Information Sheet on Ramsar Wetlands

Translation of original Information sheet by Charles Akin (August 2000)

1. **Date this sheet was completed/updated**: 22 December 1998

2. **Country**: Guatemala

3. **Name of wetland**: Parque Nacional Laguna del Tigre

4. **Geographical coordinates**:

17 10' 30" - 17 49' 53" North latitude
90 2' 44" - 90 58' 3" West longitude

5. **Altitude**: 60-182 metres above sea level

6. **Area**: 132,900 hectares

7. **Overview**:

This wetland is a complex water basin created by several rivers and lakes, formng part of the basin of the Río Usumacinta. In the lowest part, there is an alluvial plain and patches of tall forest, transition forest, marshes and lagoons. It is a fragile wetland threatened by desertification from drought through modification of the drainage pattern. It is the last refuge for species dependent on water on the Yucatan peninsula. Its conservation depends on activities in the surrounding area.

8. **Wetland type**: Continental M, N, O, P, R, Sp, Ss, Tp, Ts, Y, Zk

9. **Ramsar criteria**: 1a, 2a, 3b, 4a, 4b

10. **Map of site included? Please tick yes -or- no**

11. **Name and address of the compiler of this form**:

Oscar Francisco Lara
Via 5, 4-50, Zona 4
Edificio Maya, 4 nivel

12. **Justification of the criteria selected under point 9, on previous page**:

The Laguna del Tigre National Park includes the greatest concentration of freshwater wetlands in Mesoamerica, divided into two main water basins. It is an area subject to winter flooding, with a flat topography surrounded by rivers and streams, but also permanent bodies of water (lakes and ponds). It forms part of the Yucatan peninsula and is of karstic origin with a thin and fragile structure. It forms a high percentage of the area of distribution of endangered species of fauna and flora such as the scarlet macaw (*Ara macao*),

jaguar (*Panthera onca*), Belize crocodile (*Crocodylus moreletii*), Baird's tapir (*Tapirus bairdii*), jabiru (*Jabiru mycteria*), mealy amazon (*Amazona farinosa*) and big-leaf mahogany (*Swietenia macrophylla*). It is also an important area because it provides habitat for significant numbers of aquatic birds. There are many species of endemic and rare fish in this wetland such as the *cíclico* (*Petenia splendida*) and the gar (*Lepisosteus tropicus*). The fisheries in the region are of great importance in the diet and economy of the surrounding human populations.

13. **General location**:

The Laguna del Tigre National Park (Río Escondido) is in northwestern Guatemala in the department of Petén, with an area of 289,912 hectares and forms one of the main parts of the Maya Biosphere Reserve. It is in the Municipio of San Andrés, department of Petén, and the closest town is El Naranjo, located 12 kilometres from the park and whose population in April 1998 was 3,500 inhabitants. There are probably 3200 additional inhabitants settled in the park.

14. **Physical features**:

Geology and geomorphology: Laguna del Tigre National Park forms part of the Yucatan peninsula and all of the thin soil is of karstic origin and fragile structure. The soil is considered to be suitable for forestry, but not for farming or ranching. Most of the land is flat, ranging between 60 and 182 metres above sea level, forming lakes, floodplains, rivers and streams, produced by an alluvial plain. It is the wettest part of the Yucatan Peninsula.

Origin: Natural

Hydrology: Rainfall measuring stations report rain in all months from 1981 to 1993. The main basin is the Río San Pedro with an area of 13,800 square kilometres and a length of 186 kilometres. Its tributaries are the Chocop, Escondido, Sacluc, San Juan and Tamaris rivers, plus the Peje Largato and Agua Dulce streams. From recent studies, it is known that changes in the water level in the Río San Pedro are small, between 0.83 and 2.88 metres between the dry and wet seasons.

There are two types of drainage in the region: a drainage network in all directions that occurs on the flood plains, where flow often joins streams, lakes with abandoned meanders and lakes in abandoned streams with connecting canals. A second type of drainage is a drainage network in the form of a circular hollow (doline), typical of the regions formed on limestone substrata. In many cases, the dolines drain underground.

Soils and chemical characteristics:

a. High plateau: deep, dark brown, moderately drained clay soils, which have formed on calcarious rock in a flat or

slightly hilly topography. They crack in the dry season and become heavy with water in the rainy season.

Classification: vertisols; suborder, usterts; soil group, chromusterts; subgroup, udic chromusterts.

The chemical composition is the following: P, K, Zn and Al in low concentrations; Mg, Cu, Fe and Mn in adequate to low concentrations; Ca, S and B are very high; Ca/Mg high and Mg/K is adequate.

b. Intermediate plateau: deep, greyish brown, poorly drained clay soils because they remain wet much of the time, developing on fine residue of limestone with slopes of less than 4 per cent.

Classification: vertisols; suborder, udert, soil group, chromusterts; subgroup, typic chromusterts

The concentration of minerals is P, K and Cu low; Ca, Mg, S and B adequate; Fe and Al high to low. The relations Ca/Mg and Ca/K are high, while Mg/K is adequate.

c. Areas subject to flooding: Deep, very dark grey and poorly drained clay soils because the water table is at the surface. They form on residual material from calcarious rocks with flat relief.

Classification: vertisols; suborder, uderts; soil group, pelluderts; subgroup, typic pelluderts.

Water quality: Water in the lakes is rich in salts and alkalies that as a result of evaporation make it highly mineralized. Concentrations of oxygen are low below 1 metre in depth because of the slow current in the Río Escondido and the provision of organic material from the wetlands.

Conductivity recorded in the Río Escondido is between 1,500 and 2,500 umhos/cm, which indicates a high level of decomposition of limestone. Salinity ranges from 0.1 to 0.9 per cent.

Total solids recorded in the San Pedro and Escondido rivers are high, between 1,000 and 2,500 mg/l and the lakes also have high levels, but less than in the rivers.

The water is very hard and alkaline through the dissolving of limestone and is, therefore, inapt for human consumption, 160 to 230 mg/l of alkalinity and 1000 to 3000 mg/l of hardness. The presence of chlorides is high: between 10 and 30 mg/l, while silicon and disulphide are low, 3 mg/l and 5 ug/l.

The nitrates and orthophosphate recorded are in the range of bodies of water in eutrophication, although the chlorophyll does not have the same tendency. Because of the high concentration of solids in suspension, eutrophication inhibits photosynthesis and reduces the production of phytoplankton.

Climate: There is no recent data, but it considered to be a hot and humid climate. The most recent records of the San Pedro station show an average temperature of 35 in the dry season and 25 in the rainy season (1989). Annual precipitation is 1629 mm, with the rainy season from July to December and the dry season from January to June.

15. **Hydrological values**:

The Laguna del Tigre National Park is divided into two main basins: that of the Río Candelaria and that of the Río Escondido. The Río Escondido drains toward the basin of the Río San Pedro, which in turn is part of the basin of the Río Usumacinta. There are also the basins of the Chocop, San Juan and Xan rivers. There are permanent lakes of Laguna del Tigre, Laguna Batún, Lagunas El Perú, Guayacán, Bella Vista and El Yalá, but all of the area is characterized by a propensity to flooding. At the beginning of the rainy season, changes in water level are smaller than that recorded at mid-season. At the beginning of the rainy season, most of the precipitation enters the ground. After the ground reaches a certain level of saturation or the aquifers a certain level, surface runoff, underground flow and the discharge of underground water begin to increase the water in the wetlands. This same phenomenon occurs in other wetlands of the Petén (Río La Pasión) raising the water level up to 8.5 metres while in the Río Escondido and San Pedro systems, the increase is 2 metres, because of the damming effect. The area of these wetlands is greater than that of the Río La Pasión, which stores a larger amount of water, but the good vegetative cover of the wetlands absorbs some of the increase. Any alteration to the wetlands will lead to an increase in water level and will cause flooding.

16. **Ecological features**:

The Laguna del Tigre National Park belongs to the Yucatan peninsula physiographic regions. It is classified as a humid forest of Tehuantepec ecoregion and is tropical rain forest biomass.

Recent studies show variation in the vegetation from the area of greatest relief with a tall forest passing through a transition area to the area of swamps. Although all of the national park is ecologically connected, there are three areas with marked differences in composition and plant structure.

Remote sensing has made it possible to classify the vegetation in six classes:

a. Tall forest - A dense arboreal stratum and with typical associations such as *Bronsidium alicastrum*, which occupies an area of 19,354 hectares, the equivalent of 5.7 per cent of the park.

b. Encino oak forest (*Quercus oleoides*) - Associated with *pucté* (*Bucida buceras*) and *tinto* (*Haematoxylon campechianum*)

in areas subject to flooding. It occupies an area of 2,367 hectares, the equivalent of 0.7 per cent of the park.
c. Transitional forest - Formed by a mixture of patches of high forest, low forest and savanna in no apparent pattern, forming 51.81 per cent of the park (175,432 hectares).

d. Savanna subject to flooding - With vegetation dominated by Poaceae and Bambusaceae subject to flooding covering 50,996 hectares, 15.06 per cent of the park. It is an area that has been subject to fires.

e. Swamp, floodable areas - Covering 40,671 hectares, about 12 per cent of the park, with flat topography and elevations no greater than 100 metres above sea level, the typical vegetation is emergent (*Cladium* spp. and Poaceae); also with a record of fires.

f. Area of human impact - Represented by *guamiles* and pastures and linked to access roads, covering 49,747 hectares, the equivalent of 14.69 per cent of the park.

17. **Noteworthy flora**:

There are three zones in the park with marked differences in composition and vegetative structure.

a. Western zone: with less representation of arboreal species, but with abundant associations of emerged vegetation (*Cladium jamaicencis*). Of the 83 arboreal species found, 18 are unique for this zone: *canxán* (*Terminalia amazonia*), mora (*Maclura tinctoria*) and *xilil* (*Ardisia paschalis*). In addition, this zone has the largest quantity of specimens of mahogany (*Swietenia macrophylla*). There is *camotillo* (*Zamia* spp.) in the undergrowth, a species listed in Appendix II of CITES.

b. Central zone: A total of 98 arboreal species have been reported of which 24 are indigenous. Most of this area is savanna, an element in the transitional forest, which is characterised by tall vegetation that reaches no less than 20 to 25 metres in height, such as *pucté* (*Bucida buceras*), *jaboncillo* (*Sapindus saponaria*), *zapote bobo* (*Pachira acautica*) and *jocote quinín* (*Spondias* spp.). Towards the northwest, the area is subject to flooding, where the vegetation is dominated by Poaceae (Gramineae) and large patches of *jimbal* (Bambusaceae) subject to frequent fires. Within this zone is the richest number of epiphytes in the Laguna del Tigre National Park and large numbers of *Vainilla plannifolia*, listed in Appendix II of CITES, along with all of the Orchidaceae family.

c. Eastern zone: In the area on the border of the flood plain and the elongated prolongation to the southeast on the shores of the Río San Pedro, there is a larger percentage of high forest, usually on hills or small foothills, whose elevation above sea level varies between 100 metres up to approximately 170 metres, with tropical associations of Petén, such as *ramonale* (*Brosimum alicastrum*) and *zapotales* (*Pouteria*

reticulata, *P. amydalina*, *P. campechiana* and *Manilkara zapota*).

The partial results of the stud of arboreal flora in the Laguna del Tigre National Park show that there are at least 143 species with diameters greater than 10 centimetres in the canopy (above 25 metres in height). The crowns of the large-diameter trees in the foothills overlap.

According to this study, of the 143 species recorded there are 81 species of which 23 are indigenous to the region. Among these species are *ceiba* (*Ceiba pentandra*), *manax* (*Pseudolmedia spuria*), *danto* (*Vatairea lundelli*), *chile malache* (*Trichilia minutiflora*), *guaya* (*Talisia olivaeformis*), *silillón* (*Pauteria amygdalina*) and *hule* (*Castilloa elastica*). There are at least 42 species of epiphytes in four main families: Bromeliaceae, Cactaceae, Orchidaceae and Piperaceae.

None of the arboreal species in the tall forest are liste in the CITES appendices. Nonetheless, there are several representatives of the Cactaceae and Orchidaceae families listed in Appendix II of CITES.

18. **Noteworthy fauna**:

Studies have been made on the distribution and abundance of several indicator species such as diurnal butterflies, birds and amphibians. Partial results record 188 species of birds, of which 26 species are found only in the central area, 11 species in the western area and 8 species in the eastern area.

Of 25 species of migratory birds, seven are found only in the central area, none was recorded in the western area and only one in the eastern area. There is a record of a rare species for the region *Nyctibius grandis*, and there is a large population of the scarlet macaw (*Ara macao*), estimated to be between 500 and 600 specimens, based on the number of active nests. Another species of importance that is distributed in the region is the jabiru (*Jabiru mycteria*).

More than 90 species of diurnal butterflies have been recorded, widely distributed in the Maya Biosphere Reserve, except for *Eunica caresa* which has been recorded for the first time. Until now, 15 species of amphibians have been recorded, but it is expected that this number will increase as the study continues.

The wide extension of the park includes endangered species such as the tapir (*Tapirus bairdii*) and jaguar (*Panthera onca*) as well as stable populations of game animals: deer (*Odocoileus virginianus* and *Mazama americana*), pecaries (*Tayassu tajacu* and *Tayassu pecari*), spotted paca (*tepezcointl*) (*Agouti paca*) and occelated turkey, great curassow and crested guan (*Agriocharis ocellata, Crax rubra* and *Penelope purpuracens*).

Several endemic species are the Morelet's crocodile (*Crocodylus moreletii*), the Central American river turtle (*Dermatemys mawii*) and the *pez blanco* (*Petenia esplendida*).

Partial results of the survey of fisheries indicate the following

important species: in addition to the *pez blanco*, *sábalo* (*Megalopus atlanticus*), the sea bass (*Centropomus* spp.) and the gar (*Lepisosteus tropicus*).

19. **Social and cultural values**:

The Laguna del Tigre National Park is a protected reserve with very special characteristics, because within the reserve, there are important economic activities. Most of the activity is created by nearby petroleum fields and include oil exploitation, expanding agriculture and livestock raising plus several illegal and little-noticed activities such as traffic in illegal species, commercial hunting and fishing and probably trade in land that allows for greater mobility than in the other parts of the reserve.

Within the Laguna del Tigre National Park, there are several communities. In the area of Río San Pedro (the southeastern part of the park) there are Paso Caballos, Buen Samaritano and Mirador Chocop. In the central part and along the highway built for the extraction of petroleum are the communities of Bella Vista, El Petenero, La Mancomadora, Cruce Santa Amelia, Los Reyes, Los Tubos, Rancho Sucely and Laguna Vista Hermosa. All together there are 13 communities of various sizes.

Given the reluctance of the inhabitants of the Laguna del Tigre National Park to provide information and their mobility, it is difficult to give the exact number of inhabitants.

Nonetheless, there are estimates from a recent study, but in the short run these data can vary or change, because of a lack of information inaccessibility or because the inhabitants were absent from the settlements. However, using an average of 5.1 persons per family in the park, a population of 3250 persons was estimated, although this figure does not include persons who have their own plots (*agarrada*) or who work on them, but who were not in the national park. The ethnic breakdown is 20 per cent indigenous, mostly Quek'chies and 80 per cent mestizos from 21 departments of Guatemala.

Economic activities: The main economic activity in the Laguna del Tigre National Park continues to be agriculture, but it should be pointed out that the average number of *manzanas* of maize planted in the management unit is greater than that in the multiple use area in the Maya Biosphere Reserve. This can indicate an intent to gain title to more land or for future livestock activities, which it seems is the intention of most people. As for the raising of livestock, it appears that this is increasing in the area. On the other hand, because of the arrival of new companies for the extraction of petroleum, a large number of local inhabitants are employed in this activity. There are other activities that create an underground (undocumented economic activity) economy in the area such as the capture of illegal species, illegal transport of cattle and other activities such as unauthorized hunting and fishing.

Historical and cultural factors: Within the limits of the Laguna del Tigre National Park and all throughout Petén, there are pre-Hispanic vestiges. Most of them have not been studied or surveyed within the Mayan culture. There are approximately 20 sites identified and named, although for the rest of them there is no precise information on their number or location.

20. **Land tenure/ownership of**:

The Laguna del Tigre National Park was created on 30 January 1990 through Decree 5-90 of the Guatemalan congress and is government property. Several of the communities living in the park have signed agreements with CONAP, the administrator of the park in order to create community management units. Through the legalization of land holdings, under a regime of private property, attempts are being made to stabilise the buffer zone.

21. **Current land use**:

Within the national park, there are 13 human settlements with a total of 3250 inhabitants, most of which carry out activities incompatible with the objective of creating the national park and biotype. These activities are mainly agriculture and livestock raising, increasing the loss of forest cover and the degradation of soils. At the same time, there are extractive activities of non-timber products including subsistence hunting. On the other hand, there is the petroleum industry operating in the area through concessions granted before the declaration of national park, that include 26 wells and a pipeline, one of the main threats to the wetland.

22. **Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects**:

The main threats to the ecology are the exploration and extraction of petroleum and incompatible activities generated by human settlements in the area.

23. **Conservation measures taken**:

Given the complexity of threats, a management strategy has been drawn up to make community and industrial management activities compatible with objectives of conservation and sustainable use. They include the following measures:

- A study of the distribution and abundance of the biota, based on indicator species

- Division of the area into zones based on the study

- Preparation of the 1999-2003 master plan

- Preparation of a proposal on baseline studies for the creation of a monitoring programme in the area

- Completion of the study on the procedure for the orientation for the management of the Laguna del Tigre Ramsar site (biotype) (POG)

- Implementation of a programme of partial ecological aquatic study (AQUARAP)

- Implementation of the plan for the control and prevention of forest fires in which the Laguna del Tigre is an area of priority

- Administration of the national park and biotype through CONAP and CECON, with area directors, 44 wardens and 5 technicians from both institutions

- Maintenance of a GIS database with relevant information on the area

- A socioeconomic study

- Training of park wardens

24. **Conservation measures proposed but not yet implemented**:

Division of the area and the master plan have been approved. Proposals for a monitoring programme are being discussed for acceptance and implementation as soon as possible.

The recommendations of the POG have been approved by CONAP and steps are being taken to implement the priorities. Both the proposed zonification, master plan and monitoring programme have been prepared based on the recommendations of the POG. A programme to promote community awareness is planned in order to reconcile interests and implement joint actions. It is proposed to implement environmental education programmes through NGOs and technology transfer. Relocation of human communities has begun.

25. **Current scientific research and facilities**:

Many theses, mainly university degrees in biology, have been made on the characteristics of parts of the ecosystem such as aquatic vegetation, tree canopy, crocodile populations and a series of inventories of the fauna and flora for baseline information to define a monitoring programme.

The POG was carried out and an initial aquatic ecological evaluation (AQUARAP) was completed. Satellite images can be used to detect changes.

The Las Guacamayas biological station has research installations and 5 guard posts, 3 observation sites, 2 observation sites on towers, a visitors centre and an information centre in the town of El Naranjo.

26. **Current conservation education**:

Currently, a programme of environmental education is being carried out in all of the national park, beginning with the definition of content and methodology. Pilot projects of environmental education for the three communities established within the park and training of 15 promoters are programmed for this year.

27. **Current recreation and tourism**:

Currently, there is little tourist activity, and this is primarily ecological. The area's administration has a capacity to provide opportunities for public use without negatively affecting the ecological characteristics. In the programme for this year, there is a definition of public use policies, that includes definition of use areas, a use plan, the laying out of paths and training of persons in the local communities.

28. **Jurisdiction**:

Territorial jurisdiction is the responsibility of the government through the Consejo Nacional de Areas Protegidas (CONAP) which also has administrative responsibility for conservation. Within the national park, there is the Laguna del Tigre biosphere, administered by the Centro de Estudios Conservacionistas (CECON) of the Universidad de San Carlos, which is a member of CONAP.

29. **Management authority**:

Consejo Nacional de Areas Protegidas (CONAP)
Via 5, 4-50 zona 4, Edificio Maya, cuarto nivel

30. **Bibliographical references**: