

## **Protected Areas Programme UNEP World Conservation Monitoring Centre**

*Coiba Island is one of the last relics of tropical moist forest in Pacific Central America, a site of great beauty and great marine and terrestrial diversity, preserving endemic and endangered species. The coral reefs exemplify successful reef growth under sheltered but very restricted conditions and serve as a refuge and source of species replenishment for other islands, including the Cocos and Galapagos, during and after El Niño disturbances.*

**COUNTRY** Republic of Panama

**NAME** Coiba National Park and its Special Marine Zone

### **NATURAL WORLD HERITAGE SITE**

2005: Inscribed on the World Heritage List under Natural Criteria ii and iv.

### **COMPARISON WITH SIMILAR SITES**

Within the eastern tropical Pacific region the wildlife of Coiba is amongst the richest in an area with the highest rate of endemism in the world. It is under less threat than that of the Galapagos and Cocos islands. Its combination of a variety of warm and semi-oceanic marine habitats rich in coral and large fish with tropical forest is far larger and richer than that of Cocos Island. There are relatively few reefs in the eastern Pacific and though the coral reefs of the Gulf have fewer species, the diversity of its coral communities is high. They are well protected and in good condition even after the recent El Niño bleaching episodes which killed most of the reef corals of the Galapagos and Cocos. Reefs in the central and west Pacific (Tubbataha and East Rennell Island World Heritage sites for example) are even more vulnerable to natural predation and to damage, pollution, overfishing and destructive fishing methods. The islands' sheltered range of marine substrates from continental to oceanic is the basis for a wide diversity of fish and marine invertebrates; and their position in the flux of regional currents make the islands important in the dispersal of marine organisms and larval fish. Numbers of bird and fish species are high, and of plant species, very high, by comparison with the other sites; and it is not notably lower in species of mammals, corals and endemic species. As for the related World Heritage sites of Darien and Los Katios National Parks, Talamanca Range-La Amistad Reserves and Guanacaste Conservation Area, these are too different in type for their forests to be comparable. And Guanacaste's marine life is enriched by up-welling, not the lack of it as in the Gulf of Chiriquí.

### **PHYSICAL FEATURES**

Coiba Island in the Gulf of Chiriquí is on the edge of the Gulf of Panama and 22.5 km southwest of the mainland. It is by far the largest island (50,314 ha) of an archipelago of nine smaller islands, Jicaron (2,002 ha), Brincaco, Uva, Rancheria, Canal de Afuera, Jicanta, Pajeros and Afuera plus 28 islets. The property also includes Montuosa Island (136 ha), 21.3 nautical miles (nearly 40 km) west, and Hannibal reef, an underwater sea-

mount 12.6 n.m. (23.3 km) west. The National Park with the Special Zone of Marine Protection now covers 60% of the continental shelf and 90% of the islands within the Gulf of Chiriquí. Coiba itself has 15 rivers and 240 kilometers of coastline. Geologically, it is part of a system of oceanic islands of volcanic origin formed from subduction of the Pacific plate under the Caribbean plate, subsequently rising during tectonic movement at the end of the Tertiary. Owing to this origin and its proximity to the coast, Coiba combines volcanic rock and limestone that are overlaid by patches of sedimentary soils of secondary origin. Many of the islands within the Park are of similar origin and represent islets of high productivity, particularly for the marine environment. The islands are on the northeastern edge of the proposed Pacific Marine Biological Corridor, which extends from Punto San Lazaro on the Baya California peninsula at 24°45' north to Paita in Peru at 5°00' south. It includes the archipelagoes of Revillagigedo and Galapagos and the islands of Clipperton, Cocos, Coiba, Gorgona and Malpelo off Columbia.

This marine corridor, which is part of the Eastern Tropical Pacific Marine Wilderness, is characterised by strongly contrasting climatic effects caused by the convergence of major warm oceanic currents and cool coastal counter-currents. The dominant currents are the North Equatorial counter-current bringing moderately warm sub-tropical waters from the north via the south-flowing Panama current; and the north-flowing Columbia current reinforced by the Panamanian Cyclonic counter-current bringing cooler low salinity water from the southwest. There is also an equatorial undercurrent that flows along the equator from the west, producing upwellings of cool water rich in nutrients when they hit the underwater base of islands. Montuosa I. and Hannibal reef are oceanic in character but also nutrient-rich and very productive. Though Coiba is less exposed than the oceanic islands, these marine influences affect it, adding to the diversity of habitats and species in the Gulf of Chiriquí. However, the Gulf, being sheltered between December and April by the mainland's Central Cordillera Mountains from the prevailing cold northeasterly winds, the accompanying upwelling cold currents, and also from the worst effects of the El Nino, the Gulf is a warm and stable environment year-round where there are several coral reefs in good condition.

## VEGETATION

Coiba Island preserves approximately 80% of its original tropical moist forest cover and is one of the most extensive areas of insular character on the Central American Pacific coast. Two principal life zones on the island are defined by Holdridge: very humid tropical forest and the same with a transition to pluvial forest. There are around 2000 species of vascular plants. 858 species have been identified, with one genus endemic to Coiba (*Desmotes*) and three endemic species *Desmotes incomparabilis*, *Fleishmania coibensis* and *Psychotria fosteri*. In addition there are four coastal vegetation types: shoreline with coconut *Cocos nucifera* and wild almond *Terminalia catappa*, Mora mangrove *Mora oleifera* forest transitional between mangroves and the coast, mangrove swamp with *Rhizophora mangle* dominating four other species, and brackish-water *Prioria copaifera (cativa)* forest. 130 lichen species and 148 fungi have been recorded. There is also some successional vegetation and secondary forest on old penal colony pastures. The island is still botanically unexplored and further study would certainly reveal more species.

## FAUNA

The Gulf of Panama is one of the most productive areas of the tropical eastern Pacific. It has a high degree of complex ecological and oceanographic interactions, due mainly to the convergence of major currents which affect the movements and distribution of many species and disperse marine larvae of many kinds (Conservation International, 2001). The diverse marine habitats include coral reefs, reefless rock bottoms, sandy bottoms and mangrove inter-tidal flats. Panama's Pacific shore has 91% of the eastern Pacific reef-building corals, and the comparatively stable marine environment of the sheltered Gulf of Chiriquí contains many of these. With the less extreme temperature fluctuations, fewer corals die. The Gulf therefore serves as a refuge and a source of replenishment after die-backs in parts of the region as far away as the Galapagos, by larvae swept along in the strong southwesterly Panama current.

There are 1,703 ha of coral reef and coral communities in the National Park. The diversity of species is relatively low except for soft corals compared with the regions richest in coral, perhaps due to the influence of ENSO. High coral diversity is observed in coral communities rather than in reefs, but the biological interactions between species are complex. Corals which have developed in the calm warm waters of the Gulf of Chiriquí and Coiba Island are relatively healthy, and Ensenada Maria reef at 160 ha is the second largest in the eastern Pacific. The National Park has extensive prairies of rodolites, similar to those in the Sea of Cortés. Twenty-four species of hard corals have been identified in the Gulf of Chiriquí, of which 4 are exclusively from Panama and 2 are endemic, along with 14 species of sponges, of which 3 are new to science, and 34 species of soft corals, of which 32 are new to science and 18 exclusive to Panama. Other dispersed larvae abundant in the Gulf are those of echinoderms and molluscs 453 species of which are reported.

The productiveness of the local waters are also a key link in the movements of fish. Of these, 760 species and 375 genera (85% of eastern Pacific genera) are known from the Gulf. 33 species of shark exist locally including whale shark *Rhincodon typus*, tiger *Galeocerda cuvier*, bull *Carrcharinus leucas*, black-tip *C. limbatus*, silky *C. falciformis*, white-tip reef *Trianodon obesus*, scalloped hammerhead *Sphyrna lewini* and nurse shark *Ginglymostoma cirratum*. 20 species of cetaceans have been recorded, among them humpbacked whale *Megaptera novaeangliae* (VU), sperm whale *Physeter catodon* (VU), Bryde's whale *Balaenoptera edeni*, killer whale *Orcinus orca*, short-finned pilot whale *Globicephala macrorhynchus* and false killer whale *Pseudodorca crassidens*; bottlenose dolphin *Tursiops truncatus*, spotted dolphin *Stenella attenuata*, Central American spinner dolphin *S. longirostris centramericana* and common dolphin *Delphinus delphis*. There are also four turtle species: leatherback *Dermochelys coriacea* (CR), hawksbill *Eretmochelys imbricata* (CR), olive ridley *Lepidochelys olivacea* (EN) and loggerhead *Caretta caretta* (EN). The islands of the Gulf have the only waters in the eastern Pacific with populations of Indo-Pacific species.

Endemic Species: Despite its proximity to the coast, Coiba has been isolated long enough to allow speciation to occur. Few studies have been made but Coiba is known to

have 2 endemic mammals, 20 endemic birds and one endemic subspecies of snake. The mammalian fauna is dominated by bats, 30 species having been identified so far, many of them endemic. The Coiba Island agouti *Dasyprocta coibae* is endemic, as are the Coiba Island howler monkey *Alouatta coibensis* (EN), mantled howler monkey *A. palliata coibensis*, an opossum *Didelphis marsupialis* and a white-tailed deer *Odocoileus virginianus rothschildi*. There is a rich freshwater invertebrate life and 53 insect species new to science have been discovered on the islands. 147 species of birds have been recorded, 96 resident on Coiba itself. These include the Coiba spinetail *Cranioleuca dissita* and 20 endemic subspecies. The island is also a refuge for birds which have almost disappeared from mainland Panama such as the crested eagle *Morphnus guianensis* and the scarlet macaw *Ara macao*.