

Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: 1997
2. Country: Mexico
3. Name of wetland: La Encrucijada Biosphere Reserve
4. Geographical coordinates:

14° 43' – 15° 40' North latitude
92° 26' – 93° 20' West longitude

5. Altitude: 0 to 15 metres above sea level
6. Area: 144,868 hectares

7. Overview: This region is important because of several types of vegetation representative of the Chiapas coast found in it, for example mangroves, which are considered to be the tallest on the American Pacific coast. This reserve is habitat for the only forest of *zapotonales* in Central America.

8. Wetland type:

Marine-coastal: G and H
Continental: M

Types of wetlands by decreasing order of importance: H, I and O

9. Ramsar criteria: 1, 2 and 3

Criteria that best characterize the site: 3

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

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

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

Criterion 1: This is a biologically, ecologically and hydrologically significant wetland in the functioning of the coastal system. Seventeen rivers discharge into the wetland, maintaining a large area of marshes (*tulares* and *popales*) and promoting productivity in the coastal lagoons and swamps.

Criterion 2: A certain number of species of endangered or vulnerable fauna and flora are found in this wetland.

Criterion 3: This wetland sustains significant numbers of specimens of certain groups of 210 species of resident birds in addition to 94 species of migratory birds during winter that arrive from the United States and Canada.

13. General location:

The reserve is located in the southern part of the state of Chiapas in the physiographic region of the Pacific Coastal Plain. It includes parts of the municipios of Acapetahua, Huixtla, Mapastepec, Mazatlán, Pijijapan and Villa Comaltitlán, in addition to being located in the economic regions of La Istmo-Costa and El Soconusco. This reserve is southeast of the city of Tapachula, which is the most important city near La Encrucijada. The nearest settlement is the municipio of Acapetahua, which has a population of 25,647 inhabitants, according to the 1995 census.

14. Physical features:

Geology and geomorphology: The reserve contains surface deposits from the Quaternary and Pliocene of terrestrial, lacustrine and fluvial origin. Under these deposits, there are rocks of crystalline and metamorphic schist from the pre Cambrian and part of the Palaeozoic (Müllerried, 1957). In the mangroves, there are banks of non-fossilized bivalve molluscs, which mean that in the past these soils were submerged in the sea. Because of the pattern of rainfall, the mouth of the rivers and the movement of seawater brackish lagoons and swamps formed whose surrounding areas have a large number of small islands formed by *guijarros*, a bit of soil and banks of bivalve molluscs and sandy areas such as Barra San José (Müllerried, 1957).

Hydrology: Within the area of La Encrucijada, there is a very important fluvial system belonging to hydrological region 23 (CAN) whose main characteristic is short rivers of an average of about 45 kilometres. These are strongly influenced by the rainy season and their sediment load changes throughout the year. Some of them almost dry out completely. In general, they are rivers whose headwaters are characterized by steep slopes, a rocky riverbed, short length and shallowness. In their middle part, their bed widens, the amount of rocks decreases or they become narrower and the volume and depth increase. In the final stretch, there are almost no rocks, slope is very slight and a large amount of sediment is carried. There are 17 main rivers that form the hydrography of the reserve: Cacaluta, Cintalapa, Coapa, Comaltitlán, Huixtla,

Margaritas, Novillero, Pijijiapan, San Nicolás, Sesecapa, Urbina and Vado Ancho. There are also many secondary and tertiary streams that supply fresh water to the lakes such as Buenavista, Carretas, El Campeón, Chantuto, Los Cerritos, Panzacola, Pereyra, San Francisco and Teculapa, in addition to the swamps of Castaño, Chocohuital, El Coco, Hueyate, La Barrita, La Bolsa, Las Brujas, Palmarcito, Palo Blanco, Palo Gacho, Pampa Honda, Salitral and Santiago (INEGI, 1988).

Soils: In the area of La Encrucijada, there are the following soil types, which are described in the FAO-UNESCO classification (1988): cambisol, regosol, solonchak, gleysol, feozem and fluvisol. The soils in the coastal area are usually dark coffee-coloured almost black of medium and fine texture, almost never thick but rather deep. The mangrove soils are usually clay or silt-clay, forming clay-sand deposits of fine grains and irregular stratification with areas of exposed fossilized molluscs and abundant organic material in various states of decomposition, which creates a characteristic smell. The soils are usually a product of constant deposition from the rivers in the area. The most important and abundant are the solonchak and regosol, then cambisol, fluvisol, gleysol and feozem, which are clay, sandy clay, sand, layers of *guijarros* and sand deposits with *guijarros*.

Water quality: According to the information provided by CAN (1997), most of the streams have an acceptable water-quality index. Only three (Coatán, Pijijiapan and Vado Ancho) have a pollution level of more than 50-70. The main source of pollution is from agrochemical products and to a lesser degree, solid waste from the cities.

Depth, fluctuations in level and permanence of water: This wetland has coastal lagoons, swamps, bars, tidal areas and seasonal flooding. The coastal lagoons usually have an average depth of 0.50 to 1.5 metres and are governed by the wet and dry seasons. They are very shallow bodies of water although they are permanent. The swamp and bar mouths have an average depth of 1.5 to 3 metres and are governed by the rainy and dry seasons. The tidal and seasonal flooded areas have a regime of flooding that is favoured by the rainy season and the effect of high tides. These areas are usually shallow (less than one metre).

Tidal regime: Because it is a coastal wetland, there is a permanent influence of the tides, which fluctuate up to one metre at high tide. The physical-biological heterogeneity of the region responds to changes in water salinity (Ocampo Flores, 1995). This can vary from 10 to 25 parts per thousand (water mass with a concentration of salts between fresh water and seawater, creating a water environment ideal for typically estuarine organisms or organisms efficiently adapted to this condition (Contreras et al., 1997).

Watershed: It is important to mention that 17 rivers empty into the wetland (Cacaluta, Cintalpa, Coatán, Coapa, Comaltitlán, Huixtla, Margaritas, Novillero, Pijijiapan, San Nicolás, Sesecapa, Urbina and Vado Ancho), which promote maintenance and the processes for maintaining the ecosystem (coastal lagoons, marshes and tidal areas). The area of the watershed in the basin is 572,000 hectares.

Watershed: The rivers that empty into the wetland usually empty into swamp areas of *tulares* and *popales*, mangroves and in some cases because of engineering works that lead directly to the lagoon with ecological and biological importance for the reserve and breeding area for a large variety of animal species, contributing to maintenance of the basic ecological processes and the permanence of germ plasma that participate in soil conservation and the water cycle and nutrients. In addition, they act as a natural filter of pollutants and for flood control. This area occupies 30,000 hectares in the reserve.

Climate: The climate of the region is type Am(w) hot-humid with abundant rainfall in summer. Rainfall is determined by geographical location because rainfall increases or decreases by altitude and latitude. Rainfall is greatest in the mountains and less on the coast. Minimum annual precipitation is 1,300 millimetres (IHN La Concepción Meteorological Station), and the maximum is 3000 millimetres, spread over 100 and 200 days of rainfall per year. The rainy season begins in May and lasts until November, with a summer dry season from July to August. The rest of the year is dry or with occasional rains in February and March. The annual average temperature is 28° C throughout the year and usually greater than 22° C (García, 1973). The local inhabitants divide the year into two seasons: winter (the rainy season) and summer (the dry season).

15. Hydrological values:

There are coastal lagoons and marshes that play an important role in the macro system of the reserve, whose biological function contributes to the primary productivity through phytoplankton, the fixing of carbon and the hydro-biological cycles of a large diversity of aquatic fauna and flora (Yáñez-Arancibia, 1986). There are marine species that spend part of their biological cycle in these systems, namely fish, crustaceans, molluscs and endangered or vulnerable species such as the *pez armado* (*pejelagarto*), crocodiles and caiman (field data). There is a one-kilometre extension of the continental platform into the sea where there is greatest accumulation of detritus and minerals that promote higher primary productivity and biodiversity. The evaporation rate of the water on the continental platform is essential to maintaining a constant exchange with the lagoon and estuarine systems, supplying seawater, which guarantees the required salinity for maintaining life cycles of many marine and freshwater species. In addition, these wetlands filter pollution and sediment, conserving the health of the coastal lagoons and the marine coastal area. They are also important for regulating the water cycles that function as water deposits and links between surface and ground water, allowing recharging of the aquifers. Furthermore, the mangroves function as a large network for retaining sediment preventing beach erosion, reducing the impact of marine currents on them (Flores-Verdugo, 1989; Yáñez-Arancibia, 1994).

16. Ecological features:

The types of vegetation present in La Encrucijada are mangrove, *zapotonal*, *popal*, *tular*, sub-perennial medium forest, low deciduous forest, floating and sub-aquatic vegetation, coastal dune vegetation and palm groves.

17. Noteworthy flora:

Species	Common name	Classification
<i>Acrocomia mexicana</i>	palma de coyol	Endangered
<i>Laguncularia racemosa</i>	mangle blanco	Special protection
<i>Conocarpus erecta</i>	botoncillo	Special protection
<i>Rhizophora mangle</i>	mangle rojo	Special protection
<i>Avicennia germinans</i>	madresal	Special protection

Source: Diario Oficial de la Federación (NOM-059, 1994)

Isolated communities of *Rhizophora harrisonii* (*mangle amarillo*) have also been found, but this is not abundant in the reserve.

18. Outstanding fauna: [see figure in Spanish version]

The only population of black-handed spider monkey (*mono araña*) (*Ateles geoffroyi*) is found in the reserve on the coastal plain.

19. Social and cultural values:

Agricultural: In the reserve and area of influence, there are farming and grazing activities as primary activities. Forest is used for domestic needs, and there is obviously a lack of an integrated strategy for exploitation. The basic crops are maize, beans, watermelon, cucumber, banana, *marañon*, African palm, mango, sugar cane and papaya. Grazing is widespread but its full potential has not been reached. The type of production reveals that the greatest problem is related to a lack of technical assistance, project proposals, provision of credit and climatic-environmental factors.

Education: Of the 64 settlements recorded in the reserve, 25 of them have schools providing pre-school, primary and secondary education. Demand for education is not fully met because only 71 per cent of school-age children attend school and 29 per cent do not attend school. The best service is found in the main towns.

Fisheries: The lagoon systems of Carretas Pereyra, Chantuto Panzacola and Maragato La Cantileña permit fishing. There are fishing cooperatives for exploiting mainly shrimp (*Litopenaeus vannamei*) and fish (*escama*). For exploiting these resources, the cooperatives seasonally install traps or rustic enclosures in the coastal lagoons to promote the growth and production of shrimp and species of fish with high commercial value.

Religion: Traditionally, Catholicism has been and is the religion of most of the inhabitants. However, during recent years other religions and religious sects have grown, including the Evangelical and Jehovah Witnesses. Within the reserve, a culture of production is growing that respects the very dynamics of nature. These attitudes are being promoted by an organization linked to the Catholic Church.

Basic services: Of the 64 communities established in the area, more than 95 per cent of the communities have basic services (water, telephone and electricity) with the exception of the municipio of Mapastepec, where 60 per cent of the localities do not have electricity.

20. Land tenure/ownership of:

The structure of land tenure in the reserve is 48 parcels of government land, 65 of federal land, 61 *ejidales* and 554 private properties in addition to public land, unoccupied land and federal property that is not owned and that represents the sites of greatest biodiversity and a high degree of conservation.

21. Current land use:

Land use on the coast of Chiapas is in function of the development models and the human activities prevalent at that time. There was an initial stage of extraction of valuable timber and the pre-Hispanic growing of cacao. Later, clearing of the forests led to farming and grazing activities, but the natural phenomena of flooding promoted grazing for the production of meat and milk. Farther south in the region known as Soconusco, recently cleared fields were used for planting banana plantations. In the past few years, there has been diversification of crops towards growing mangoes, sugarcane, papaya, African palm and, on a smaller scale, *marañon*. In the reserve, there are three types of primary activity: agriculture, grazing and fishing. Use of the forest is only for domestic use, which makes evident the lack of an integrated strategy of exploitation.

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

Adverse factors affecting the reserve are caused by several social, cultural, economic and, to a degree, political factors.

Transformation of forests, mangroves and *tulares* for creating farm and grazing land, namely the cutting of trees for building houses and for firewood.

Forest fires caused by the extraction of wildlife or for opening areas for crops or grazing using the system of slash and burn.

The creation of irregular human settlements results in changes in land use, destruction of the habitat and overexploitation of animal species, many of them endangered or vulnerable. Most of these species are sold or used for subsistence. This is the case of sea turtle eggs, which are highly exploited in the area. Changes in habitat have caused a decrease in the size and quality of the populations of wildlife in the region, especially among the migratory and resident birds, reptiles and mammals.

Pollution from organic and inorganic chemicals dumped in the canals of the swamps and coastal lagoons as well as the chemical waste from banana plantations, papaya groves and in general in the other farming and grazing areas in the Sierra Madre.

Construction of hydrological works (draft hydrological plan for the coast of Chiapas). The diverting of rivers, opening of canals, construction of drainage canals, drying of swamps changes in the flow and pattern of freshwater and saltwater, bringing as a consequence important changes in the production of nutrients and species of commercial importance.

An increase in the exploitation of fisheries, which leads to the capture of shrimp and other species without respect for closed seasons, the decrease in volumes captured, both intimately interrelated.

The growth of shrimp farms in the area. There is an interest on the part of the fishermen, *ejidatarios* and private business to build pens for raising shrimp and destroying large areas of *tulares* and mangroves, species of great importance for maintaining the coastal lagoons.

Conflicts over land tenure between the *ejidatarios* and cooperatives over lagoons for exploiting shrimp.

23. Conservation measures taken:

In 1972, the nature and typical area of the state of Chiapas Zapotón ecological mangrove was declared with an area of 2,500 hectares. Later, a technical study was carried out to expand the ecological reserve to 36,000 hectares to the category of special biosphere reserve. Later, through the agreement signed in 1988 with the Secretariat for Development and Ecology for management of the reserve by the Instituto de Historia Natural of the state government, which became responsible for activities of effective protection at the site and the area was increased to 80,000 hectares. Unfortunately, these two efforts were unsuccessful, and only in 1995 was the site declared a biosphere reserve with an area of 144,868 hectares. In addition, the state government reinforced the legal aspect by declaring La Encrucijada an area subject to special ecological protection, in addition to participating in its administration, management and operation. La Encrucijada Biosphere Reserve forms part of the 52 priority protected nature areas in the new system for management that the Comisión Nacional de Areas Naturales Protegidas manages as pilot areas. This is an important contribution of resources by the federal government. In addition, the ANP has a management programme published in the diario oficial of the federation in September 2000, which is an instrument and planning tool for the management and conservation of the reserve.

24. Conservation measures proposed but not yet implemented:

In order to strengthen conservation and protection of the natural resources, thought has been given to implementing a project on land protection, which calls for

regularization of land tenure, marking of boundaries of the buffer area and the nucleus of the reserve in addition to acquisition through purchase of land that is environmentally important or subject to risk. One of the measures implemented for protection of the wetland is the management and conservation of water basins as a strategy for reducing the impact created by the use of chemicals, erosion and the advance of the farming frontier for which a management plan has been created for the basin and activities of restoration, productive reorientation and rehabilitation of bodies of water.

25. Current scientific research and facilities:

Currently, the reserve has agreements for cooperation with the Universidad Autónoma Metropolitana, the Colegio del Frontera Sur, the Universidad Autónoma de Chapingo and the Universidad de Ciencia y Artes de Chiapas for joint studies on water quality, community infrastructure, biological and chemical pollution, current and potential land use and socio-economic studies. There is a central office, two regional offices (Acapetahua and Pijijapan) and three operational camps established for management of the reserve.

26. Current conservation education:

The reserve provides services to visitors that have been operating for three years, for students, scientists and domestic and foreign tourists. An interpretation trail has been established within La Concepción Camp, which has an observation point for birds. There is information available in the form of pamphlets and information displays about La Encrucijada.

27. Current recreation and tourism:

Under the reserve's visitors' programme, an annual average of 120 Mexican and foreign persons visit and hike through the area, in addition to visiting several conservation programmes for the sea turtle and green iguana. There are installations for transporting visitors by boat and a camping area with baths, dormitories, a kitchen and dining room. La Encrucijada can be visited during any time of the year, except during the rainy season. There are also unregulated tourist activities such as traditional tourism practiced by the local inhabitants.

28. Jurisdiction:

Territorial jurisdiction: This wetland is located on national, federal, private and community land.

Administrative jurisdiction: Secretariat for the Environment and Natural Resources of the National Commission for Protected Areas.

For effects of its conservation, La Encrucijada is administrated by the Secretariat for Natural Resources and the National Commission for Protected Areas.

29. Management authority:

Reserva de la Biosfera La Encrucijada
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Barrio La Pimienta
C.P. 29000
Tuxtla Gutiérrez, Chiapas, Mexico

30. References: