

Information Sheet on Ramsar Wetlands

1. **Date this sheet was completed/updated:** 11 December 1995

2. **Country:** COSTA RICA

3. **Name of wetland:** Térraba-Sierpe

4. **Geographical coordinates:**

8°04'N - 9°03'N
83°29'W - 83°38'W

5. **Altitude:** sea level

6. **Area:** 30,654 hectares

7. **Overview:**

The Térraba-Sierpe wetland is characterized by a woodland ecosystem periodically flooded by tides where there is a transfer of fine muds rich in organic material.

8. **Wetland type:**

D, E, F, G, (I), (L), (M), O, T**, X**

9. **Ramsar criteria:**

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

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

Field Station
Proyecto DANIDA-Manglares
Coronado de Osa
Puntarenas

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

13. **General location:**

This wetland is located in the province of Puntarenas near Ciudad Cortéz.

14. **Physical features:**

Geology: This wetland and its area of influence are geologically formed by materials from the Cretaceous, Tertiary and Quaternary periods. There are rocks of volcanic origin from the Cretaceous period that form the Nicoya complex (Kvs).

The rocks from the Tertiary belong to the Térraba formation and the Lagarto and Zapote stages. These rocks are located in the higher parts of the basin.

From the Quaternary period, there are rocks of sedimentary origin from the Holocene era that correspond to rivers, marshes and recent colluvial and alluvial coastal deposits. These are located in the mangroves near the swamps at the mouths of the Térraba and Sierpe rivers.

Geomorphology: The following geomorphological features are found:

- denudation on steep slopes and an eroded escarpment of the coastal range (Sierra Costeña)
- alluvial sedimentation divided into five units: marshes, permanent or seasonal swamps, coastal alluvial plains under marine influence, small alluvial plains and the delta fan of the Río Térraba
- tectonic or erosive forms where the following units can be found: coastal range (north of this wetland and parallel to the Pacific Ocean); a raised fluvial-marine abraded platform (located on the Isla Violín and the Isla Guerra); hills in the Osa peninsula forming the peninsula's high ground

Hydrology: The Río Grande de Térraba is the main drainage for a very extensive river network and the most important source of fresh water for the estuary system. It is 160 kilometres long from its source in the Cerro de la Muerte (Río Buena Vista) up to its point of entry into the Bahía Coronado. It drains a basin of approximately 5,000 square kilometres (ICE, 1988). Its main tributary is the Río General along with its tributaries of the Buena Vista, Ceibo, Chirripó del Pacífico, Convento, Coto Brus, Pacuar, Pejivalle and Volcán rivers.

Another river, the Sierpe, forms the limit of the mangroves and among its tributaries are the Chocuaco, Culebra, Salamá and Tigre rivers and the streams Jungla, Porvenir, Potrero and Sábalo.

During the period 1965-1989, the Palmar Sur meteorological station recorded precipitation greater than the potential evapotranspiration between April and November (the rainy season) and a potential evapotranspiration greater than precipitation from December to March (the dry season). The potential evapotranspiration is greater than evapotranspiration, but is less during May, July, August, September and October when evapotranspiration is equal to the potential evapotranspiration because of abundant precipitation and soil humidity.

Soils: The predominant soils in this area (Vásquez, A., 1989) are:

- a) entisols, soils with very little morphogenetic development and no clearly identifiable horizons. The majority of the soils in the reserve have mangrove

vegetation, a high water content, variable quantities of salt and low levels of oxygen (Cintron and Schefer-Novelli, 1983). These are poorly consolidated semifluid soils, grey or black in colour reflecting a high sulphuric acid content. Among the entisols are the tropaquepts (Et) and associated soils of tropaquepts and tropofibrists.

b) inceptisols and alluvial soils with good to poor drainage derived from *tobas*, *lahares*, sediments and volcanic ash. In this area are found the eutropepts (Ie) with associated soils of fluventic tropaquepts, typic ustifluvents, typic tropopsamments and tropaquepts (It).

c. ultisols are widely distributed in Costa Rica. The main groups are tropohumults (Ut), the subgroups typic, ustic and andic and tropudults (UI) and the subgroups typic, andic and aquic.

The soils of Térraba-Sierpe are frequently flooded and have high salinity and a predominance of heavy textures. They also have high hydraulic conductivity (84.6%) (Asch, C., 1991), possibly owing to the presence of roots and microorganisms that cause cracks.

Tides: In general, the daily tidal regimen has one or two maximums and one or two minimums. The average high tide in 1990 was 3.94 metres, and the average low tide was 1.96 metres. In this same year, the spring high tides were an average of 4.02 metres, and the lowest low tides were an average of 1.89 metres. The average total tidal fluctuation was 1.98 metres.

Climate: This climate is classified as very hot and humid with a moderate dry period of 35-70 days with a water deficit. Precipitation is abundant from May to November. The rainy months are September and October. Rain falls either in the afternoon or at the beginning of the night. The average annual rainfall was 3,638.3 mm. The average annual temperature is 26.5°C with a maximum in March and a minimum in October.

15. Hydrological values:

Controlling erosion: Mangrove vegetation in the reserve plays a basic role in checking erosion on the coast and on the shores of the rivers and marshes.

Storm protection: The mangroves act as protective barriers and windbreaks.

Flood control: Rain water and run-off are stored in the wetland.

Improvement in water quality: The mangroves retain toxic contaminants, transfer nutrients and regulate sedimentation.

Depletion of aquifers: The depletion of the aquifers of the Grande de Térraba and Sierpe rivers is mitigated.

Maintenance of the food chain: One of the most important functions is that of maintaining the habitat and supporting the reproduction and life of many species of fish and wild animals.

16. Ecological features:

A large delta ensures an abundant supply of fresh water, nutrients and sediment for the growth of a large mangrove and the *tagua-yolillo* association. There are three types of vegetation defined by biological characteristics, soil salinity and degree of flooding.

- Core vegetation: The distribution of core species is closely tied to the influence of sea water. Mangrove vegetation is viviparous and has a high tolerance for salt concentrations, aerial roots, pneumatophores and glands which excrete salt.
- Marginal vegetation: The species in the marginal vegetation surrounding the core vegetation are on higher ground and irrigated by brackish water. When salinity is less than that of sea water or when flooding is light, these species grow together with core vegetation.
- Optional marginal vegetation: This vegetation is occasionally associated with the mangrove, but is usually found outside of this environment in mangroves under conditions of permanent low salinity or where the area has been modified (see annex 1).

17. Noteworthy flora:

The flora in the reserve is formed by hydrophytes whose growth cycle is in harmony with the aquatic environment. There are halophytic species whose growth cycle depends totally on the aquatic environment and adapt to palustrine, riparian and coastal forms of vegetation.

There are three types of vegetation (mangrove, palustrine and herbaceous) in the Terraba-Sierpe wetland.

18. Noteworthy fauna:

This reserve is the habitat of many species of birds, fish, mammals and reptiles. The most numerous species are resident and migratory birds. Sea life includes fish, mollusc, oysters and shellfish. There are less variety and fewer mammals and reptiles.

19. Social and cultural values:

Fish production: The mangroves play an important direct and indirect role in maintaining the fish stock. Some species depend on these sites for their life cycle or for an important part of this cycle (reproduction, growth or feeding).

Almost all local inhabitants fish for subsistence and sometimes for small-scale commercial use. Only small-scale line fishing is permitted in the estuary of the Terraba-Sierpe. In this area, there is a mollusc, locally called *piangua* (*Anadara tuberculosa*), which has been exploited for at least the past 1,200 years and is highly sought after not only for local subsistence consumption but also for trade.

Forest production: The mangroves have been used by the Terraba Indians for the extraction

of dyes from the bark of the *Rhizophora racemosa*. Systematic exploitation began at the beginning of the century for the production of charcoal, use of bark for tanning and wood in construction, agriculture and for firewood. The indiscriminate use of the mangrove led to the government's intervention and the regulation of the sustainable use of the mangrove and the ecosystem.

Education and scientific research have been sponsored by the NGO Proyecto DANIDA-Manglares (CATIE-IUCN) in cooperation with local and foreign universities.

20. Land tenure/ownership of:

The site is on government-owned land, and the surrounding area is private property of banana plantations, rice fields and pasture for livestock.

21. Current land use:

At the site, forest products are extracted for fence posts, firewood for drying rice and for sale, poles for the construction of moorings, for use in construction and raw material for charcoal production carried out by one enterprise and individual families.

The gathering of *pianguas* (*Anadara tuberculosa*) and the small-scale fishing of fish and crabs are the major source of income for families that live off the mangrove.

There is little tourism at the present time, but there is a large potential. A private aquaculture project has been proposed.

In the surrounding area, many families have several hectares of land where they grow subsistence crops of rice, beans, maize, plantains, yucca, sugar cane, fruit and vegetables. There are also rice and banana plantations and intensive and extensive ranching. Few local inhabitants live in the wetlands, but instead live in settlements around the wetland.

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

At the site, trees in the mangrove were cut down without regulation, indiscriminately and in an unorganized way for the bark of the *Rhizophora harrisonii* used by nearby tanneries. This led to the destruction of part of the mangrove until the government began to regulate the situation setting norms for the extraction of bark and wood. At the same time, the indiscriminate extraction of *pianguas* (*Anadara tuberculosa*) was regulated with limits on the quantity and size that could be collected.

In the surrounding area and basin, the use of fertilizers and pesticides in rice fields and on banana plantations and their subsequent concentration in the wetlands have had an unknown effect on both the birdlife, fisheries and other resources.

Pressure on land around the wetland is another conservation factor to take into account.

23. Conservation measures taken:

Law 7174 (forestry law) prohibits the extraction of trees without a forest management plan and permission. Law 7317 (wildlife conservation law) regulates the use and protection of wildlife.

The mangroves were declared a forest reserve in August 1977.

These wetlands were created by executive decree. All of the country's mangroves were also declared wetlands, and the regulation of their use was assigned to the Ministry for the Environment and Energy (formerly MIRENEM).

24. Conservation measures proposed but not yet implemented:

An overall management plan for natural resources in the Terraba-Sierpe national wetland has been prepared. A reforestation project has been proposed for deteriorated mangroves, but has not yet been carried out.

25. Current scientific research and facilities:

The DANIDA-Manglares project has conducted a series of studies on mangrove ecology and the socioeconomic relations of the groups that depend on these resources. A study is being carried out on the effect of the extraction of wood on the structure and composition of the mangrove. There is a field station that provides housing and a research centre.

26. Current conservation education:

The Mangrove Environmental Education Programme was established in 1989. There is also a field station for visitors, printed information on the annual educational programme and boats available for visiting the area.

27. Current recreation and tourism:

This wetlands is a tourist attraction used by tour operators to promote the beautiful landscape, fauna and flora. A study is being carried out on tourist capacity and areas of limited use in order to regulate tourism. A cooperative (COOPEMANGLE R.L.) has been formed for exploiting the mangrove.

28. Jurisdiction:

Area de Conservación de Osa (ACOSA)
Programa Regional de Manejo y Conservación del Humedal Nacional Terraba-
Sierpe
Dirección General de Vida Silvestre
Sistema Nacional de Areas de Conservación
Ministerio del Ambiente y Energía

29. Management authority:

Dirección General de Vida Silvestre
Sistema Nacional de Areas de Conservación
Ministerio del Ambiente y Energía

30. Bibliographical references: