shrubs, and 72 lianas. The only member of the Lacandoniaceae family in the world, *Lacandonia schismatica*, is endemic to this particular region.

There are three predominate vegetation types in Lacantún Biosphere Reserve: moist evergreen tropical forest, riparian vegetation, and *Bambusa longifolia* vegetation (Rzedowski 1983; Miranda 1975).



Cultivated *Lacandonia schismatica* (photo © E. Martínez S.)

The moist evergreen rainforest is a very dense forest whose foliage is always green. Its distribution is between the altitudes of 100 and 900 m and it is known to harbor a diversity of trees reaching 60 meters or more (Arriaga *et al.* 2000). Common rainforest species include mahogany (*Swietenia macrophylla*), Terminalia amazonica, Brazilian firetree (*Schizolobium parahybum*), jutahy (*Dialium guianense*), *Nectandra* sp. and the shaving brush tree (*Pseudobombax ellipticum*).

Riparian vegetation is found along the reserve's fertile riverbanks, in altitudes between 100 and 500 meters on flat terrain. Trees in the riparian zone grow between 20 and 40 meters and common species include *Pithecellobium arboreum*, *Schizolobium oarahybum*, *Lonchocarpus guatemalensis*, *Inga spuria*, *Castilla elastica*, *Salix humboldtiana*, *Licania platypus* and *Ficus glabrata*.

Bambusa longifolia vegetation is found along the banks of the Lacantún River. The woody grass *Bambusa longifolia* is the dominant species and it grows in dense, exclusive communities reaching heights of 15 meters. This vegetation grows in flat areas that remain inundated for most of the year. Other species associated with this community include: *Schizolobium parahybum*, *Bursera simaruba*, *Ceiba pentandra*, *Castilla elastica*, *Spondias Bombin* and *Pithecellobium arboreum* (Castillo-Campos y Narave, 1992).

Management

Lacantún Biosphere Reserve was declared in 1992 with 61,874 hectares. Even though it was created 12 years ago, the national parks agency is still working on its management program, its zoning, and other necessary components for its management and conservation (D.O.F 1992; CONANP 2003b). The legal boundaries correspond to these limits: 16° 23' 44", 16° 43' 20" N, and 90° 42' 29", 91° 03' 19" W. The Federal Government's National Commission of Natural Protected Areas ([CONANP](#)) has yet to name a director for the reserve; however, as part of this institution's regionalization program, they have named Biologist Adrián Méndez as the coordinator for Region X, Frontera Sur, and Montes Azules Biosphere Reserve. He is supposed cover Lacantún to the extent possible as well. Since CONANP has no field personnel assigned to the area, those assigned to Montes Azules along with three inhabitants of Frontera Corozal attend to Lacantún's needs.

There is no infrastructure within Lacantún, although there is a security post in San Javier, which is located along the border highway and close to the turn-off to the Lacanjá community. This infrastructure, property of CONANP, is used to help manage and coordinate activities for three protected areas: Montes Azules, Lacantún and Chan Kin. Close to the mouth of Lacantún River, the Federal Prosecutor's Office for Environmental Protection (Procuraduría Federal de Protección al Ambiente—PROFEPA) also has a security post to care for the region's natural resources.

While there are no field stations within Lacantún, the non-governmental organization Espacios Naturales y Desarrollo Sustentable A.C. ([ENDESU](#)), manages two stations within Montes Azules: Chajul and the newly constructed station close to the mouth of Tzendales River (ENDESU 2003). It remains to be seen whether or not the focus of these field stations will be research or tourism.



New facilities of a field station by the Lacantún River -
This is the station closest to the Reserve

Lacantún does not have its own federally mandated budget, rather it shares Montes Azules' annual operating budget of \$118,181. Some institutions have provided money for specific programs within Lacantún, like the Mexican Nature Conservation Fund (Fondo Mexicano para la Conservación de la Naturaleza—FMCN), who in 2003 provided approximately \$4,500 for forest fire prevention and control (CONANP 2003a).

In 2003, the Mexican Government signed several bilateral environmental collaboration agreements (CONANP, 2003). With Guatemala's National Commission of Protected Areas, they signed an agreement to conduct joint projects in Mexico's Lacantún Biosphere Reserve and in Guatemala's Sierra del Lacandón National Park. Their collaboration will focus on the following issues: conservation management, research and monitoring, social development, information exchange and training, financing and procurement, inspection and security, and legal issues.

Human Influence

It is important to note that in 1972 a Presidential Decree declared the Lacandona Community proprietors of the land that is today Lacantún Biosphere Reserve. It is part of the Frontera Corozal territory, which is one of the five Lacandona sub-communities. The other sub-communities are Nueva Palestina, Lacanjá–Chansayab, Naha and Metzabok (INE 2000).

Lacantún was recently recognized as one of the most pristine reserves in Mexico and free of human settlements. Yet, in 2001 the first human invasion into the reserve was reported. As a result, 18 hectares were cleared and 23 small huts were constructed. In 2002, monitoring revealed that the affected area had grown to 26 hectares (CI 2002).

Frontera Corozal's population center is located outside of Lacantún, near the banks of the Usumacinta River and Yaxchilán Natural Monument. Within the reserve, locals use temporary housing called "trabajaderos" (CONANP 2003b). These areas are used for agricultural activities and they are distributed throughout the eastern portion of the reserve, close to the border highway.

Communities adjacent to the reserve include Frontera Corozal, Lacanjá-Chansayab, Benemérito de las Américas, and Quiringuicharo along the banks of the Lacantún River. The last two communities are immigrant communities. The inhabitants have come from different states and have the greatest impact on the reserve. They log precious woods, fish, poach, engage in wildlife trafficking, and in some places, they cultivate narcotics.

The main access road to the reserve is the border highway that travels from Palenque to Benemérito de las Américas. The reserve is also accessible by the Lacantún River in boat. Finally, small airplanes that leave the city of Comitán or Palenque fly to the communities in the region, although not many people chose this mode of transportation since it is costly and the new asphalted highways are accessible.



Working areas or "trabajaderos" of the Frontera Corozal community within the Reserve's region, including grazing lands and cultivation lands

Within the reserve there are absolutely no infrastructure or services. Within the communities, on the other hand, one can find rustic accommodations, supply stores, health clinics, primary and secondary schools, and other services such as electricity, telephones, and public transportation to the cities of Palenque and Comitán de Domínguez, Chiapas. Commercial activity has grown notably in the border community of Benemérito in the last eight years because of its geographic location on the banks of Usumacinta River next to Guatemala. Many Guatemalan and Central American immigrants pass through this community on their way to the United States. Many of them are detained by the Mexican

police and deported to the other side of the Usumacinta, yet they continue to try until they achieve their goal and some end up staying temporarily or permanently in Benemérito.

Total population in 2000 for Benemérito was 6,150 people (INEGI 2004). This economic and demographic growth has occurred in other large border cities, but in this case it has created social problems such as sordid nightlife, drug addictions, alcoholism, and drug trafficking.

In Frontera Corozal, there are approximately 5,000 indigenous Choles (INEGI 2004). This community has been considered a starting point for tourists visiting the Mayan ruins of Yaxchilán Natural Monument. The inhabitants have created cooperatives to offer hotel accommodations in Escudo Jaguar, where they have lodging, restaurant, bathrooms, telephone, and river transportation to the Yaxchilán ruins and Guatemalan communities like Técnica. Frontera Corozal also has public transportation (vans and buses) to the city of Palenque. This community has grade schools, high schools, and distance learning centers as well as a rural health center and a rural medical unit of the Mexican Institute of Social Security (IMSS). This community's cultural way of life is very laid-back and tranquil. The adults work the land, fish from the riverbanks, and raise cattle.

Yaxchilán and Bonampak archeological reserves are the most visited of the region. Tourists, mostly from Europe and United States, usually take pre-arranged vacations organized by tourist agencies based in Palenque, Chiapas and Villahermosa, Tabasco. There are also national tourists, but not as many. Statistics on precise number of visitors are unavailable; the Chol community in Frontera Corozal and the Lacandona community in Lacanjá do not maintain systematic records. The National Institute of Anthropology and History (INAH), present in both sites, could not give precise information either.

The Lacanjá-Chansayab community, found close to the reserve's northern sector, has 754 indigenous Lacandona inhabitants—the most of any community (INEGI 2004). There are several lodging options in this community, most administered by indigenous Lacandona people, including small hotels and campgrounds in conserved forest. In some cases, they have formed agreements with companies in Palenque called “Explora.” Most of the indigenous people involved in tourism have invested their own money, but some receive funding from governmental agencies such as the Secretary of National Tourism.

Inhabitants of Lacanjá-Chansayab and Frontera Corozal are part of the Lacandona Community and their productive activities are mostly subsistence, although they do engage in some commercial resource use. Benemérito and Quiringuicharo are immigrant communities and their economy is based on agriculture, grazing, and commerce, in addition to some illegal activities like logging and drug trafficking.

Conservation and Research

Mexico's Universidad Nacional Autónoma de México (UNAM) has had significant presence in the area over the years and its scientists have conducted important research. Among notable scientists include the brothers Javier and Roberto de la Masa who studied butterflies (De la Maza and De la Maza 1985). [Rodrigo Medellín](#) conducted one of the longest studies in the region on bats and small mammals. Alfredo Cuarón has studied monkeys and other fauna; botanist Miguel Martínez conducted studies on population ecology and communities of tropical flora in the region; Esteban Martínez along with other colleagues completed Selva Lacandona's floral inventory; Rodolfo Dirzo's research focused on the plant-animal interaction and tropical ecology (Medellín 1994; Martínez *et al.* 1994; Mendoza and Dirzo 1999; Martínez-Ramos *et al.* 2001).

Eduardo Iñigo is another expert in the region who has conducting monitoring studies on key species like the scarlet macaw and on birds of prey over the last ten years (Iñigo-Elias, 1996; Carreón *et al.* 2001).

Another institution working in the zone is the Colegio de la Frontera Sur ([ECOSUR](#)). Eduardo Naranjo studies ecology, ungulate conservation, and subsistence wildlife use. In the community of Lacanjá, Samuel Levy carries out agroecology projects using traditional Lacandon techniques. Rocío Rodiles studies fish populations in the Lacantún and Lacanjá Rivers (Naranjo 2002; Rodiles *et al.* 1996; Morales-Román and Rodiles *et al.* 2001).

ECOSUR's Conservation Biology Program has conducted several cartographical studies of Selva Lacandona using geographic information systems. From these, valuable information on deforestation rates, hydrology, vegetation types, and human settlements has been obtained (March and Flamenco 1996).

Universidad Autónoma Metropolitana (UAM) also works in the region. Its work is more interdisciplinary in nature and tends to deal directly with civil society organizations. They provide technical support and consulting services on social development programs. They focus on the area known as Marqués de Comillas (Cortez 1998).

Conservation International (CI) has worked in the Selva Lacandona and provided financing for key species such as the jaguar, scarlet macaw, and harpy eagle. They also monitor the area by conducting flyovers, and analyzing aerial photographs and satellite images. They estimate deforestation rates and maintain an important database. They also support community development projects, the most notable being "Escudo Jaguar" in Frontera Corozal (CI March 2003).

Recent CI publications include two compact discs: "La Selva Lacandona Tesoro de Biodiversidad en México" and "Selva Lacandona siglo XXI Estrategia Conjunta para la Conservación de la Biodiversidad" which mean "The Selva Lacandona: Mexico's Biodiversity Treasure" and "Selva Lacandona: 21st Century Joint Strategy for Biodiversity Conservation" respectively (CI – ECOSUR 2001; March 2003).

Mexico's Fund for Nature Conservation (Fondo Mexicano para la Conservación de la Naturaleza) finances organizations like Espacios Naturales y Desarrollo Sustentable and provides money for training projects and fire fighting equipment.

Current Threats

- Unauthorized human settlements
- Border highway
- Illegal logging
- Overuse of non-timber forest products
- Overhunting and fishing
- Lack of administrative personnel and park guards
- Forest fires
- Lack of management program
- Agricultural activities
- Exotic species

Possible future threats

- Construction of hydroelectric dams

Unauthorized human settlements



Invasion of Arroyo Cristalino within the Lacantún Biosphere Reserve

Problems resulting from numerous unauthorized human settlements within Montes Azules Biosphere Reserve started to attract the attention of conservation groups, civil society, human rights groups, and government authorities in the early 1990s. More invasions occurred in indigenous communities during 2001 and 2002. During this time, these different stakeholders debated about how to

best resolve the invasion problems in the area. They witnessed yet another invasion in 2001 in Lacantún Biosphere Reserve, the first in this previously untouched area. The settlers invaded an area known as “Arroyo Cristalino,” deforested approximately 26 hectares, built

23 huts, and shortly after the initial invasion, they continued to expand their settlement and deforest additional areas to cultivate (CI 2002).

Border highway

Over the last 15 years, deforestation, grazing, and agricultural activities have fragmented the Selva Lacandona, which connects with Guatemala's Selva Maya in Petén. Colonization, deforestation, and fragmentation were further accelerated when the border highway opened. Recent improvements to the highway, including asphaltting, have created an additional threat to the fauna - animals are run over on a daily basis.



Skunk run-over by road traffic

Illegal logging

Deforestation is evident throughout the region. In Arroyo Cristalino, at least 50 hectares of vegetative coverage has been cleared. In communities like Quiringuicharo (in Marqués de Comillas region on the banks of the Lacantún River), one can observe large quantities of cut wood and boards drying next to the houses in the sun. This wood comes from the protected area (Anonymous, personal communication). Benemérito de las Américas is a large town close to the reserve, along the highway and river. Here too there are several sawmills; it is well known that inhabitants illegally use timber extracted Lacantún. During our visit to the area, we were told that during May and June 2003, PROFEPA inspectors stationed at the mouth of Lacantún River confiscated 65 logs and 7 m³ of mahogany.



Sawn wood in the Quiringuicharo community

Overuse of non-timber forest products

The community of Frontera Corozal uses non-timber forest products from the protected area. For the most part, they intensely harvest the palm fronds of xate (*Chamaedorea oblongata*), the parlour palm (*Chamaedorea elegans*) (CCA 2002) and la pita (*Aecmea sp.*). They also consume fruit from some trees, such as sapote, ramon, anona, pepper and cacao.

Because firewood is intensely harvested for domestic use and for some production activities (albeit inefficient production), we have identified firewood collection as a threat to the targeted species.

Overhunting and fishing

Wildlife hunting is a growing threat in the reserve. In addition to hunting for subsistence (which is legal), members of the Frontera Corozal and Lacanjá-Chanzayab communities hunt for commercialization. In Quiringuicharo and Benemérito de las Américas hunting is done mostly to obtain bush meat to consume and sell. Some species beginning to show population declines in the region include: *Odocoileus virginianus*, *Tapirus bairdii*, *Tayassu tajacu*, *Mazama americana*, *Ateles geoffroyi* and birds such as *Penelope purpurascens*, *Crax rubra* and *Ara macao* (Naranjo 2002).



Hunters' shelter with the Lacantún Biosphere Reserve

Another significant pressure is fishing in the Lacantún and Lacanjá rivers. Basic information on target species, such as reproductive cycles, is unknown and therefore no fishing seasons or size limits have been established. Some species are overfished and their populations do not recuperate. Inappropriate methods are also used; fisherman use poison

(barbasco) or very fine nets. They catch juveniles as well as adults. The communities most involved in fishing and consuming fish are Benemérito, Quiringuicharo and Zamora Pico de Oro, which is on the banks of Lacantún with 1,700 inhabitants (INEGI 2000). It should also be noted that several endangered aquatic species are hunted, including the Central American river turtle (*Dermatemis mawii*) and the crocodiles (*Crocodylus acutos* and *C. moreletti*) (UICN 2003).

Lack of budget, administrative personnel, and park guards

Undoubtedly, without a budget or personnel Lacantún has been marginalized; the 2001 invasion occurred because there was no security or management. If Lacantún continues as is—without budget, staff, or management—biodiversity will be lost to deforestation, forest fires, hunting, and wildlife species trafficking.

Forest fires

The 1998 fires demonstrated how vulnerable Lacantún's ecosystems were and forest fires are now considered a permanent threat. During our field evaluation, fires had affected 2,797 hectares. In Chan Kin, a neighboring protected area, fire affected 1,980 hectares (CONANP 2003a). These fires were caused by ranchers attempting to open up additional grazing pastures for their cattle and by slash and burn farmers.



Impacts of 2003 fire on the eastern part of the reserve

Lack of a management program

Lacantún's management program has yet to be completed. There are several factors contributing to the delay. First of all, the institutions responsible for doing it have failed because of missing information and lack of research on the reserve. In addition, the role the

Lacandona community (the actual proprietors of the land) will play has not been determined.

Without a program, managing and conserving the area is impossible, as is carrying out any reserve-related activities (which the program itself is supposed to establish). One element urgently needed within the program is fairly developed zoning in order to guide land use and establish restricted and permitted activities for each zone.

Agricultural activities

The agriculture and grazing frontier has yet to penetrate into the reserve. Currently, within the reserve there are only small areas of pasture and crops in the north and east, and in the recently invaded area (CI 2002). Surrounding the reserve, agriculture and grazing is confined to the areas around the border highway and along the Lacantún riverside road. Before the land invasion, Frontera Corozal was the only community involved in agriculture and grazing and they were not problematic because the indigenous people maintained their areas and the deforestation rate was slow.

The risk agricultural and grazing activities pose to the reserve is high. First of all, more agriculture leads to a higher wildfire risk because of slash and burn techniques used before planting during the hottest months: April, May, and June. Second, there has also been an expansion of cattle grazing and creation of pasture. Finally, communities such as Quiringuicharo are expanding their agricultural lands. The slow but continued advance of deforested areas into the reserve could be considered the start of its own fragmentation.

Some people living in Marqués de Comillas claim that members of the Quiringuicharo community are involved in narcotics trafficking. An anonymous researcher who, during his fieldwork, was intercepted by armed men protecting drug crops in Lacantún's area confirmed this. After visiting the community and passing by several Mexican army posts, ParksWatch experienced something similar. When we arrived at the border highway, we were thoroughly searched. We assume that the army personnel had identified us as potential traffickers because we were outsiders visiting the community.

Exotic species

Several exotic species have been reported in the area. The Africanized bee (*Apis mellifera adansonii*) is known to exist in the zone. It represents a threat to the scarlet macaw because in some cases it has affected this species' reproductive cycle (personal observation). There are two exotic fish in the Lacanjá River: Nile tilapia (*Oreochromys niloticus*) and the grass carp (*Ctenopharyngodon idella*) (Rodiles *et al.* 1996). Members of the Frontera Corozal community have also introduced several domesticated animals, including cows, horses, pigs, chickens, and dogs. It is also believed that the unauthorized settlers within the Lacantún's core zone have cattle, dogs, and chickens.

Construction of hydroelectric dams

For the last few federal administrations, infrastructure development for southeastern Mexico, and specifically Chiapas, has been a hot topic. Conservation organizations are concerned about the mega-electricity infrastructure projects proposed in Plan Puebla Panamá (PPP). The PPP recommends building six dams within the Usumacinta River Basin, some as high as 235 meters.

The hydroelectric dam project known as “Boca del Cerro” in the Usumacinta River involves the states of Tabasco and Chiapas in Mexico and Guatemala. The conservation community and local inhabitants are most concerned about this project because preliminary site studies have already taken place.

Boca del Cerro Dam would be 135 m tall and as a result, Usumacinta River would flood a large portion of Mexico’s and Guatemala’s border territories. Important archeological sites, such as Yaxchilán in Chiapas and Piedras Negras in Guatemala, would be flooded.



Community manifest against the *Plan Puebla Panamá* and the construction of dams

Recommended Solutions

Unauthorized human settlements

The recent invasion into Lacantún Biosphere Reserve is a very special case and in order to resolve it, governmental authorities must establish communication with the illegal settlers to agree upon the terms of their resettlement. We believe that it would be a serious error to allow the illegal settlers to stay in Lacantún’s core. If left unresolved, the other threats

would continue to worsen in the short and medium term. Deforested areas would increase since the inhabitants' needs would grow. In addition, there is no guarantee that additional settlers would not immigrate to the area. As in the case of Montes Azules Biosphere Reserve, Lacantún should be a national priority. The federal governmental funds (724,000 USD) designated for land reform and the money invested by the European Union (31 million Euros) in the Selva Lacandona region for 2004 for social development projects could be used to help find alternatives for the people living illegally Arroyo Cristalino (Elvira 2003).

Border highway

This highway interrupts the corridor connecting the protected areas of Selva Lacandona in Mexico (Lacantún, Chan Kin and Sierra La Cojolita Communal Reserve) and Sierra del Lacandón in Guatemala. Zoning and management programs are needed in both Lacantún and Chan Kin to help stop deforestation for pasture and agriculture along the highway. In addition, protection and security activities should be strengthened to help control the situation. Finally, research is urgently needed to evaluate the border highway's impact on the fauna in the area.

Illegal logging

As in other protected areas, we verified that PROFEPA authorities responsible for dealing with environmental crimes are not prepared to deal with the perpetrators. PROFEPA lacks what loggers have: budget, equipment, and vehicles. In addition, the loggers are well armed and the authorities cannot confront them as such.

On occasion, PROFEPA and the Mexican army have coordinated efforts to stop illegal logging, but these are few and far between and therefore unable to resolve the problem. Most of the time the inspectors prefer not to get involved in order to assure their own personal safety. We recommend that coordinated efforts continue on a regular basis and should involve even more authorities from communal and municipal institutions. Another proposal is to arm PROFEPA inspectors and park guards so that they are on an even playing field with the armed perpetrators.

PROFEPA inspectors in the zone are by and large forestry professionals and most of their work focuses on timber. We recommend additional training for the inspectors to increase their knowledge regarding other flora and fauna in the region and specifically regarding the protected species (NOM-059). Inspectors should receive materials and identification guides. Governmental institutions or non-governmental organizations could train community security committees on the same material to then work with PROFEPA to identify perpetrators. This proposal could have good results because those involved most in hunting and wildlife trafficking are people from other areas.

Overuse of non-timber forest products

Even though commercialization of cultivated palm species has been ongoing for the last 20 years, collectors still harvest wild palms. This has seriously diminished the number of

native palms, and collectors have to penetrate deeper into the forest to find them. In addition, many collectors utilize inadequate methods to harvest the palm fronds that end up damaging the plant. Some collectors cut the entire palm thereby inhibiting quick regrowth.

Fortunately, there are already some palm nursery projects in the area. These nurseries provide an alternative, additional income source for 300 inhabitants who work there part-time.

Improper cutting techniques and outside harvesters have almost entirely exhausted the agave (member of the bromeliad family) populations. Since there is strong demand for the pita fiber of the agave plant, a temporary harvest ban should be implemented in order to allow time to research the state of its wild populations.

The people of Frontera Corozal are conscientious of their dependence on firewood for home use and they have set aside portions of areas where they commonly gather firewood for future use. In addition, organizations like Conservation International promote appropriate technologies like conservation wood-burning stoves that use less firewood but more efficiently use the heat produced.

Overhunting and fishing

Lacantún Biosphere Reserve cannot sustain long-term wildlife use as long as the communities of Benemérito de las Américas, Frontera Corozal, Quiringuicharo and Zamora Pico de Oro continue to overharvest. These communities already exert a great deal of pressure on wildlife populations, so much so that people complain about the scarcity of species like the white-tailed deer, red brocket deer, tapir, jaguar, collared peccary and paca.

We propose that the government provide subsidies so that the communities in this region can afford to buy meat instead of hunting wildlife to obtain protein. Current federal government programs to help rural farmers (Procampo and Proganadería) have not solved the problem. Through these programs, the farmers receive money if they can demonstrate that they have certain areas dedicated to agriculture, or they receive calves to start their cattle herds. These programs do not consider whether or not the land is appropriate for such activities and they do not control that the cattle is contained within the assigned lands.

Institutions like the Secretary of Agriculture, Ranching, Rural Development, Fishing, and Alimentation (Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación in Spanish, or SAGARPA) and SEMARNAT need to coordinate their activities. They should research the meat market in the region then determine special preferential prices for these marginalized, extremely poor communities. Potential meat suppliers could be the cattle ranchers of neighboring Tabasco or ranchers in other parts of Chiapas. This could potentially solve problems such as malnourishment, deforestation, illegal hunting, destruction of biological corridors, and the advancing cattle ranching frontier—lands which are usually underutilized anyway.

Lack of administrative personnel and park guards

Within CONANP's conservation strategies, the administrative structure and operations must be strengthened in reserves like Lacantún in order to immediately address their multiple problems. CONANP needs to instill ethical values and morals to improve its park guard force. From our point of view, the institution should seek authorization for the park guards to carry arms, both for their own protection and to enforce the laws. This proposal should not be considered crazy or trying to incite violence, rather it is a way to help the natural resource protectors do their job and to ensure that people recognize their work to ultimately stop the crimes against the environment.

Security guards working in private areas are trained and legally empowered to carry arms. In addition, local authorities responsible for the communal reserves have accepted the idea to create groups to protect their natural resources. While of course it is not the only solution to environmental problems, it has been shown to considerably reduce them. The actual number of PROFEPA operations responding to environmental crimes is low; the corresponding bureaucracy to such operations is debilitating as is the lack of interinstitutional coordination and lack of equipment and financial resources. Therefore, we propose that CONANP create a Natural Resource Control and Security Office in which the personnel are trained and educated in environmental legislation, ecology, ethics and morality, and in use and management of firearms. They would work exclusively within protected areas and buffer zones and would help strengthen PROFEPA's work.

Forest fires

This problem's resolution calls for an integrated approach that includes strengthening personnel assigned to the reserve and their capacity to respond to situations such as wildfire control and management. In addition, community participation should be strengthened and environmental and cultural awareness needs to be increased.

Coordination mechanisms should be established between the reserve's administration and the community members of Frontera Corozal who use land within the reserve for crops and/or pasture. Community leaders should publicize the start of their agricultural burn season so that they could coordinate with CONANP and the National Forestry Commission (CONAFOR) to incorporate wildfire preventative measures such as firebreaks, clearing underbrush and other accumulated flammable materials. The management program must also include a section on forest fire control and management.

Management program

There should be no further delays when it comes to elaborating and publishing the management program, as this is the reserve's most important management document. Of course this process is complex because it deals with an area where the communities could be very demanding when it comes to their role in the reserve's management; but through dialog and reactivation of an Advisory Council for the reserve, issues will be agreed upon in order to move forward with this management and conservation tool. Lacantún Biosphere Reserve, like Montes Azules, is part of the extremely important Selva Lacandona and with

the help and synergy of the Federal Government, State Government and non-governmental organizations, its weaknesses can be resolved.

Reaching goals, such as completing the management program, can help create expectations regarding the protected area since the program is a key element needed to secure internal and external funding.

Agricultural activities

In order to resolve agricultural activities within the protected area, the management program and zoning are needed as well as a solid administration, with a full-time director, park guards and community participation (Lacandona Community living in Frontera Corozal). The law should be enforced according to the regulations and norms established in the management program.

Again, we suggest that institutions like SAGARPA and SEMARNAT coordinate their social development programs in the region. They should seek development strategies that are appropriate for the area's environment. They should also work to generate income from conserved and managed forested areas by charging for environmental services or charging for their use and enjoyment, as is done in some marine protected areas.

Exotic species

We recognize that the Arroyo Cristalino illegal settlement is one of the most difficult and violent, we recommend that the authorities maintain communication in order to eventually relocate these communities outside of the protected area and begin to restore and remove introduced species. Resources should be secured (by groups like SAGARPA, and the National Water Commission) to continue projects like fish propagation, bee keeping, and others that could provide income and serve as environmental indicators in the case of amphibian projects.

Construction of hydroelectric dams

Plan Puebla Panama's energy production plan is too much for the Usumacinta River Basin. There have been no official public announcements regarding the plan's implementation, but rumors indicate that technical work has already begun in places like "Boca del Cerro" in Mexico and that electricity infrastructure studies are going on over the border in Guatemala.

Conclusions

Lacantún Biosphere Reserve is extremely important for the Selva Maya. Along with Montes Azules and Sierra la Cojolita, it forms a biological corridor connecting Mexico's Selva Lacandona and Guatemala's Petén (Ankersen y Arriola 2001). Despite its importance, threats to the reserve endanger biodiversity conservation in the entire region. Since the 1990s the border highway has been a threat because it facilitated access to the reserve for communities and immigrants. The most affected regions in the zone are along

the highway, in the north and east. This is where most agriculture and grazing takes place and where the access trails for legal and illegal timbering are located. This is also where the major wildfires have caused the most damage.

Lack of personnel and financial resources is also alarming. Full-time employees are needed in Lacantún, as are resources and equipment. Currently, CONANP mandates that the staff and resources assigned to Montes Azules are to be shared with Lacantún. While their intentions are good, this strategy is severely insufficient—Montes Azules lacks staff and resources to attend to its own needs, let alone try to cover a larger area and resolve Lacantún's complex problems.

According to ParksWatch experience in Guatemala and Mexico, both Lacantún Biosphere Reserve and Sierra del Lacandón National Park are extremely important to the Selva Maya. They represent the only remaining narrow bridge maintaining genetic exchange between the Selva Maya and Selva Lacandona. This has been demonstrated in studies documenting seasonal migrations of the scarlet macaw (personal observation) and *Amazona farinosa*.

Both areas also lack management program. While Sierra del Lacandón does have a master plan, some of the strategies within the plan are legally questionable (ParksWatch 2003). Despite this, certain lessons can be drawn from Sierra Lacandón's experience, like how to focus the management program to resolve real problems and establish reasonable, reachable goals. In addition, Lacantún can look to Sierra del Lacandón for guidance when it comes to dealing with the illegal settlers and reaching agreements. Specifically, as was learned in Guatemala, these negotiations should not be above the law and they should not delegate institutional responsibilities to the communities (Albacete 2004).

These tropical forests are without a doubt the richest ecosystems in the world (WWF and IUCN 1994-1997). It should also be noted that Lacantún harbors unique species, such as the *Lacandonia schismatica* (the only member of the Lacandoniaceae family) and Sierra del Lacandón is home to four endemic plant subspecies.

Lacantún Biosphere Reserve's threats are growing and this relatively well-conserved protected area could soon deteriorate and find itself in a situation similar to Sierra del Lacandón National Park, which has lost more than 40% of its forest cover to similar threats (ParksWatch 2003). We have determined that Lacantún Biosphere Reserve is critically threatened and in the short term the reserve will no longer be able to maintain its biological diversity unless immediate solutions are implemented. At the same time, there are still many opportunities in Lacantún and efforts to conserve it should be accelerated.

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