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IGUAÇU NATIONAL PARK BRAZIL

Iguaçu Park shares with the adjacent Iguazú National Park in Argentina one of the world's largest and most impressive waterfalls, 70 metres high and 2,700 metres wide, within a remnant of highly endangered Atlantic forest. It is an island of wilderness in the wide Paraná river valley, most of which has been deforested for agriculture. It shelters rare and endangered species of flora and fauna, such as the giant otter and giant ant-eater. Clouds of spray round the waterfall produce lush vegetation.

Threats to the site: The disputed closure of an old road bisecting the park and proposed dam construction upstream. The sites' scenery and biodiversity are being degraded and no rehabilitation is being undertaken.

COUNTRY

Brazil

NAME

Iguaçu National Park

NATURAL WORLD HERITAGE SITE

1986: Inscribed on the World Heritage List under Natural Criteria vii and x.

1999-2001: Listed as a World Heritage site in Danger because of the re-opened illegal road.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

IUCN MANAGEMENT CATEGORY

II National Park

BIOGEOGRAPHICAL PROVINCE

Brazilian Rain Forest (8.08.02).

GEOGRAPHICAL LOCATION

In southern Brazil, in far southwestern Paraná State. Bordered across Rio Iguaçu to the south by Iguazú National Park in Argentina. The Paraguayan border is near its west end where three towns lie close together: the city of Foz do Iguaçu in Brazil, Ciudad del Este across the Rio Paraná in Paraguay, and Puerto Iguazu in Argentina. The recently built Itaipu hydroelectric dam is twenty kilometres upstream of Foz do Iguaçu on the Paraná river. Located between 25° 00' to 25° 45'S and 53° 43' to 54° 30'W.

DATES AND HISTORY OF ESTABLISHMENT

1916: The first measures taken to protect the Iguaçu Falls;

1939: The National Park established by Federal Decree 1035 amended and extended by Decrees 6587 of 1944 and 86676 of 1981, based on the Forestry Code Law 4471 of 1965 and the National Park Creation & Regulation Decree 84017, 1979.

1999-2002: Listed as endangered by the re-opening of an illegal road across the Park.

LAND TENURE

State-owned. Administered by the Chico Mendes Institute, a semi-autonomous body of the Ministry of the Environment.

AREA

170,086 ha. The contiguous Iguazú National Park in Argentina is 49,200 ha and the adjacent National Reserve in Argentina is 6,300 ha.

ALTITUDE

150m to 740m.

PHYSICAL FEATURES

The main feature is the huge Iguazu Falls in the far southwest of the Park, 18 km above the confluence of the Rio Paraná and the Rio Iguazu where the river, which rises 500 km to the east, cascades spectacularly over the edge of the southern Brazilian plateau, a lava tableland which covers a million square kilometres of Brazil, Argentina, Paraguay and Uruguay. Rio Iguazu borders the southern edge of the Park for 50 km in forested generally flat land of red nutrient-poor semi-lateritic soils. The rocks are mainly Mesozoic basalt lavas interbedded with sandstones into which the river below the falls has cut the 80m wide fault-line canyon, *el Garganto do Diablo*. The river is about 1,200m wide at the falls, which drop 72m over a 2,700m ledge flanked by islands, islets and rocks in some 150-300 cataracts, depending on the rate of flow which varies seasonally between 500 and 6,000 cm./sec. Of the total length, some 800m are on the Brazilian side of the border. The rest of the Park is a rolling plateau which holds the valley of a major local tributary, Rio Floreano, which drains south into the Iguazu River. The Salto Caixas hydroelectricity dam only 20 km from the east end of the Park, and four others upstream, create heavy siltation, rapid runoff and high diurnal temperature variations, and marked variations in the water flow, especially at weekends, which affect the scenic and probably the biological quality of the site (UNESCO, 2008).

CLIMATE

The climate is humid subtropical with over 1,700mm of annual rainfall and no dry season. The mist cloud creates a super-humid microclimate round the falls. The relative humidity is between 80-90% and fog forms round the falls in winter and at night. The river flow is highest in the wettest season between January and March. Mean temperatures are 15°C in winter and 25°C in summer with an annual mean of 21°C which falls to 19°C above about 500m.

VEGETATION

Although 50 times smaller than the Brazilian Amazon, the Brazilian Atlantic forest harbours more than 20,000 plant species, 40% of them found nowhere else on Earth. This Park preserves one of the most complete remaining patches of the highly endangered *Paranense* forest, a peninsula of southwestern interior Atlantic rainforest in the Paraná river valley which has been largely deforested elsewhere for intensive agriculture. It is an extremely biologically diverse area with some 2,000 vascular plant species. The three main plant associations are 1) humid subtropical rain forest dominated by 30-40 meter high trees which covers about 90% of the park, rich in tree ferns *Cyatheaceae*, lianas and epiphytes, with species of *Ilex*, *Podocarpus*, *Aspidosperma*, *Cedrela* and *Philodendron*; 2), a lush growth of mist forest beside the Falls; 3) humid subtropical deciduous forest in the upper part of the Park, with a small area in the northeast of the umbrella-shaped Paraná pine *Araucaria angustifolia* (CR), here at its western limit, with two palms, the assai palm *Euterpe edulis*, of which the heart is eaten, and wild coconut palm *Cocos romanzoffiana*, also *imbuva* or Brazilian walnut *Phoebe porosa*.

FAUNA

The extremely rich fauna is still not thoroughly studied. It includes at least 45 mammals, 350 birds, 41 snakes, 8 lizards, 12 amphibian 18 fish and 257 butterfly species (H2FOZ, n.d.). The Parks together have 83 species endemic to the Atlantic forest which is 40% of the total endemics in the biome (Straube & Urban-Filho, 2005). The Park's fauna includes giant anteater *Myrmecophaga tridactyla* (VU), bush dog *Speothos venaticus*, giant otter *Pteronura brasiliensis* (EN), long-tailed otter *Lontra longicaudis*, coatimundi *Nasua nasua*, ocelot *Leopardus pardalis*, margay *L. wiedii*, jaguar *Panthera onca*, puma *Puma concolor*, lowland tapir *Tapirus terrestris* (VU) and dwarf brocket deer *Mazama rufina* (VU) (Jorge Padua *et al.*, 1974). There have been reports of black-and-gold howler monkey *Alouatta caraya*, but it is not noted in the management plan; and of capybara *Hydrochoerus hydrochaeris*. Also recorded are lance-headed viper *Bothrops alternata*, a large population of broad-nosed caiman *Caiman latirostris* and dwarf caiman *Paleosuchus palpebrosus* which nest in the islands. According to Straube & Urban-Filho (2005) also found in the Parks are: little water opossum *Lutreolina crassicaudata*, Ipanema bat *Pygoderma bilabiatum*, spiny rice rat *Abrawayomys ruschii*, Williams' side-necked turtle *Phrynops williamsi*, a rear-fanged colubrid snake *Clelia plumbea* and

Brazilian steppe iguana *Urostrophus vauieri*. The high endemism of the ichthyofauna results from the biogeographical isolation created by the Falls.

Notable bird species include solitary tinamou *Tinamus solitarius*, harpy eagle *Harpia harpyja*, black-fronted curassow *Pipile jacutinga* (EN), purplewinged ground dove *Claravis godefrida* (CR), white-tailed trogon *Trogon viridis*, helmeted woodpecker *Dryocopus galeatus* (VU), whitebearded antshrike *Biatius nigropectus* (VU), russet-winged spadebill *Platyrinchus leucoryphus* (VU) and Sao Paulo tyrannulet *Phylloscartes paulista*. No longer seen on site are the formerly listed glaucous macaw *Anodorhynchus glaucus* (CR), vinaceous-breasted parrot *Amazona vinacea* (CR) and red-spectacled parrot *Amazona pretrei* (VU) (Wege & Long, 1995). Unconfirmed from the site but said by Straube & Urban-Filho (2005) to exist in the Parks are fasciated tiger heron *Tigrosoma fasciatum*, Guiana crested eagle *Morphnus guianensis*, orange-breasted falcon *Falco deiroleucus*, silky-tailed nightjar *Caprimulgus sericocaudatus*, and strange-tailed tyrant flycatcher *Alectrurus risora* (VU). Records for the Argentinian side of the river note even more birds (422 species)

CONSERVATION VALUE

The Park, with Iguazú National Park in Argentina, surrounds one of the world's greatest waterfalls. With Urugua-i Provincial Park in Argentina and Mbaracayu Forest Reserve in Paraguay, the four protected areas form one of the most extensive remaining tracts of the endangered Atlantic rainforest and harbour much of its threatened and endangered fauna. The Park lies within a C.I.-designated Conservation Hotspot, a WWF Global 200 Freshwater Eco-region, and in one of the world's Endemic Bird Areas.

CULTURAL HERITAGE

Before the Spanish and Portuguese invasion in the 1550s, the area belonged to the Guarani people who are now denied use of the Park, though their name of I-guassu ('big water') for the Falls remains. The first European to reach the Falls was the Spaniard Don Alvar Nuñez Cabeza de Vaca in 1541 some ten years before Spanish and Portuguese colonisation began.

LOCAL HUMAN POPULATION

The Park is located in a region of rapid population growth, with three large nearby towns, Foz do Iguaçu in Brazil, Ciudad del Este in Paraguay and Puerto Iguazú in Argentina. The population of Foz do Iguaçu rose from 30,000 at the beginning of the 1960s to over 200,000 in the 1990s. The town is a major tourist destination mainly for people visiting duty free shops across the Paraguayan border in Ciudad del Este (Bailby, 1995). The construction of the Itaipu dam has also changed the economy of the area. Closure of the old Colon road, *Estrada do Colon*, which bisects the Park, obviating a long detour for people living just to the south, has been a constant source of conflict. Elsewhere the Park's borders are cleared up to the boundary for soybean farming, cattle ranches and pine plantations.

VISITORS AND VISITOR FACILITIES

The Falls are part of the third largest tourist destination in Brazil: one recent figure gives over 1.5 million visitors a year to the region (Straube & Urban-Filho, 2005). This probably includes passing visitors to the city of Foz do Iguaçu a few kilometers west, with 160 hotels, mainly serving tourists shopping in Paraguay. In 1994, 970,000 tourists visited the National Park (Bailby, 1995) and in 2004, after a 35% increase in tourism following a drop in the peso, Reuters reported annual visitation of nearly 800,000. Daily visitation of about 2,500 swells to almost 8,000 during Holy Week. About 60% of the visitors are foreigners. Access by the public is limited as the Park is closed to visitors except for guided activities but it is well organised, and very good information is provided by university trained guides who guide 70% of the visitors. There is a large hotel within the Park, a heliport, a visitor centre, a museum, interpretive trails, viewpoints, a prominent elevator from the rim to lower levels, rafting, boat trips up the river, jet-boating in the rapids, helicopter rides across the falls and cliff climbing and rappelling from the top of the gorge or off the footbridge between the two countries downstream from the falls. The area is well served by roads, and is close to an international airport.

SCIENTIFIC RESEARCH AND FACILITIES

Research is under way into otter, giant anteater and harpy eagle and into assessment of the Park's resources in order to assist management but relatively little is known of the biota (IBDF, 1987). In 2008 a study of carnivores, especially jaguar and their habitat was begun, and in 2009, a study of endangered species (UNESCO, 2010). There is accommodation for scientists and a museum with laboratory facilities.

MANAGEMENT

Formerly under the Institute for Forest Development, the property is now managed by the Chico Mendes Institute, a semi-autonomous body of the Environment Ministry. A 1981 Management Plan revised in 1999 now needs extensive revision and was replaced in 2008 (UNESCO, 2008). The Park is zoned 80% Intangible which covers most of the central and eastern section - Primitive (4%) - Extensive use (3%) - Intensive use/Recuperation-Special use/Cultural-Historic (13%). Following the closing by federal authorities of the *Estrada do Colon* road through the middle of the Park, a state and federal government group began studies and a project to promote sustainable income generation and employment for surrounding populations through organic agriculture crafts and ecotourism.

The Parks were not originally created as a transboundary site. In 1996 conservationists from the three nations, co-ordinated by WWF, agreed to a new cross-border strategy. This aimed to create a 300,000-hectare genetic corridor of the remaining fragments of the Atlantic Forest from the Moises Bertoni Scientific Monument and the Mbaracayu Forest Reserve in eastern Paraguay through the Misiones Forest, including the two Iguazu/Iguaçu National Parks and the Argentinian Urugua-i Provincial Reserve (86,000 ha) in a mosaic of nature reserves and private lands. These were to be managed for the conservation of their resources with protected sustainable uses including farming and some logging continuing on much of the land. This is especially critical in Paraguay, where more than 90% of all land is privately held and agricultural expansion has accelerated the highest deforestation rate in South America, although some ecologically sound and economically viable private wildlife refuges have been developed (Villa-Lobos, 1998). In 2002 a mission by the IUCN and the World Heritage Committee recommended transborder cooperation with Iguazú National Park in Argentina bringing together government officials, local community leaders and organizations, legislators and university researchers to develop a management plan for the region (UNESCO, 2002). An exploratory transboundary project was funded in 2006 and the first steps towards coordinated though separate revisions of the two management plans were taken in 2008 although without mechanisms for cooperation between the managements. By 2010 an international Action Plan on joint management, joint management plans and monitoring of the parks had been prepared (UNESCO, 2008b; 2010).

MANAGEMENT CONSTRAINTS

In May 1997 some 800 people invaded the Park to illegally reopen an old colonial road the *Estrada do Colon* between two local towns which passed through 18 km of the Park until it was closed in 1986. The re-opened road would have made the Park more accessible for hunting, fishing and tree felling and the conservation authorities were unable to stop its construction because of political pressures. No new management plan to deal with the threats to the Park had been drawn up since the issues were first raised (UNESCO, 1997). The Park was placed on the Danger List for this reason between 1999 and 2001. In June 2001 the federal authorities closed the road, set up a police post at the entrance, scarified the whole length and planted 25,000 seedlings to replace the cleared vegetation (UNESCO, 2002). However, in September 2003, a 300-strong group again crashed the barriers and destroyed the IBAMA guard post, opening the road for local use (WWF, 2003). By 2005 relations had improved between the Park authorities and local people, though tensions remain and the local communities have appealed to the Supreme Court. By 2008 the reforestation was beginning to succeed but the possible re-opening of the road remains a threat (UNESCO, 2005; 2008b; 2010).

The Park lies in an area of intense agricultural development and increasing construction close to several towns and faces several other threats. Tourist use is extensive, encouraged by the government in order to increase park system revenues, and proposals have been made to allow greater development of facilities. These are largely concentrated around the falls where infrastructure such as the remains of an abandoned walkway (now fallen) and cliff-edge commercial buildings, and activities such as jet-boating the rapids and helicopter flights which disturb the wildlife also detract from the view. Scenic and biological values have been degraded by the marked variations in the water flow of the river and falls, especially at week-ends from the Salto Caixas dam on the Iguaçu River and four others upstream in Brazil which create heavy siltation, rapid runoff and high diurnal temperature variations, and the marked variations in water flow. In 2005 plans drawn up for the development of the Baixo hydroelectric dam on the Iguaçu 500m from the eastern end of the Park were resuscitated in 2008 (UNESCO, 2005; 2008b). There has been illegal logging and agricultural development in a privately owned key biological corridor between the parks known as the Argentine Peninsula Bottleneck, which could begin to limit the genetic flows between the populations of the parks. The Park is subject to invasion by domestic stock, poaching for hearts of palm and deer, paca and agouti for bushmeat, roadkills especially along the national highways which cross both Park and Reserve, and forest fires. To manage these problems regular monitoring, research and education of the local

people about conservation are needed (UNESCO, 2005). There are too few forest rangers to effectively police so large and heavily visited an area (Bailby, 1995). This has been complicated by a lack of transboundary cooperation, although that is improving.

STAFF

In 1981 there were under the Director, ten administrative staff, 15 park guards and 17 general workers. In 2007 staffing is provided by technical staff from the Chico Mendes Institute including 5 environmental education specialists; Green Rangers from Paraná State Police Force; and outsourced administrative, maintenance, and security personnel. A contract with the National Forest Police has lapsed, undercutting efforts to protect the Property' Management programs include resource protection, public use, environmental education, sustainable development in the buffer zone, and research (UNESCO, 2008).

BUDGET

This was Cr\$10,000,000 (about \$US600,000) in 1981, subsequently dropping to about Cr\$5.5 million (US\$327,000) per annum (undated information). In 2000, IBAMA allocated US\$60,000 to close the *Estrada do Colon* and restore the area; and the government has allocated US\$50,000 for the planning of fire fighting. Revenue from entry fees and concessions is high.

LOCAL ADDRESS

The Administrator, Iguazu National Park, 85.890 Foz do Iguazu, Paraná.

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