
WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

JAÚ NATIONAL PARK (BRAZIL)

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (8 references).
- ii) **Additional literature consulted:** Bibby *et. al.*, 1992. **Putting Biodiversity on the Map. Priority Areas for Global Conservation.** Cambridge, UK; Biodiversity Support Program, Conservation International *et. al.*, 1995. **A Regional Analysis of Geographic Priorities for Biodiversity Conservation in Latin America and the Caribbean.** Washington, DC; Davis, S. D. *et. al.* **Centres of Plant Diversity.** Vol. 3. IUCN; Thorsell, J. and T. Sigaty, 1997. **A global overview of forest protected areas on the World Heritage List (Draft).** IUCN; Gillet, H. *et. al.*, 1998. **A global overview of protected areas on the World Heritage List of particular importance for biodiversity.** UNESCO/WCMC/IUCN; Rylands, A. B., 1991. **The status of conservation areas in the Brazilian Amazon.** WWF, Washington DC; Rojas, M. and C. Castaño, 1990. **Áreas protegidas de la cuenca del Amazonas.** Bogotá, Colombia; Castaño, C., 1993. **Situación general de la conservación de la biodiversidad en la región Amazónica: Evaluación de las áreas protegidas propuestas y estrategias.** FAO/CEE/IUCN, Ecuador; Henrique Borges, S and Carvalhes, A., 2000. Bird species of black water inundation forest in the Jaú National Park: their contribution to regional species richness. **In Biodiversity and Conservation**, Vol. 9, No. 2, pp 201-214.
- iii) **Consultations:** 5 external reviewers, local park staff; staff of Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) - Brasília and IBAMA-Manaus; Vitória Amazônica Foundation; Municipal Secretary for Environment and Development/ Manaus; National Foundation of Indigenous Communities; National Institute for Environmental Research for Amazonia; University of the Amazon. Representatives of local communities.
- iv) **Field visit:** Pedro Rosabal. February, 2000.

2. SUMMARY OF NATURAL VALUES

The Jaú National Park (JNP), with an area of 2,272,000ha, is the largest National Park in the Amazon Basin. It is located approximately 200km north-west of the city of Manaus, within the municipalities of Barcelos and Novo Airao in Amazonas State (see Map 1). Amazonia is known as one of the most biodiversity rich regions on the planet. It is the largest drainage basin of the world, measuring 6,300,000km², and home to the largest tropical forest, extending some 5,000,000 km².

The Amazon River can be divided, from the limnological point of view, into three types of systems characterised by water colour. One of them is the blackwater system, the headwaters of which are located primarily in the crystalline soils of the Guyana Shield. Its dark colour results from organic acids liberated into the water through the decomposition of organic matter and the lack of terrestrial sediments. JNP includes a significant proportion of the blackwater drainage system and associated flora and fauna. The rivers of JNP provide a landscape of white-sand beaches during the dry season and flooded forest during the wet season, as well as secondary stream beds of different sizes, channels, lakes, *paraná*s (a branch of the river separated from the main channel by a strip of non-inundated land) and an important fluvial phenomenon - the *ria lake*, which is typical of all large rivers in the Amazon region. Of important aesthetic value during the dry seasons is the nine-tier waterfall of the Carabinani River where the river drops gradually along an 800m trajectory.

The forest cover of JNP is linked to the extensive and continuous tropical rainforests of the Amazon Central Plain. It includes three vegetation types (RadamBrasil, 1978): (a) dense tropical forest, located primarily on *terra firme*, thereby free from inundation in the flooding season. This forest is generally very stratified,

including a stratum of large emergent species than can reach more than 30m, and presents an average of 180 plant species per hectare (Ferreira *et. al.*, 1996); (b) open tropical forest, characterised by an arboreal stratum with individuals of low height and thin trunks, with many epiphytes of the families Bromeliaceae and Orquidiaceae, and containing an average of 108 plant species per hectare (Ferreira *et. al.*, 1996). Where these forests grow on inundated soils they are known as *Igapó* forests; and (c) Campinarana, a vegetation mosaic restricted to the Negro River watershed, occupying primarily upland regions and drained by tabular watercourses.

JNP protects an impressive range of fauna, with many species associated with blackwater river systems. There is a high diversity of vertebrates with 120 species of mammals, 441 birds, 15 reptiles and 320 fishes. The number of birds reported for JNP is likely to increase with research as the avifauna of this area is poorly known. It has been indicated as a priority area for ornithological studies (Oren and Albuquerque, 1991). Numerous species of global conservation concern live within JNP, including jaguar, giant otter, Amazonian Manatee, South American River Turtle and black caiman. The importance of JNP for the Amazonian fauna is reflected by the fact that it contains approximately 60% of the species of fishes reported to exist in the Negro River watershed, and also 60% of the birds recorded from the Central Amazon (Borges *et al.*, 1996). JNP is also a key reference area for the study of the Amazonian Manatee.

3. COMPARISON WITH OTHER AREAS

The nominated site is located within Udvardy's Amazonian Biogeographic Province. There are other World Heritage areas which contain parts of the Amazonian Province (namely Sangay National Park in Ecuador and Manú National Park in Peru); however, JNP is the only one that contains this Province exclusively.

The Manú National Park (Peru) is mainly located in the Yungas Biogeographical Province. It encompasses altitudes ranging from 240 to 4,000 m, with a mosaic of tropical forests, mountainous landscapes and high plains. However, Manú conserves only part of the broad diversity of Amazonian landscapes. The Jaú National Park offers the possibility of preserving a large area of tropical forest on the Central Amazonian Plain. The Park is also unique in protecting extensive Amazonian forests within a blackwater ecosystem, a system that is still poorly known from the scientific point of view.

JNP is also important from the hydrological point of view as it covers the entire basin of Jaú River, considered as the best example of a blackwater river ecosystem (Pinheiro, 1999). The site includes the unique flora associated with blackwater flooded forests. The dry-land habitats of JNP contain large areas of high forests and an open vegetation called campinas and campinaranas on white-sand soils.

The Central Suriname Nature Reserve, that has been also nominated for World Heritage listing in 2000, is located in a very different area of the Amazon region (on the Pre-Cambrian Guyana Shield). In these areas clear water rivers predominate. Despite the fact that aerial photographs suggest that JNP and the Suriname reserve are similar, the floristic composition is very different.

There are a number of protected areas covering blackwater ecosystems in the Brazilian Amazon - the Pico da Neblina Transfrontier National Park (2,200,000 ha); Jaú National Park (2,272,000), the Anavuhanas Ecological Station (350,018 ha), the Uatumã Biological Reserve (560,000 ha), Serra do Aracá State Park (1,818,700 ha), and Rio Negro State Park (436,042 ha). The most significant of these, however, is Jaú in terms of its size, the large extension of blackwater flooded forest, and its location spanning two important Biogeographical Provinces: the central lowlands of Amazonia and the Guyana Shield. The Serra do Aracá and Pico da Neblina are mountain protected areas, mainly associated with the Guyana Shield.

As mentioned, the only other World Heritage Site which includes at least part of the Amazon lowland ecosystems is Manú National Park in Peru, but it is only representative of whitewater river ecosystems of the upper Madre de Dios basin. Otherwise there are no such sites in the Amazon lowlands and certainly none which include the blackwater ecosystems, which are highly distinct in terms of their fauna, flora, limnology, and geology.

4. INTEGRITY

4.1 Boundaries

JNP's initial point is the confluence of the Jaú and Negro rivers and, from this point onward, it extends along the right margin of the Jaú River until the mouth of the Carabinani River. It encompasses the hydrographic basin of the Jaú River. According to the Brazilian Law for Protected Areas it has been established with a 10km buffer zone all around the National Park. The boundaries are adequate including a large area that is sufficient to maintain ecological processes occurring in the Jaú River watershed.

Park boundaries and geography favour protection of natural resources, such that only two monitoring posts are necessary to administer and control the entire area of the Park. IBAMA is the Federal Agency responsible for the management of the site. JNP has a permanent post at the mouth of the Jaú River, where it is possible to control all boats entering the Jaú and Carabinani Rivers. Although the monitoring routine has already been put into effect, equipment and training of Park employees are still insufficient for meeting identified needs. The second post, planned for the mouth of the Unini River, will be the most difficult to implement since part of the river lies outside official park boundaries, and the river is mostly used by commercial fishermen. The installation of this post is planned for this year, according to the Management Plan (see below).

4.2 Management

JNP is one of the few conservation units in the Brazilian Amazon with a management plan that is both complete and in the implementation phase. The management plan was completed in 1997 by the Vitória Amazônica Foundation after extensive consultation between IBAMA, the State government, research institutions and individuals from the extractive and tourism industries. Park planning benefited from the contribution of nearly 60 researchers of distinct areas of expertise, representing 13 different institutions.

The management plan for JNP is a comprehensive document that includes detailed information on the natural and social-cultural values of the Park, thematic maps, and the zoning of the Park. A management regime is proposed for each zone. Nine management programmes are proposed for the Park including operations and control, public use, research, environmental management and restoration, alternative economic options, and environmental education. A detailed workplan for implementation and budget is also included.

One of the objectives of the management plan is to integrate local people with conservation activities. Local communities (175 families) live along the main channel of the Unini River (112 families), with a small population on the Jaú River (56 families) and only 7 families on the Carabinani River (FVA, 1998). No indigenous residents live within the Park boundaries. Local people carry out traditional ways of life, making a living from the exploitation of traditional products such as bitter manioc cultivation, and from hunting and fishing (fishes and turtles). There are no major impacts associated with the activities of local people, which are very localised and based on sustainable practices. It is important to note that local people are now tending to leave the park looking for better schooling and medical facilities that have been developed outside the Park.

Management activities planned to integrate local residents with conservation initiatives within JNP include periodic meetings with Park residents to disseminate planning actions, training for professionals working on environmental education and research on economic valuation of natural resources. This programme includes the area of influence of JNP in Novo Airao. During the field mission it was possible to verify the high level of commitment from local people toward conservation of the site.

JNP has a personnel consisting of 27 people, four of them working for IBAMA (the head of the conservation unit and three rangers) and 23 working for Vitória Amazônica Foundation (including five researchers, two educators; and two technical staff responsible for the analysis and implementation of alternative economic activities). In addition there are 26 volunteer environmental protection agents from local communities. They use small radio stations to inform the authorities of IBAMA and Park staff of any intruders or problems detected, thus providing an active support to patrol activities. The management plan considers the need to increase the number of staff working in the Park although the number of staff today has proven to be sufficient to enforce conservation and control activities.

Between 1993 and 1998, IBAMA invested around R\$1,400 million (approximately US\$780,000) in JNP, of which R\$378,000 (US\$211,000) were spent on the elaboration of the management plan for the Park. It has been estimated that from 1992 to 1997, FVA channelled around R\$1,600 million (US\$894,000) into the preparation of the plan. Not included in this figure are salaries of researchers and expenses incurred by collaborating organisations. The primary sources of funding were: IBAMA through its National Programme for the Environment (PNMA-IBAMA),

World Wildlife Fund (WWF), the European Union (EU), the W. Alton Jones Foundation and the Government of Austria. Available funding for the PP-G7 amounts close to US\$47 million, with just a portion of this total (close to US\$3.8 million) allocated to the Phase 1 for implementing the management plan.

4.3 Threats

In the region surrounding JNP, there are no development projects in effect or foreseen in the future, such as the construction of hydroelectric dams, gas transport lines, power lines or highways.

In the JNP, three natural processes that cause alterations to the environment occur: blow downs, changes in river flood dynamics and natural burns in areas of open vegetation. However, all of these events are part of the natural dynamic of Amazonian ecosystems and particularly hold important implications for the successional dynamics of the forest.

Activities conflicting with conservation of the area are primarily the commercial and ornamental fishing activities, and the hunting of chelonians. These activities occur primarily in the rivers surrounding the Park, such as the Unini and no impact to the populations of these species within the JNP has been reported. The Park Management Plan outlines extension activities which seek to conserve natural resources and educate the population living within the park and in adjacent areas in order to reduce the pressure over the Park's resources. The primary steps described to ameliorate these conflicting activities have already been carried out. These include the routine monitoring of the mouth of the Jaú and other areas, the training of 26 volunteer environmental agents to assist in these activities, and environmental campaigns over the radio to disseminate the limits and objectives of the JNP.

Ecotourism in the JNP is still limited; only in the last year, with the completion of the Management Plan was the Park opened for tourists. In 1998, 850 individuals visited the Park, the majority of these foreigners. These visits seek primarily the waterfalls of the Carabinani and the extensive beaches of the Negro River. This activity does not impact on the Park's natural values.

5. ADDITIONAL COMMENTS

The Ministry of the Environment of Brazil (MMA) has been working on an innovative new project called "Ecological Corridors", the purpose of which is to support conservation projects and help regulate the use of natural resources. This project is part of the Pilot Programme for the Protection of Brazilian Tropical Forests (PP-G7), in which various public organisations, such as the Ministry for the Environment, IBAMA, the National Indian Foundation (FUNAI) and state environmental institutions, are participating.

As mentioned before, the government of Brazil, through the Ministry of the Environment and IBAMA, is working on the development of a large biological corridor in Central Amazon which includes JNP and other 6 protected areas. Three reviewers suggested the desirability of including in a World Heritage site two of these areas, Mamirauá and Amanã, both of them designated as State Sustainable Development Reserves (close to Category VI, IUCN 1994). This issue was discussed during the evaluation mission in a meeting organised in the Institute for Environmental Protection for the Amazon Basin, Manaus. All participants agreed that it would be desirable to have a World Heritage site covering Jaú, Mamirauá and Amanã. However, they were also concerned at the implications of World Heritage status for areas like Mamirauá and Amanã where there is much higher human occupation including indigenous peoples groups. It was stressed that there would need to be a process of consultation with these local communities and indigenous peoples before a nomination for World Heritage listing was prepared. It was recommended that the best option would be to proceed only with the nomination of Jaú National Park and, if inscribed on the World Heritage list, this may provide a framework for future consultation for a subsequent nomination including Mamirauá and Amanã State Sustainable Development Reserves.

JNP also contains important cultural values that are relics of past human occupation of the Amazon region. A recent survey identified 17 archaeological sites at the mouth of the Negro River, with collected material as yet undated, suggesting that the area may have been a passageway between the Solimoes and Negro watersheds by ethnic groups present in these two regions. Numerous stone carvings are found on the river's edge, reinforcing the potential for archaeological research. Detailed studies of these sites could help to explain the history of human occupation of the lower Negro River region (FVA, 1997). The city of Airao, founded near the end of the XVII Century, is located in the buffer zone of JNP and represents the first Portuguese settlement of the Negro River watershed. Nowadays, the

Instituto do Patrimônio Histórico Brasileiro (IPHAN) is in process of confirming the merit of the Airao ruins (abandoned in the 1950's) for official preservation activities (FVA, 1997).

6. APPLICATION OF WORLD HERITAGE CRITERIA

JNP has been identified as a significant site in a number of regional and global assessments. It is considered as a hot spot for biodiversity conservation in the Amazon basin (CI, 1991), as well as a site of high biodiversity value for conserving tropical forest biodiversity (CIFOR/UNESCO, 1998). IUCN also identified JNP as a forest protected area that merited World Heritage nomination (Thorsell, J. & Sigaty, T., 1997). This site has been nominated for inscription on the World Heritage List on the basis of all four natural criteria:

Criterion (i): Outstanding Example of Major Stages of Earth's Geological Evolution

JNP occupies an intermediate geographical position between the oldest and the most recent sedimentary formations of the Amazon Basin. Nearly 65% of the site forms part of the Solimoes Formation, an extensive sedimentary deposit, from the Palaeocene and Pleistocene. A unique geological formation of the Amazon basin is found here: the Prosperança formation, composed of uplands in a tabular terrain, which represents a barrier against the drainage of pluvial waters, is found here. Prosperança and Trombetas formations are much older landforms, dating from the Palaeocene Era. However JNP does not rank highly compared with other existing World Heritage sites that show examples of longer periods of Earth's evolution. IUCN does not consider that the nominated site meets this criterion.

Criterion (ii): Contains Outstanding Examples Representing Significant On-going Ecological and Biological Processes

From the limnological point of view the complex drainage system of the Amazon basin can be subdivided into three types of systems, one of them being the blackwater river system. Its dark colour results from organic acids released into the water through the decomposition of organic matter and the lack of terrestrial sediments. JNP not only protects the entire hydrological basin of the Jaú River but a large portion (60%) of the biodiversity associated with the blackriver system. JNP also has a sufficient size to allow the maintenance of significant on-going ecological and biological processes, such as blow downs, changes in the river flood dynamics and natural burns, thus providing unique opportunities to study their effect on biodiversity in natural ecosystems. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Site Containing Superlative Natural Phenomena or Exceptional Natural Beauty

The rivers of JNP provide a landscape of white-sand beaches during the dry season and flooded forest during the wet season, as well as secondary streambeds of distinct sizes, channels, and lakes. All these natural features are of aesthetic value but they are also found in other large rivers in the Amazon region. JNP contains the nine-tier waterfall of the Carabinani River, where the river drops gradually along an 800m trajectory. However, it can only be seen during the dry season and cannot be compared with other spectacular natural phenomena presented in a number of World Heritage natural sites. IUCN does not consider that the nominated site meets this criterion.

Criterion (iv): Contains Important Habitats for Biological Diversity and Threatened Species

JNP protects a large and representative sample of the Amazon Central Plain forest, presenting an average of 180 plant species per hectare. JNP also protects an impressive sample of fauna, with many species associated with blackwater river systems. There is a high diversity of vertebrates with 120 species of mammals, 411 birds, 15 reptiles and 320 fishes. Numerous species of conservation concern live within the Park, including jaguar, giant river, Amazonian Manatee, South American River Turtle and black caiman. The importance of JNP for other Amazonian fauna is reflected in the fact that it contains approximately 60% of the species of fishes reported to exist in the Negro River watershed, and 60% of the birds recorded from the Central Amazon. JNP also cover one Endemic Birds Area of the World (BirdLife International, 1998), a Centre of Plant Diversity (WWF/IUCN, 1994) and one of the Global 200 Ecoregions (WWF, 1998). IUCN considers that the nominated site meets this criterion.

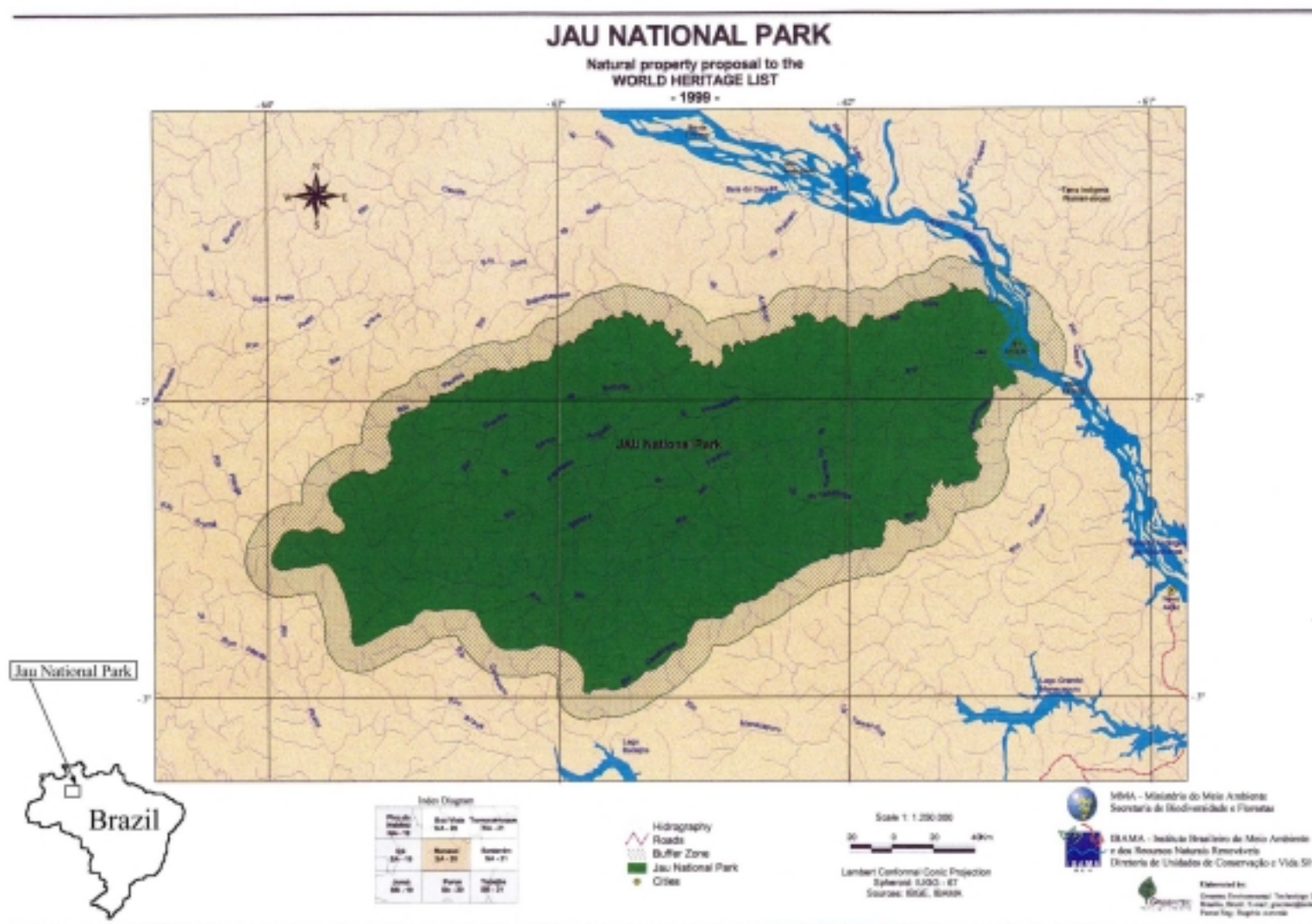
The nominated site meets all the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

7. RECOMMENDATIONS

The Bureau recommended to the Committee that Jaú National Park be **inscribed** on the World Heritage List under natural criteria (ii) and (iv). The Bureau noted that the site protects a large and representative sample of the Amazon Central Plain forest including the entire hydrological basin of the Jaú River. The site is important for biodiversity, protecting a large portion of the biodiversity associated with the Blackwater River system – one of the three types of lymnological system associated with the Amazon basin. The site has a sufficient size to allow the maintenance of significant on-going ecological and biological processes, such as blow downs, changes in the river flood dynamics and natural burns, thus providing unique opportunities to study their effect on biodiversity in natural ecosystems.

The Bureau encouraged the State Party:

- to support implementation of the project to develop a biological corridor (including JNP and Mamirauá and Amanã State Sustainable Development Reserves);
- to acknowledge the efforts of Vitória Amazônica Foundation for the protection and management of this site; and
- to provide additional technical, human and financial resources to consolidate the management of JNP.



Map 1: Location and Site Map – Jaú National Park