

## Caroni Swamp Ramsar Wetlands

**Country:** The Republic of Trinidad and Tobago

**Name of the Ramsar site:** Caroni Swamp

**Geographical coordinates** (latitude/longitude):  
10° 30-39' North Latitude, 61°25-30 ' West Longitude

**General location:** Caroni Swamp is situated on the west coast of Trinidad, 3.5 km southwest of the capital, Port of Spain. Trinidad and Tobago is situated in the southernmost end of the Caribbean island chain between 10° 02' -10° 50'N latitude and 60° 55' -61° 56'W longitude

**Elevation:** Varies from sea level to 10 m at its highest point.

**Area:** 8398.1 ha

**Overview:** Caroni Swamp is an estuarine system comprising 5,996.3 ha of mangrove forest and herbaceous marsh, interrupted by numerous channels, and brackish and saline lagoons, and with extensive intertidal mudflats on the seaward side. The swamp has been modified by attempted reclamation, and there is some seasonal cultivation on the landward fringe (Bacon, 1970). Caroni Swamp is important economically for oyster and fish harvesting, for hunting and for ecotourism (Ramdial, 1975 and Chin Yuen Kee, 1978). Major commercial fisheries are based on demersal stock in the adjacent eastern Gulf of Paria.

**Ramsar Criteria:** 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

**Justification for the application of each Criterion listed in above:**

**Criterion 2:** A total of 20 endangered bird species have been recorded in Caroni Swamp. In particular, the following species are included in CITES Appendix II: *Eudocimus ruber*, *Sarkidiornis melanotos*, *Elanus leucurus*, *Rostrhamus sociabilis*, *Buteogallus urubitinga*, *Buteogallus anthracinus*, *Circus buffoni*, *Milvago chimachima*, *Polyborus plancus*, *Falco femoralis*, *Falco columbarium*, *Falco sparverius*, *Forpus passerinus*, *Tyto alba*, *Otus choliba*, *Chlorostilbon mellisugus*, *Anthracothorax viridigula* and *Polytmus guainumbi*. The *Falco peregrinus* is protected under CITES Appendix I and the *Plegadis falcinellus* under Appendix III.

**Criterion 3:** The Caroni Swamp is an important wetland since it is ecologically diverse, consisting of marshes, mangrove swamp and tidal mudflats in close proximity. The wetland provides a variety of habitats for flora and faunal species and as such, supports a rich biodiversity.

**Criterion 4:** It is highly productive system that provides food (organic production) and protection and is a nursery for marine and freshwater species.

**Biogeography**

**a) biogeographic region:** Caroni Swamp is situated on the west coast of Trinidad. Trinidad is situated in the southernmost end of the Caribbean island chain, on the continental shelf of South America, and immediately adjacent to the outflow of the Orinoco River. The site is within the Orinoco bioregion.

**b) biogeographic regionalisation scheme** (include reference citation):  
Trinidad mangroves fall within the Amazon-Orinoco-Maranhão mangrove complex in the Orinoco bioregion using the Dinerstein et al., 1995 classification for ecoregions.

**Physical features of the site:** Caroni Swamp is bounded on the north by the Churchill Roosevelt Highway, on the east by the Uriah Butler Highway, on the west by the Gulf of Paria and on the south by the Chandernagore River. This Swamp was developed during the late Pleistocene and is composed of recent deposits of peat and river-borne sediments derived from the Caroni River Basin (Bacon, 1970). Below the peat deposits of the Caroni Swamp are Pliocene clays overlying Mio-Pliocene conglomerates. Strong faulting in the latter, and in the underlying Cretaceous rocks, suggests that a graben with an east-west axis determined the position of this sedimentation area

Under natural conditions, the Swamp received sediment-laden freshwater inflow and overflows from the Caroni River along its northern boundary, and along its eastern boundary from overflows further upstream, east of the Swamp, while the Guayamare River and Cunupia River entered the Swamp towards the south. However, the original drainage pattern in the Swamp has been modified by attempted reclamation, under the Cipriani Reclamation Scheme 1921-1922, which was initiated to facilitate rice cultivation (Bacon, 1975). Further flood protection works, which began in the 1950's, have resulted in an overall reduction of freshwater inflow into the swamp (Phelps, 1997). This loss of freshwater inflow has further reduced freshwater storage in the Swamp and caused salinity levels to increase. In addition to saltwater penetration, the Swamp receives water polluted with sewage, wastewater from industry and agriculture run-off.

**Physical features of the catchment area:** The Caroni River Basin, the hydrometric area that encompasses the Caroni Swamp, is situated in the northwestern section of Trinidad and covers a total of about 883.4 km<sup>2</sup>, equivalent to 22% of the land surface area of the island (Juman et al, 2002).

The Caroni River Basin falls within the physiographic regions of the Northern Range, which rises to nearly 940 m, and the Central Range, which bisects the island obliquely from east to west and rises in places to over 300 m in the Northern Basin. The Caroni River, which is the largest river in Trinidad, drains the Northern and Central Ranges to the west and has a catchment area of about 600 km<sup>2</sup>. The major part of the Caroni River water supply comes from perennial tributaries of the Northern and Central Ranges (Bacon, 1970)

Twelve rivers flow into the Caroni River on its northern side from the Northern Range, and six rivers flow in from the southern side from the Caroni Plain and the northern side of the Central Range (Phelp, 1997). The northern tributaries contribute the major part of the Caroni River water supply while draining the rainforest covered mountains of the Northern Range; which is composed of indurated metamorphic rocks, which include marmorolized, silicified and schistose limestones, mica schists and slaty shales (Bacon, 1970). Tributaries from the Central Range that contribute to the Caroni outflow drain mainly soft, massive, arenaceous, yellow- white limestone hills (Bacon, 1970) on which agriculture has largely replaced native forest. The lower course of the Caroni River flows through the Caroni plain from an elevation of less than 30m across broad alluvial valleys. After meandering westward through this basin, the river at one time separated into a number of distributaries in the Caroni Swamp; but the drainage pattern was modified by channelization.

**Hydrological values:** Surface water flows supporting local ecosystems, flood water interception, sediment trapping, and shoreline stabilization (Alleng, 1997). This wetland also functions as a receiving and absorbing body of land-based runoff and pollutants and is the natural infrastructure for tourism.

### **Wetland Types**

**a) Presence:** Marine/coastal ,Inland ,Human-made

**b) Dominance:** Mangrove forest, approximately 3278 ha (Bacon, 1993)

**General ecological features:** The Caroni mangrove system is the most extensive on the island and is dominated by estuarine and basin *Rhizophora*, mainly *R. mangle*, but *R. harrisonii* and *R. racemosa*. There is evidence of rapid pioneering by *R. mangle* in the internal lagoons with retreat/erosion of forest on the Gulf of Paria coast. There are extensive stands of *Avicennia germinans* forming woodland and basin communities. *Avicennia schaueriana* is present but uncommon. *Laguncularia racemosa* is common in mixed basin forest but do not form stands (Bacon, 1970).

To the west of the swamp (Gulf coast), there are extensive mudflats. Brackish marsh with *Eleocharis*, *Fimbristylis* and other cyperaceae are found on the east and south sides grading into freshwater marsh and cultivation.

**Noteworthy flora:** Red, black and white mangroves are present throughout Caroni, the red being very important for shoreline stabilization and flood control. (See Appendix I)

**Noteworthy fauna:** A wide variety of aquatic, estuarine invertebrates are present, including commercially important resource organisms such as the mangrove oyster (*Crassostrea rhizophorae*), mussels (*Mytella guyanensis* & *M. falcata*), clams (*Phacoides pectinatus*), conch (*Melongena melongena*), and shrimp (*Penaeus* spp.). Some 190 species of birds have been reported in Caroni Swamp; which include resident and nesting water birds, plus migratory species, and a number of forest and pasture birds that roost in the mangrove (Bacon, 1970). The site is also an important habitat for the scarlet ibis (*Eudocimus ruber*), which is the national bird (Bildstein, 1990). The Swamp is a breeding passage for several waterfowl species. (See Appendix II)

**Social and cultural values:** The Swamp is utilised extensively, particularly with respect to fishing, harvesting of crabs, oysters and eco-tourism. A section is also used for agriculture and industrial development.

**Land tenure/ownership:** (a) The Caroni Swamp Ramsar site is 8398.1 ha, of which 2405.8 ha is coastal water and mudflats. It is mainly state owned: 3,197 ha within a Forest Reserve, 1,854.3 State Lands and 941 ha privately owned.

(b) In the surrounding area: Private ownership

**Current land (including water) use:** (a) within the Ramsar site: recreation, ecotourism, fishing, research

(b) In the surroundings/catchment: 33% of the national population lives within the Caroni River Basin (CSO, 1995). There are also agricultural lands, industries, a dam and quarries within the catchment

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

(a) within the Ramsar site: attempted reclamation, hydrological alteration, over-fishing, sewage discharges, solid waste and chemical pollution, over-harvesting of oysters and destructive harvesting practices, clearing of mangrove

(b) in the surrounding area: land clearing, agriculture

**Conservation measures taken:** Projected areas fall under the Forest Act of 1915 (amended 1999) and the Conservation of Wildlife Act 1984. National Wetland Policy passed by Cabinet on July 2001.

**Conservation measures proposed but not yet implemented:** Proposal to manage the area as a National Park facility and implement recently passed National Wetland Policy. No management plan is presently in place.

**Current scientific research and facilities:** Institute of Marine Affairs, a marine research institute in Trinidad, is conducting research on land-based sources of pollution in the Caroni River Basin and its impact on the marine environment which in this case includes the Caroni Swamp. The IMA also monitors the wetland through its Coastal Conservation project. Students in the Master's programme at the University of the West Indies, St Augustine are researching the nursery function of the swamp and the prop root communities.

**Current conservation education:** Development of a Visitors' Centre, information booklets, school visits, exhibition area, educational videos. This system provides excellent access for ecological studies, tours and other recreational pursuits.

**Current recreation and tourism:** Tourism/recreation – Caroni Swamp is a major tourist attraction for bird watchers. Daily boating trips are conducted for both tourists and residents, however no statistics are available. Other recreational activities include game fishing, hunting, and crab catching.

**Jurisdiction:** Forestry Division, Ministry of Agriculture, Lands and Marine Resources.