

Guatemala: Naachtún Dos Lagunas Protected Biotope

[Summary](#)

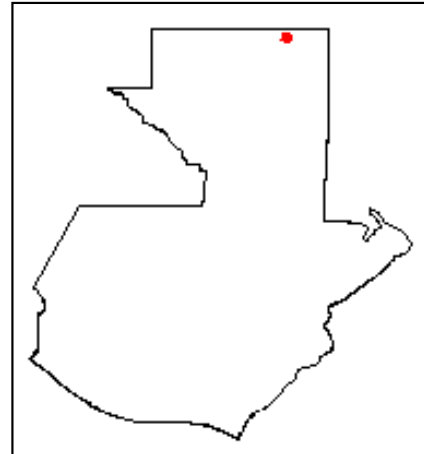
[Description](#)

[Threats](#)

[Solutions](#)

[Conclusions](#)

Date of most recent on-site evaluation: February 2002
Date posted: June 2002
Location: Department of Petén, Maya Biosphere Reserve
Year created: 1989 Area: 49,500 ha
Ecoregion: Tehuantepec moist forest
Habitat: Low-vegetation Flooded Forest; Terra-firme Forest



Summary

Description

Naachtún Dos Lagunas Protected Biotope is located in the department of Petén in northern Guatemala, and is one of the four core zones of the Maya Biosphere Reserve (MBR). One of the characteristics of the biotope is that it has only a few sources of fresh water. One of them, Dos Lagunas, gives the biotope its name. The biotope was created specifically for the protection of the white-tailed deer, but it also harbors an impressive array of plant and animal species. In addition, valuable Mayan archeological remains have been found in the area. The area has not suffered from destructive changes in plant coverage, nor has it suffered from the widespread forest fires that in recent years have damaged much of the reserve. Furthermore, the illegal extraction of timber and other products has been sporadic and minimal.

Biodiversity

Recognized as one of the places in the MBR with the highest plant diversity, the biotope harbors numerous regionally endemic animal species. Among them are the crocodile (*Crocodylus moreletii*), Central American river turtle (*Dermatemys mawui*), ocellated turkey (*Agriocharis ocellata*), red snook (*Petenia splendida*), howler monkey (*Alouatta pigra*), spider monkey (*Ateles geoffroyi*), and vulnerable animals like the tapir (*Tapirus bairdii*), white-tailed deer (*Odocoileus virginianus*), jaguar (*Panthera onca*), margay (*Leopardus wiedii*), jaguarundi (*Herapilurus yagouaroundi*), and mealy amazon parrot (*Amazona farinosa*).

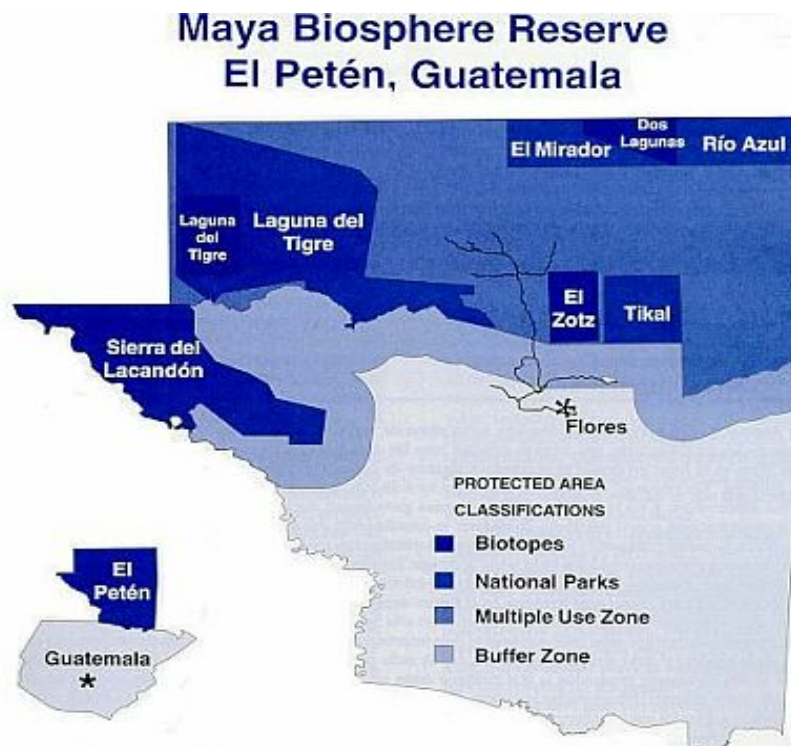
Threats

Naachtún Dos Lagunas is classified as [vulnerable](#), meaning that although immediate conservation measures are not needed, monitoring is necessary to assure the protection and maintenance of its biological diversity. The threats to the biotope include a deficient budget, looting of archeological sites, extraction of forest products, cultivation of drugs, and heavy grazing on a local tree called Ramón (*Brosimum alicastrum*). Timber activities have not yet developed in the periphery of the biotope largely because the nearest community of Uaxactún has been reluctant to develop activities that could be detrimental

Guatemala: Naachtún Dos Lagunas Protected Biotope

to the forest. The lack of financial resources to increase biotope personnel and to buy the necessary equipment for park guards is one of the most serious problems.

Map showing the location of Naachtún Dos Lagunas Protected Biotope in the northeast corner of the Maya Biosphere Reserve



Description

Physical description

Naachtún Dos Lagunas Biotope is located in the northeast corner of the department of Petén and the Maya Biosphere Reserve. The biotope is under the jurisdiction of the municipality of Flores, but the legal area of the biotope is not totally clear. According to the Center of Conservation Studies (CECON), the biotope's area is 49,500 ha (CECON 1996), while Guatemala's National Council of Protected Areas (CONAP) considers its area to be only 30,179 ha (CONAP 1999). The reason for the confusion is that upon the biotope's creation, its legal coordinates did not match its area. As a result, maps have been drawn showing the southern border slanting diagonally in a northeast-southeast trajectory. According to Barrios (2002, pers. comm.), the problem originated when the biotope's coordinates were transcribed incorrectly. This error has decreased the area of the biotope and CECON is currently correcting the problem.

The biotope shares physical and biological characteristics with a large zone that extends towards the east and west of the biotope into El Mirador-Río Azul National Park; towards the south, in the Multiple Use Zone of the MBR of Guatemala; and towards the north, in Mexico's Calakmul Biosphere Reserve.

Naachtún Dos Lagunas is part of the physiographic region called the Yucatán Platform. The platform is characterized by karstic topography with steep, rounded hills alternating with lowland depressions. The soils are composed of residual clays that have low permeability and fertility, and are shallow and easily eroded (CECON 1996). In those areas with steep slopes, or in flat areas with porous soils, drainage is

Guatemala: Naachtún Dos Lagunas Protected Biotope

very rapid. This characteristic may be the reason why the vegetation loses part of its leaves during the dry season (Pennington and Sarukhán 1998). Using the classification system of Dinerstein et al. (1995) as a reference, the ecoregion of the biotope is the Tehuantepec Moist Forest.

The altitude varies between 100 to 300 m, and the average annual temperature is 25° C. According to data from Tikal's meteorological station (the closest to the area), the range of temperatures oscillates between 20° C and 30.7° C. The annual average precipitation ranges from 1,160 and 1,700 mm, with a three-month dry season between February and May (CECON 1996).



Sunset at Naachtún Dos Lagunas



Suspiro Lagoon situated in the northeast corner of the biotope. Archeological remains have been found in its banks. The salty water lagoon is the biotope's most prominent body of water during the dry season

Vegetation

The trees of the Tehuantepec Moist Forest reach a height of approximately 25 to 30 m in its highest strata. Three strata are differentiated in the canopy: an inferior with trees 4 to 8 m, including several species of palms; an intermediate, from 10 to 15 m; and a superior, from 20 to 30 m. This type of forest grows predominantly in upland areas that remain well drained throughout the year. It has two characteristic species, one called the Ramón (*Brosimum alicastrum*), and another Chicozapote (*Manilkara zapota*). Other prevalent tree species include *Swietenia macrophylla*, *Pimenta dioica*, *Bursera simaruba*, *Bucida buccera*, *Dendropanax arboreus*, *Maclura tinctoria*, *Pouteria reticulata*, *Sabal* spp., and *Talisia olivaeformis*. Plant associations are formed according to drainage and soil composition. The most important characteristic of this forest is its deciduousness, with some tree species losing one fourth of their foliage during the dry season (Pennington and Sarukhán 1998).

Some areas within the biotope are characterized by deep, heavy, and sticky soils that are flooded during the rainy season, and which dry and crack open in the dry season. They are found in small or medium-size lowland depressions. These soils are poorly drained and have a permanent layer of water during the rainy season. They contain low vegetation forest, where the dominant species is palo tinto (*Haematoxylum campechianum*). This plant association is found in areas that accumulate water from adjacent areas. According to Lundell (1937), the canopy height of this plant association varies between 5 and 11 m, and the number of individual trees increases from the center (flooded areas) to its periphery (inundated periodically). Other species found are the jícaro or guiro (*Crescentia alata*) and the pucté

Guatemala: Naachtún Dos Lagunas Protected Biotope

(*Bucidas bursera*).

Archeology

The area's archeological wealth is outstanding, having valuable Mayan remains (CECON 1996). Part of the biotope's name comes from one of its archeological sites - Naachtún. This site has three structures and one observatory in the northern plaza, 21 sculpted stelae, 24 smooth stelae, and nine altars. The most important archaeological investigations were done on these sites between 1922 and 1943 (IDAEH 1999).

Biodiversity

Along with El Mirador-Río Azul National Park, Naachtún Dos Lagunas is considered to have the highest plant diversity in the MBR, with an estimation of more than 200 species per hectare. Within the MBR, the biotope has registered the highest number of mahogany trees per hectare (APESA 1993).

The diversity of fauna is partly the result of its varied terrain, which includes hills, flooded lowlands, and watering holes. There have been very few recent faunal investigations, although field visits and interviews with officials in charge of the area indicate the existence of regional endemic species including the crocodile (*Crocodylus moreletii*), the Central American river turtle (*Dermatemys mawui*) classified as an endangered species by IUCN's Red Book, ocellated turkey (*Agriocharis ocellata*), howler monkey (*Alouatta pigra*) and red snook (*Petenia splendida*). There are abundant populations of spider monkeys (*Ateles geoffroyi*), and, according to park guards, the tapir (*Tapirus bairdii*) is relatively common. Among those species classified by CONAP as vulnerable, are the jaguar (*Panthera onca*), margay (*Leopardus wiedii*), ocelot (*Leopardus pardalis*), cougar (*Puma concolor*), jaguarundi (*Herpailurus yagouaroundi*), pecarí (*Dicotyles pecari*) and red-brocket deer (*Mazama americana*). Among the birds are the jabiru (*Jabiru mycteria*), king vulture (*Sarcoramphus papa*), hook-billed kite (*Chondrohierax uncinatus*), peregrin falcon (*Falco peregrino*), and mealy Amazon parrot (*Amazona farinosa*) (CONAP 2000a). The Wildlife Conservation Society (WCS) installed five transects at the beginning of 2002 to inventory animal species (Balas 2002, pers. comm.).



Howler Monkey (Alouata pigra), a regionally endemic species

Management

Guatemala: Naachtún Dos Lagunas Protected Biotope

Naachtún Dos Lagunas was declared a protected biotope in 1989 with the Decree 4-89 (Guatemala 1989) and by means of the declaration of the Maya Biosphere Reserve in 1990. It constitutes one of the core areas of the MBR, in addition to El Mirador-Río Azul, Tikal, Laguna del Tigre, and Sierra del Lacandón National Parks, and San Miguel La Palotada El Zotz and Laguna del Tigre Protected Biotopes. Naachtún Dos Lagunas is administered by CECON, which is part of the Faculty of Chemical Sciences and Pharmacy of the San Carlos University of Guatemala (USAC)--an autonomous governmental institution. In addition, by law, CONAP shares administrative duties of the area with CECON. The biotope does not have a management plan but operative plans are prepared annually. These plans include subprograms in the areas of administration, construction, environmental education, interpretation, and research. The area is considered a conservation priority by CECON, and according to the 2000 operational plan, the primary objectives for the biotope are to promote protective mechanisms for the natural environment; to develop programs that support the conservation of biological diversity; to strengthen measures to preserve archaeological, historic, and cultural features; to foment and support the development of projects in scientific research; to increase educational programs in conservation within the area as well as in the surrounding zone of influence; and to promote and support activities related to cultural and ecological tourism.

The only active programs in the biotope are vigilance and maintenance activities, and there is no evaluation of their effectiveness. There is one scientific station where formal research programs are being developed. The main activities that occur in the biotope are the exploitation of forest resources, and some tourism and research. Those resources that are exploited by the nearest communities are xate, pepper, chicle, mimbre, and various medicinal plants (Ramos 2002, pers. comm.).

In 2000 the USAC donated about \$34,600 for the biotope's budget. The funds were distributed for salaries, travel expenses, transportation, management infrastructure and training, and prevention of forest fires (CECON 2000). In the same year, the MacArthur Foundation gave a NGO a donation to support the operation of the biotope; however, the funds were misappropriated and USAC took over management of the funding (Barrios 2000). For 2002, the biotope enjoys relatively solid financial support compared to previous years; however, it remains seriously underfunded. This year's funding will be invested in infrastructure for personnel (\$6,500), salaries (\$2,000), and the purchase of mules (to carry equipment), vehicles, and fuel (\$5,200).

The biotope has eight park guards, one technician, and an administrator, who is the regional representative of CECON. The technician and the administrator also work in three other areas administered by CECON: Laguna del Tigre, El Zotz, and Cerro Cahuí Biotopes. Park guards work for twenty-two days each month, with eight days of vacation. Each park guard works one year at Naachtún Dos Lagunas before being transferred to one of the other biotopes mentioned above. CECON guards are assisted in their patrolling by CONAP park guards from the El Cedro guard station. According to the biotope's administrators, despite CONAP's assistance, the current number of personnel is not sufficient to adequately patrol the entire biotope. One problem is the work/vacation structure which often leaves only two park guards working at one time (Barrios 2002), and are only able to make short patrols close to the base camps. Administrators estimate that eight more people are needed to ensure effective vigilance of the entire biotope (Barrios 2002).

The geographic coordinates according to CECON should be P1: 17° 48' 52" / 89° 46' 07;" P2: 17° 48' 52"/ 89° 30' 05;" P3: 17° 40' 00"/ 89° 30' 05;" and P4 : 17° 40' 00"/ 89° 46' 07." According to CONAP, the P4 limits should be: 17° 46' 00"/ 89° 46' 07." The legal boundaries are not demarcated, except for the northern limit where a wide gap is clearly defined and marks the border between Mexico and Guatemala

Guatemala: Naachtún Dos Lagunas Protected Biotope

(controlled by the army). The other boundaries have not been demarcated, including the east and west boundary with El Mirador-Río Azul National Park, and the southern boundary with the Multiple Use Zone of the MBR along the forest concession belonging to the community of Uaxactún.

Human influence

Housing and equipment for field personnel is minimal. There is no electricity and guards have frequent problems with the lack of potable water. According to Barrios (2002), facilities to lodge tourists and researchers are currently being constructed. Permanent communities do not exist in the biotope or near its boundaries. Naachtún Dos Lagunas and El Mirador National Park are the only Guatemalan protected areas with this degree of isolation.

Roads connecting the biotope to other areas of the MBR are crude and barely passable with a four-wheel drive vehicle. As a result, communication is sporadic, especially in the rainy season. To arrive at the biotope from the town of Flores, the capital of Petén, one takes the road to Santa Elena, continuing around lake Petén Itza to the town of San Andres. From there, one heads directly north on the dirt highway towards Carmelita until reaching the village of Cruce de Dos Aguadas. From there, one takes a rough, dirt road to the village of Uaxactún, which crosses the Zotz Biotope and Uaxactún's communal forest concession. From Uaxactún, Naachtún Dos Lagunas is 50 kilometers to the north. In the dry season, four-wheel drive vehicles can enter with some difficulty. Generally, biotope workers arrive on motorcycles or by foot. An alternative route is on foot from the village of Carmelita.

Very few tourists visit the biotope, which is due to both its inaccessibility and because CECON has not promoted the biotope as a tourist destination. Administrators estimate the number of tourists range from 30 and 40 annually, the majority of which are foreigners. A local tourism operator is available as well as local guides.

Conservation and research

Research is, in theory, one of the principal activities in the biotope. The WCS has authorization to work in the biotope and has conducted research on mealy Amazon parrots (*Amazona farinosa*) and jaguars (*Panthera onca*). From 2000-2001, Robin Bjork directed the mealy Amazon parrot study that focused on migration patterns across the Maya tropical forest. Anthony Novack studied the dispersion patterns of jaguars in areas close to, and far from human influence. His study area included El Mirador-Río Azul National Park and Uaxactún's forest concession - part of the MBR's multiple use zone.

Threats

Lack of vigilance and funding

Naachtún Dos Lagunas has a serious deficiency in personnel and funds. In theory, each of the eight guards is responsible for 6,000 ha, in order to cover the entire 49,500 ha that CECON considers as the biotope's area. In comparison to neighboring El Mirador-Río Azul National Park, where each guard is responsible for 3,000 ha, the situation in Naachtún Dos Lagunas is considerably worse. In the latter, at least one guard is on vacation during four months of the year; park rangers are organized in two groups of four each, which indicates hypothetically that one park ranger is in charge of 12,000 ha.

Guatemala: Naachtún Dos Lagunas Protected Biotope

Infrastructure and resources are minimal and inadequate equipment and old facilities make it hard for guards to do their job. However, there are plans to improve infrastructure and purchase basic equipment in the near future. This support is an effort to protect Naachtún from the rampant archaeological looting occurring in neighboring sites in the MBR. Current patrols are only occasionally bolstered by the assistance of CONAP guards (Bonilla 2001, pers. comm., Barrios 2002, pers. comm.).

Looting of archaeological sites

The most important archaeological sites within the biotope are called Dos Lagunas and Naachtún. Looting has occurred for many decades throughout the entire biotope and surrounding areas of the MBR. ParksWatch documented evidence that serious looting has degraded the majority of both large and small archaeological sites. The existence of stelae and tombs has incited looters to make harmful excavations.



An illegal excavation--locally termed "hueche"--that ParksWatch documented during the last visit to the biotope. The depth and expanse of the tunnel indicates that several people were involved in the looting. The photo was taken near the archeological site Naachtún

Illegal extraction of forest products

Temporary camps are occasionally established within the biotope for the extraction of non-timber products like xate (*Chamaedorea* spp.) and chicle (*Manilkara achras*). The Law for Protected Areas (1989) does authorize the extraction of non-timber products, but only in a manner that does not negatively and permanently alters the ecosystem. Unfortunately, guards are so limited in their ability to patrol the entire biotope that it is almost impossible to verify that the legal regulations are enforced. Nevertheless, during our visit to the northwestern part of the biotope in February 2002, we observed a great abundance of a variety of species of xate, which is a good sign that extraction activities occur only occasionally. Another related problem is hunting by the extractors, although no studies have yet been conducted on this problem.

Guatemala: Naachtún Dos Lagunas Protected Biotope

In recent years, logging has been detected in the northeastern limits of the park, near the Mexican border. This seems to be uncommon, however, as evidenced by our air flight observations made in February of 2002, when we did not detect recent logging activity. Nevertheless, the threat of illegal logging is always present due to the lack of vigilance in the area.



A "chiclero" and "xatero": In February 2002, ParksWatch met these men collecting chicle and xatero just outside the biotope

Drug cultivation

Marijuana (*Cannabis sativa*) plantations are found inside the park, but the guards cannot prevent or remove them due to the inherent danger of the drug trade. This is a very difficult problem to control because there is no support from - or coordination with - other institutions. Moreover, guards do not carry firearms. The cultivation of drugs makes the administration of the biotope very difficult.

Grazing of Ramón trees

Due to the lack of natural pasture in the biotope, the leaves of the Ramón tree (*Brosimum alicastrum*) are used as food for mules by xateros and chicleros. However, because of the lack of detailed information, it is difficult to establish the degree of threat that this problem represents.

Guatemala: Naachtún Dos Lagunas Protected Biotope

*A Ramón tree (*Brosimum alicastrum*)
whose limbs have been cut to feed
mules*



Future threats

Construction of highways

In 1992, the Guatemalan General Ministry of Economic Planning prepared the Development Plan of Petén that proposed to stimulate tourism in the area of El Mirador-Rio Azul National Park and Naachtún Dos Lagunas Biotope (SEGEPLAN 1992). In 1999 the Guatemalan Institute of Anthropology and History developed a tourism development strategy for the Petén until 2015. The strategy includes a highway that connects Flores to the Río Azul section of El Mirador-Rio Azul National Park, and the construction of another highway that would continue the highway to Mexico's Calakmul Biosphere Reserve (IDAEH 1999).

The construction of these highways was supposed to be included within the large-scale tourism development plan called Puebla Panama Plan (Valenzuela 2002, pers. comm.). Although the plan does not include the biotope, it would certainly endanger the integrity of its ecosystems. Thankfully, the National Council of Protected Areas rejected the construction of these highways (see ParksWatch news), but the problem could reappear in the future. According to Valenzuela (2002, pers. comm.), a highway has already been built on the Mexican side in Calakmul, and there exists strong political pressure to continue the highway through Guatemala and the MBR.

Recommended Solutions

Lack of vigilance and funding, looting of archaeological sites, and illegal extraction of forest products

The increase in personnel and infrastructure could strengthen the effectiveness of the guards, although this should be complemented by improved coordination with other institutions involved in the management of the biotope. The area's director strongly supports the proposal to double the number of

Guatemala: Naachtún Dos Lagunas Protected Biotope

guards in the biotope and improve coordination with CONAP and the Service for the Protection of Nature (SEPRONA) of the National Police. The director predicts a more efficient job if the number of guards is doubled. However, considering the enforcement deficiencies of neighboring El Mirador-Río Azul National Park, with twice the number of park rangers as that of the biotope, our opinion is that the number of guards in the biotope should be four times greater. In conjunction with the biotope's director, ParksWatch has planned a workshop to support the improvement of his capacity to develop conservation projects. In addition to the issue of enforcement, administrators should develop a fundraising department solely for the biotope.

Drug cultivation

Efforts to counteract the spread of marijuana crops should be made in coordination with the Department of Antinarcotic Operations and the Army, who are in charge of controlling drugs and the borders, respectively. Unfortunately, even if this cooperation occurs, the control of illegal activities in the biotope is hampered by the financial deficiencies of CECON and because the Law of Protected Areas is relatively weak as it concerns illegal activities in the biotope.

Highway construction projects

In February 2000, CONAP proposed to change the biotope's management category and add the biotope to El Mirador-Río Azul National Park (CONAP 2000b). However, the proposal does not sit well with CECON, which does not want to cede areas under its control (Barrios 2002, pers. comm.). Converting the biotope into a park would bring numerous advantages, as it would make it much more difficult to conduct illegal activities within its borders. National parks have stricter regulations than biotopes, and despite CONAP's limited budget and other weaknesses, we consider the change of category a positive move because it would solidify the protection of one of the most important protected areas in Guatemala. Re-categorizing the biotope as a national park would strengthen the protection status of Naachtún Dos Lagunas, and the administration could still be controlled by CECON as long as legal jurisdiction was included in the re-categorization agreement.

Conclusions

Naachtún Dos Lagunas Protected Biotope is one of the areas of highest biological diversity in the Maya Biosphere Reserve and Guatemala. Due to its isolation and the absence of people within the biotope and near its boundaries, it is not currently threatened and its conservation status is very stable. However, future plans for the area pose such a serious threat to its biological integrity, that the biotope should be considered vulnerable.

Of all the areas administered by CECON, Naachtún Dos Lagunas is the best conserved and with the fewest threats. Current problems are minimal, but the lack of personnel and the subsequent impossibility of conducting necessary patrols-preferably with armed police-makes illegal activities a potential threat.

The lack of financial support should be relatively easy to resolve. A top priority for administrators should be to increase their capacity to attract funding, through the creation of a special development department exclusively dedicated to this activity. Many of the current problems would be immediately removed if supplemental funding (raised by the administration) were secured and earmarked specifically for the biotope.

The cultivation of drugs is not a problem to be solved in the short run. Once the budget is increased and

Guatemala: Naachtún Dos Lagunas Protected Biotope

the management category changed, coordination with the Department of Anti-narcotic Operations would be easier because the budget would be sufficient to fund patrols.

Because the potential construction of highways represents an extremely serious threat for the biotope, it would be prudent to change the biotope's management category to that of a national park. In this way, it would be legally more difficult to manipulate negatively against the area. Changing its category would promote long-term conservation and stability, and mitigate its vulnerability. This should be negotiated with CONAP; an agreement that should be done with without distrust.

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Guatemala: Naachtún Dos Lagunas Protected Biotope

Puebla-Panamá en Petén.