

## World Heritage Sites

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## COCOS ISLAND NATIONAL PARK COSTA RICA

*Cocos Island, isolated 530 km southwest of the coast of Costa Rica, is the only island in the tropical eastern Pacific with a rainforest. It also possessed the richest and most extensive coral reef in the east Pacific. Its productive waters are a distribution centre for marine larvae and hold large aggregations of sharks. Its many interactions with the surrounding seas make it an ideal laboratory for studying biological processes. It is also a magnificent diving site and one of the best places in the world to see large pelagic species such as sharks, rays, tuna and dolphins.*

### COUNTRY

Costa Rica

### NAME

Cocos Island National Park

### NATURAL WORLD HERITAGE SITE

1997: Inscribed on the World Heritage List under Natural Criteria ix, x.

2002: Marine Zone extended by 100,000 ha.

### STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

The UNESCO World Heritage Committee issued the following statement at the time of inscription:

#### Justification for Inscription

The Committee inscribed Cocos Island National Park under natural criteria (ix) and (x) because of the critical habitats the site provides for marine wildlife including large pelagic species, especially sharks.

### INTERNATIONAL DESIGNATION

1998: Designated a Wetland of International Importance under the Ramsar Convention (99,623 ha).

### IUCN MANAGEMENT CATEGORY

II National Park

### BIOGEOGRAPHICAL PROVINCE

Cocos Island (8.43.13)

### GEOGRAPHICAL LOCATION

The island is 532 km southwest of Puntarenas on the Pacific coast of Costa Rica, and 630 km northeast of the Galapagos Islands. The site covers the whole island and 25 km out to sea all around. Centred on 5°31'08"N by 87° 04'18"W.

### DATES AND HISTORY OF ESTABLISHMENT

1978: Isla del Coco designated a National Park by Executive Decree No.08748-A;

1982: The status of the Island as a protected area reinforced by Law No.6794;

1984: The Park extended by Executive Decree No.24652 to include all marine ecosystems within 15 km of the island in the Cocos Island Marine and Terrestrial Conservation Area (99,700 ha);

2002: The marine limit extended to 22.2 km from shore.

## LAND TENURE

State owned, in the Province of Puntarenas. Managed by the National Park Service of the Ministry of Environment and Energy.

## AREA

199,790ha. The island is 2,390 ha in area. The surrounding marine ecosystems total 197,400 ha.

## ALTITUDE

Sea floor to 634m (Cerro Yglesias).

## PHYSICAL FEATURES

Cocos Island is the only point above sea level of the Cocos Ridge, which runs from Costa Rica almost to the Galápagos. This is a line of otherwise submerged volcanoes formed over the margin of the Cocos and Pacific Tectonic Plates, which is being actively subducted under the Caribbean plate. The island is a rectangular 7.6 by 4.4 kilometres surrounded by cliffs, inlets, islets and rocks. Its highpoint of Cerro Yglesias, 634 meters high, is at the west end of the island, surrounded by wooded ravines. Below the peak the land is a plateau which falls gradually south and east, in rocky terraces to the northeast but to the north drops steeply to 200m sea cliffs. The relief and coastline are rugged, with cliffs rising almost vertically from a narrow shore and many rocks on the irregular west coast. There are two bays with sandy beaches, Bahía Wafer in the north and Bahía Chatham in the northeast. Inland, the mountainous terrain runs with numerous small rivers and streams, many of which plunge over the coastal cliffs in spectacular waterfalls. The island's rocks are mainly andesite and strata of columnar basaltic lavas with tuffaceous ash which formed over a hotspot between 1.91 and 2.44 million years ago. The islets are formed of columnar basalt. Soils are easily eroded very acidic entisols.

The submarine slopes consist of stepwise shelves with almost no intertidal zone. The shallow submerged fringing reef culminates in sand and *Porites* rubble at the edge of a trench several hundred metres deep. The most important reefs are located off Punta María, Punta Presidio, Punta Pacheco and parts of the Yglesias, Chatham and Wafer Bays. The southern and southwestern sectors show the greatest bathymetric variation in the area, with emergent small islands, submarine caves and a great number of submerged rocks.

## CLIMATE

The climate of Cocos Island is governed by the seasonal north-south migrations of the Intertropical Convergence Zone where the weather patterns of the two hemispheres converge near the equator. From January to May the convergence moves south and a warm current surrounds the islands. Most of the year there is continual cloudiness and rain except for a short relatively dry season from January to March. The average rainfall is about 6,000mm a year and can reach 1,000mm a month in May and June (FAICO,n.d.).The highest mean annual temperature is 27.6°C, the mean minimum is 23.1°C. The sea- level temperature is 25.5°C increasing by 0.4° per 100 meters of elevation. Water temperatures range between 29°C and 30°C and the tidal amplitude is about 2 metres (UNEP/IUCN, 1988).

The climate is strongly influenced by a complex system of ocean currents, but especially by the warm (23.6°C) eastward-flowing North Equatorial Counter Current. At sea, upwellings of cool plankton-rich water are created by the Equatorial Undercurrent striking the wide undersea base of the island. There is a persistent southeasterly wind. The island is periodically affected by the southern oscillation of El Niño (ENSO). Three lesser ocean currents affect the island: the Costa Rican Coastal Current, water from the southern Colombian coastal current, and water from the Gulf of Panama (FAICO, n.d.).

## VEGETATION

Cocos Island National Park is the only island in the tropical eastern Pacific with an undisturbed humid tropical forest. Like other oceanic islands, it has a relatively impoverished flora of 235 vascular plants, 70 (nearly 30%) being endemic. The vegetation is dense and exuberant due to the heavy rainfall and the condensation which is intensified by the rugged relief. There are three main plant associations on

the island: a coastal, mostly herbaceous plain and piedmont to 50m, with some marshlands, then undisturbed very moist montane forest from 100-500m and above 500m, cloud forest. In addition to vascular plants there are 74 species of ferns (5 endemic), 56 species of moss, 106 liverworts, at least 85 fungi and 99 lichens (3 endemic). The species are predominantly neotropical (FAICO, n.d.).

On the coastal strip there are three distinct plant associations: on sand - *Ipomea pescaprae*, *Hibiscus tillices*, *Caesalpinea bonduc*, *Erythrina fusca* and coconut *Cocos nucifera* with undergrowth of Rubiaceae and Solanaceae (Cortés 1986); in salt-sprayed marshes - *Annona grabra*, button mangrove *Conocarpus erectus* and *Caccipourea* spp. with the fern *Acrosticum aureum*; and on rocks - *Clusia rosea*, *Euterpe precatoria* var. *longevaginata*, the endemic *Cecropia pittieri* and *Cornutia grandiflora*, with *Ipomea acuminata* on cliffs, and *Clusia rosea* on islets, with the endemic grass *Chloris paniculata*. In humid lowlands are small forests of endemic tree ferns *Cyathea alphonsiana*, *C. notabilis* and *C. nesiotica*. Riparian associations include *Ardisia compressa*, the sedges *Calyptrocarya glomerulata* and *Fimbristylis dichotoma* and the grasses *Digitaria setigera* and *Paspalum virgatum*. In the rainforest the trees are over 30 meters high, dominated by the endemic *Saccoglottis holdridgei*, avocado *Ocotea insularis* and *Cecropia pittieri*, with an undergrowth of Melastomaceae and Rubiaceae. In the dense undergrowth the sedge *Hypolirium amplum* is dominant, with abundant tree ferns such as *Alophila armata*; also mosses, liverworts and epiphytes including an endemic orchid and a bromeliad *Epidendrum insularum* and *Guzmania crateriflora* (FAICO, n.d.). An endemic palm, *Rooseveltia frankliniana*, is abundant. Above 500 m, in the tropical cloud forest, *Melastoma* species are common (Cortés 1986). Some flowers such as *Mucuna urens*, are adapted to pollination by an endemic finch instead of by a bat as on the mainland (Government of Costa Rica, 1996).

## FAUNA

The seas and coasts of the east central Pacific islands are one of the world's most biologically diverse provinces for their size. The high degree of ecological interconnection and oceanographic complexity, are due mainly to the convergence of major marine currents which affect the migrations, movements and distribution of the many migratory marine species meeting in the island's waters, particularly for feeding and reproduction. The geographic isolation has also accelerated the processes of natural selection and evolution on land. The area is therefore a key locale for maintaining marine resources and species, and is important for the study of animal behaviour, reproduction and population dynamics.

There is low diversity of terrestrial fauna. The five terrestrial mammals are introduced: wild boar *Sus scrofa*, white-tailed deer *Odocoileus virginianus*, goats, cats and rats. But because of the topography and the amount of rain, the island's fresh water environments contain an exceptional diversity of organisms and 7 species of freshwater fish. 100 species of birds have been recorded, 13 being resident, with the remainder either regular or occasional visitors. Of the resident species, 7 are land birds. The island is one of the 27 areas of Central American / Caribbean avian endemism with three limited-range species: Cocos Island cuckoo *Coccyzus ferrugineus* (VU), Cocos Island flycatcher *Nesotriccus ridgwayi* (VU), Cocos Island finch *Pinaroloxias inornata* (VU) plus a species endemic to both Cocos and the Galapagos Islands, golden warbler *Dendroica petechia* (Wege *et al.*, 1995; FAICO, n.d.). Waved albatross *Phoebastria irrorata* (CR), Wilson's storm-petrel *Oceanites oceanicus*, red-footed booby *Sula sula* and brown booby *S. leucogaster*, great frigate bird *Fregata minor*, white tern *Gygis alba*, and common noddy *Anous stolidus* form breeding colonies on the surrounding islets and rocks.

There are five reptiles, two being endemic: anolis lizard *Norops townsendii* and gecko *Sphaerodactylus pacificus*, but no amphibians. Of the 362 species of insects so far recorded 65 (18%) are endemic. The most diverse groups are the *Lepidoptera* (with one endemic butterfly) and *Formicidae* (17 species of ant). There are also 3 spiders, centipedes, millipedes, isopods and miriapods. The endemic spider *Wendilgarda galapagensis*, shows a pattern of habitat selection, web design and building behaviour not seen in other species of the genus on the mainland (Cortés, 1986; Eberhard, 1989).

The diversity of marine fauna is less than that off the Central American mainland, possibly due to the island's past isolation (IUCN, 1988). Marine mammals include blue whale *Balaenoptera musculus* (EN), humpback whale *Megaptera novaeangliae*, Cuvier's beaked whale *Ziphius cavirostris*, killer whale *Orcinus orca*, bottle-nosed dolphin *Tursiops truncatus*, and Californian sea lion *Zalophus*

*californianus*. There are hawksbill *Eretmochelys imbricata* (CR), green *Chelonia mydas* (EN) and olive ridley turtles *Lepidochelys olivacea* (VU) in the surrounding waters and occasionally using the beaches. The fish fauna is exceptionally rich in standing crop and moderately diverse: more than 260 species of fish species having been recorded. It includes the rare redlipped batfish *Ogocephalus darwini*. Vast aggregations of scalloped hammerhead sharks *Sphyrna lewini* (EN), white-tip reef shark *Triaenodon obesus*, and fish pass close to the island; whale shark *Rhynchodon typus* (VU), giant manta ray *Manta birostris* and pelagic sting ray *Pteroplatytrygon violacea* are abundant, also sharks - silky *Carcharhinus falciformis*, bigeye thresher *Alopias superciliosus* (VU) and lemon *Negaprion brevirostris*, and large pelagic fishes - broadbill swordfish *Xiphias gladius*, striped marlin *Makaira audax*, blue marlin *M. nigricans*, sailfish *Istiophorus platypterus* and shortbill spearfish *Tetrapturus angustirostris*. The fringing reefs are some of the richest and more extensive in the east Pacific (Guzmán & Cortés 1992) with 57 crustacean and 500 mollusc species (35 endemic) and 32 species of corals, the most abundant being *Porites lobata*, *P.californica*. Living *Porites* is mixed with *Porites* rubble. *Pocillopora robusta* occurs in small scattered patches at depths of one to eight metres. *Tubastrea aurea* is common at various depths, particularly at Isla Manuelita.

## CONSERVATION VALUE

Isla del Coco is the only major oceanic island of the eastern tropical Pacific with wet rainforest and, above 500m, a cloud forest. It also possesses the most diverse and extensive coral reef in the east Pacific and rich surrounding waters with unusually large numbers of pelagic sharks. It is a distribution centre for the larvae of marine species and it lies within a Conservation International-designated Conservation Hotspot, is a BirdLife-designated Endemic Bird Area and a Ramsar wetland.

## CULTURAL HERITAGE

The Isla del Coco has been known to mariners and cartographers since the first half of the sixteenth century though its position was vaguely indicated and was only found by experienced sailors. Fishermen, pirates, commercial sailors, and scientific expeditions visited the island for fresh water and shelter. Since 1869 it has been Costa Rica's. Between 1872 and 1874 the Government ran a prison on the island. An expedition in 1898 to reconsider this led by the naturalists Anastasio Alfaro and Henri Pittier, turned into a scientific mission. They suggested the project be dropped in favour of a protected area: the first time a recommendation to conserve the islands was made. Numerous pirate ships visited the island which led to a belief in the existence of hidden treasure, for which during, the first half of the 20th century, several unsuccessful expeditions were mounted.

## LOCAL HUMAN POPULATION

The Government of Costa Rica took official possession of Isla del Coco in 1869. After two unsuccessful attempts to colonize it, the island remained undisturbed, the largest tropical island to do so though fishermen, naturalists and divers visit it regularly, and apart from a few rangers it is uninhabited. There are two houses for the Park staff, one each in Bahía Wafer and Bahía Chatham. The greatest current impacts on the site are from tourism and the fishing industry, with marine tourism now the major legal economic activity.

## VISITORS AND VISITOR FACILITIES

The island receives about 1,100 visitors annually, mainly between March and May. It can be reached by commercial launch or small boats from the port of Puntarenas in approximately 36 hours. Easy anchorage is found in Bahía Wafer and Bahía Chatham, where there are also dining huts and rest areas, sanitary services and showers. There are no other facilities, nor accommodation, and camping is not allowed. The diving is world class but difficult, with large swells, fast currents and strong surges. Divers must be licensed. Fishing vessels are strictly prohibited near the island.

## SCIENTIFIC RESEARCH AND FACILITIES

The island is swept by the Northern Equatorial Counter Current and the myriad interactions between it and the surrounding marine ecosystem make the area an ideal laboratory for the study of biological processes. It is a major site for protecting large pelagic species, especially sharks, and much research could be done on the life cycles of marine species and the interrelations of the climate with the currents, birds and nutrients (IUCN, 2001). Researches have included studies of landbirds, the terrestrial flora, the biogeographic affinities of insects, and the impacts of introduced pigs and tourism. Benthic biodiversity assessments, seafloor mapping, electronic tagging and remote sensing technologies have been developed by the Tagging of Pacific Pelagics project. They are used to obtain

information about the conditions and the distribution of organisms in the corridor between the mainland, Cocos Island and the Galapagos as a basis for sound management of the marine ecosystem. There are no facilities for researchers except for the rangers' lodges. A full list of references is given in the official nomination (Government of Costa Rica, 1996).

## MANAGEMENT

The Park is managed by the National Park Service within the Ministry of Environment and Energy. A General Management Plan for the site was approved in 1995 by Executive Decree No.24205 - MIRENEM. This provided for the planning of public use of the island including tourism control, protection of sensitive sites, elimination of alien species, promotion of scientific research, and the review of relevant legislation. The site has absolute protection; extraction of marine resources, as well as any commercial, industrial or agricultural activities are banned. There is a buffer zone, which extends 22.2 km offshore. The Friends of Cocos Island Foundation, (FAICO) created in 1994, is an independent, multi-sectorial organization committed to the long-term management, protection and conservation of the island's National Marine Park. It focuses on developing projects and obtaining funds.

In late 2002, partly in response to the movement of shark fishermen from the Galapagos to the Cocos Islands, a Marine Conservation And Sustainable Development Corridor (MARIVA) was launched between the Galapagos and the Cocos Islands 800 km north, by the governments of Ecuador, Costa Rica, Columbia and Panama, with Conservation International, UNEP, IUCN, Ramsar, UNESCO-WHC, the Charles Darwin Foundation, the Inter-American Tropical Tuna Commission and Tagging of Pacific Pelagics.

## MANAGEMENT CONSTRAINTS

The area is vulnerable to degradation from human activities and from El Niño. Introduced mammals, especially the wild pigs and rats, damage seedlings and the roots of mature trees. With erosion, this is degrading the forest. Cultivated plants such as coffee *Coffea arabica* and guava *Psidium guajava* were also introduced by settlers, and coffee has now invaded the forest understorey in several places. Littering and other pollution caused by passing vessels and yachts is common. The El Niño of 1982/1983 seriously affected the coral reefs: about 90% died, but not the animals preying on it, such as crown-of-thorns starfish *Acanthaster planci*, sea urchins *Diadema mexicanum*, *Eucidaris thouarsii*, and the coralivorous fish *Arothron meleagris*. Although the coral shows signs of recovery, bioerosion by sea urchins was so extreme in some places such as Bahía Chatham the reef foundations were severely weakened. An increase in number of divers increases the probability of this degradation. Illegal fishing within the protected area is seriously compromising its fauna and ecosystems, as well as the island's capacity for maintaining its reproduction levels and productivity. This is done by sport fishing and hunting, extracting lobsters and the seabass *Serranus cabrilla* which are endemic to the island, and above all, by the shark fin trade using unselective and destructive commercial fishing techniques such as multiple hooks and long lines which kill turtles and large fish indiscriminately.

## STAFF

In 1997 the Cocos Island National Park, had a staff of 14 people, including a director, a sub-director, three administrative staff, and nine rangers.

## BUDGET

From 1995-1997 funds totalling US\$1,040,000 were available. The estimated annual budget for fixed expenses and an investment plan from 1997 onward was US\$250,000. FAICO has executed projects financed by the Japanese Cooperation Agency (2000 to 2005), AVINA Foundation (2003 to 2005), UNESCO and Conservation International (2006 to 2008), S.C. Johnson (2007), GEF/PNUD (2007 to 2008) and the French Global Environment Fund (2005 to 2008).

## LOCAL ADDRESS

National Park Service, Ministerio del Ambiente y Energía de Costa Rica, Apartado 10104, San José, Costa Rica.

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The principal source for the above information was the original nomination for World Heritage status.

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