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## WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

### JAÚ NATIONAL PARK (EXTENSION TO FORM THE CENTRAL AMAZON PROTECTED AREAS) (BRAZIL) ID N° 998 Bis

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#### 1. DOCUMENTATION

- (i) **IUCN/WCMC Data Sheet:** (10 references)
- (ii) **Additional literature consulted:** IUCN, 2000. **IUCN Technical Evaluation, Jaú National Park (Brazil)**. SCM/CNPQ/MCT/IPAAM. 1996. **Mamirauá: Plano de Manejo**. Manaus: IPAAM. Queiroz, H., and M. E. B. Fernandes. 2001. **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 Carvalho, 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, representatives from the Ministry of Environment, Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), environmental authorities, from the States of Brasilia and Manaus, local staff of the protected areas from IBAMA and the Mamirauá Institute, and researchers from the University of Florida and the Amazon Research Institute (INPE).
- (iv) **Field Visit:** Jim Barborak, August 2002.

#### 2. SUMMARY OF NATURAL VALUES

The nomination proposes the expansion of the existing Jaú National Park and World Heritage site (2,272,000 ha) and the change of name to the “Central Amazon Protected Areas”, with a total area of over 6,000,000 ha, through the inclusion of three additional protected areas that form part of the Central Amazon Biosphere Reserve and Corridor:

- Mamirauá Sustainable Development Reserve (1,124,000 ha);
- Amana Sustainable Development Reserve (2,350,000 ha); and
- Anavilhanas Ecological Station (350,018 ha).

Jaú National Park and the three additional reserves proposed for inclusion in the expanded World Heritage site are located west-northwest of Manaus, the capital of Amazonas state, Brazil. They lie between the Solimoes and Negro Rivers, two of the major tributaries of the Amazon watershed.

The Mamirauá and Amana reserves are protected under Amazonas state legislation and Anavilhanas is a federally created and managed protected area. Mamirauá and the adjacent sector of Amana are particularly noted for their conservation of a representative sample of *varzea* forest, which is seasonally flooded by fertile “whitewater” rivers flowing from the Andes region. The *varzea* is characterized by high productivity and biomass and the presence of unique and endemic species adapted to the dramatic seasonal variations in river levels; these are often associated with vast floating vegetation mats. Here it is easy to see spectacular wildlife, including river dolphins, monkeys, manatees, and aquatic birds in impressive numbers. Anavilhanas protects a considerable extension of *terra firme* forest, plus seasonally inundated *igapó* forests, and also includes one of the two largest archipelagos of islands in the basin, which have a unique origin and shape derived from flocculation and settling of sediments.

The Mamirauá and Amana reserves represent one of the most diverse areas in the ‘New World’ with respect to primates, with 7 species in Mamirauá, 11 in Amana, and 15 between the two areas. The water bodies existing in these reserves contain 64 species of electric fishes in seven families, including 3 species new to science, which represent the highest known diversity of this unique group of organisms in the world, with a level of radiation and adaptation akin to that of cichlids in the Rift Valley of Africa.

### 3. COMPARISONS WITH OTHER AREAS

The original IUCN Technical Evaluation of the Jaú National Park (2000) nomination provided a good comparison of that area with other World Heritage sites located totally or partially within the Amazon basin, such as Sangay National Park in Ecuador, Manu National Park in Peru, and the Central Suriname Nature Reserve in Suriname. Manu and Sangay National Parks protect altitudinal transects of which lowland Amazonian tropical forests are just one of the ecosystems protected. The same can be said of the Río Abiseo National Park in Peru. The Central Suriname Nature Reserve is located in the Pre-Cambrian shield area of the Guyanas and has different watershed characteristics and a quite distinct flora. Noel Kempff Mercado National Park in Bolivia, far to the south, was inscribed because of the importance of its much drier cerrado ecosystems. The vast new Tumucumaque National Park in northeastern Brazil also contains important biodiversity values but it protects different flora and fauna communities from those found in the Central Amazon.

No other protected area complex in the lowlands of the Amazon basin protects such a diverse array of terrestrial and aquatic ecosystems and special habitats. In fact, the nominated reserve complex constitutes one of the largest contiguous complexes of protected areas anywhere in the tropics; it is larger than more than 40 sovereign states. The addition of the Mamirauá, Amana and Anavilhanas to the Jaú National Park would expand this World Heritage site to include an array of other ecosystems and geomorphological features absent from, or not well protected in either Jaú or any of the other above-mentioned existing World Heritage sites. Expansion of the World Heritage site would also improve and expand protection of the ecosystems found within Jaú. Because much of Amana is *terra firme* (non-flooded) forest contiguous to Jaú, it increases the prospects for the maintenance of genetically viable populations of fauna and flora populations within the World Heritage site.

## **4. INTEGRITY**

### **4.1 Boundaries**

The boundaries of the proposed site coincide with the limits of existing state and federal protected areas and include sufficient area to protect the site's heritage values from most direct effects of human encroachment and commercial resource extraction. The terra firme forests, which make up most of Jaú and Amana, are virtually untouched wilderness areas covering millions of hectares. Jaú, Amana and Mamirauá are contiguous but Anavilhanas, located along the Rio Negro, is separated from Jaú by a predominantly forested corridor consisting of state extractive reserves and an indigenous reserve, where management and protection need to be improved (see recommendations section below). Most of the outer limits of the reserves consist of stream or river channels. This reduces maintenance costs and makes regular monitoring of encroachment easier.

However, a large part of the Mamirauá reserve, proposed for inclusion in the World Heritage site (the subsidiary area), does not currently have active protection or management and has a few thousand inhabitants who depend on resource extraction. Until such time as there is active protection and management of this area, and until the inhabitants formally accept the increased restrictions on resource use needed to ensure conservation of the outstanding ecosystems of the area and sustainability of resource utilization, that area would be more properly seen as a buffer zone to the World Heritage site.

The nomination mentions the creation of a 20 km buffer zone surrounding the entire area. However, this buffer zone does not have legal protection at present. The size of the protected area complex is so great as to make buffer zone management much less of an issue than proper zoning, protection and management of the reserve complex itself. The Brazilian authorities should be informed that while legal creation and effective land use regulation within an exterior buffer zone surrounding the perimeter of the area would be welcome, the buffer zone is not part of the expanded World Heritage site. They should also be urged to improve protection and management of the state extractive reserves and indigenous reserve that lie between Jaú National Park and Anavilhanas, and as noted above, establish adequate on-site management and protection programmes in the subsidiary area of Mamirauá, and reach written agreement with communities regarding World Heritage listing of that area, prior to listing that portion of the proposed site on the World Heritage List.

### **4.2 Legislation and Legal Protection**

Anavilhanas Ecological Station was created under federal decree 8606 in June 1998. While part of Mamirauá was also originally created as a federal ecological station, since 1996 the entire area has been protected, through an act of the Amazonas State Legislature, as a Sustainable Development Reserve, a protected area category that has as its objective the conservation of biological diversity with strong local participation, and which allows for limited resource extraction by traditional communities in some management zones (IUCN, Category VI). Amana Sustainable Development Reserve was also created through an Amazonas State government decree.

### **4.3 Management and conservation**

Amana and Mamirauá reserves (IUCN, Category VI), are managed through a unique cooperative agreement between the Amazonas State Institute for Environmental Protection (IPAAM), with 4 federal agencies - the Brazilian Institute of the Environment and Renewable Natural Resources, the Ministry of the Environment, the National Council for Scientific and Technological Development, and the Ministry of Science and Technology (MST) – and with the Sociedade Civil Mamirauá, an NGO that also supports management of these reserves.

Anavilhanas is managed directly by IBAMA, the environmental federal agency, with some support from collaborating NGOs.

It is probable that no other protected area in the Amazon basin has enjoyed the level of staff or funding of Mamirauá over the past decade; approximately \$15 million has been invested in research, protection, management, and outreach activities in the reserve over that period. In the past several years, with the creation of the Amana reserve and the establishment of a co-management agreement for its administration, the level of management there has improved substantially as well. More than 100 employees are assigned to these areas, and they are well trained and equipped.

The investment at Mamirauá has, however, been spent within what is referred to as the focal (demonstration) area of 260,000 ha where almost all research, protection and community development activities have been centered. There has been almost no physical presence or investment in the so-called “subsidiary area” of the reserve of 864,000ha. While the human population of that large area is quite low and concentrated along major rivers, extractive activities by both local inhabitants, by fishermen and by timber interests from outside, have not received the same level of scrutiny and control as in the demonstration area, which represents a long-term threat to the integrity of the “subsidiary area”. This problem was carefully assessed and discussed with the Brazilian authorities during the evaluation mission to the site in order to evaluate the possibility of excluding this area to ensure management consistency of the nomination.

Anavilhanas Ecological Station (IUCN, Category Ia) has not benefited from the flows of international assistance or strong cooperation by NGO partners found at Mamirauá--at present there are only six staff members, very modest infrastructure, and a very limited operational budget, thus having a level of management and protection that is less than adequate. This area is by far the most accessible of the Central Amazon Reserves, since roads extend from Manaus to Novo Airao on the far edge of the river that forms one boundary of the area, which could lead to uncontrolled visitation and to impacts associated with poaching and illegal fisheries. Unlike the other nominated areas, Anavilhanas is physically separated from Jaú National Park by a series of state extractive reserves and an indigenous reserve which in the long-term can add pressures to the use of its natural resources.

#### 4.4 Threats

In general, the *terra firme* forests of the Central Amazon, which are located far from navigable rivers or highways, are faced with few major threats. Much of Amana (the vast *terra firme* portion) shares similar ecosystems and integrity to adjacent portions of Jaú: the areas are inaccessible, remote, have almost intact natural ecosystems, and therefore, virtually protect themselves. The situation within the *varzea* forests, which characterize much of Mamirauá and adjacent portions of Amana, is quite distinct. Along the length of the Amazon, these ecosystems were the most utilized by human inhabitants even before Europeans arrived in South America, and over the past three hundred years a distinctive culture of riverside mestizo inhabitants has evolved in the *varzea*. However, human population density remains low and impacts are limited to narrow bands of higher land on natural levees along stream courses, and to the effects of traditional harvest of fish and other aquatic organisms. Seasonal flooding also temporarily limits the human footprint on the terrestrial portions of the site.

While the traditional inhabitants practice subsistence agriculture, fish, hunt and harvest timber and some other forest products, their population density is so low in Amana and the demonstration zone of Mamirauá as to not pose any major threat to the overall integrity of the reserve, as long as conservation agencies have a physical presence in the areas and local residents are directly involved in and benefit from management regimes. Previously

unsustainable harvest levels for some fish and wildlife species have been dramatically reduced through enforcement, research and education programs.

In Anavilhanas, while the area is uninhabited and in general encroachment levels by neighbours and illegal activities are not as yet factors of great concern, the area is separated from the rest of the proposed World Heritage site by poorly protected state extractive reserves and an indigenous reserve. Anavilhanas also lies along a navigable river with regular transit of large ships carrying, among other things, petroleum products. There are no buoys or any other system in place to reduce the danger of a ship going aground in the archipelago: an oil spill upstream could do great damage to the fragile resources of the area. Increased management presence, outreach programmes, and marking of navigable river channels are needed to reduce threats to Anavilhanas.

## 5. ADDITIONAL COMMENTS

Because of the high productivity of the *varzea* ecosystems found in much of Mamirauá and part of Amana, and their relative accessibility by water routes, this area is where most human habitation and resource use occurs in the Central Amazon. Some reviewers questioned the sustainability of the extractive reserve management regime applied to these areas. In the entire Amazon basin, the “mestizo” riverside communities and smaller numbers of indigenous inhabitants have used the *varzea* for hundreds of years with relatively limited environmental impact. Finding a large intact piece of *varzea* without low levels of human population and resource utilization is probably impossible. Also, because of the seasonal nature of floods, the human footprint is restricted to narrow areas along river channels and adjacent levees; in many cases it nearly disappears with the onset of annual floods. For these reasons, the low levels of human habitation and resource use found in Mamirauá and Amana do not justify the exclusion of these areas from the nomination. However, existence of adequate on-site management and protection programmes, and clear, written documents regarding rights and responsibilities of inhabitants, should be precursors to inscription of these areas on the World Heritage List; they have already been obtained for the inhabited portion of Amana and the focal area of Mamirauá.

## 6. APPLICATION OF WORLD HERITAGE CRITERIA

The “Central Amazon Protected Areas” have been nominated as an extension to Jaú National Park and World Heritage site under the 4 natural criteria.

### **Criterion (i): Earth’s history and geological features**

The original evaluation of the Jaú nomination indicated that Jaú does not rank highly compared to other existing World Heritage sites that demonstrate a much longer period of the Earth’s evolution. The geological formations typical of the adjacent Mamirauá and Amana reserves and nearby Anavilhanas also consist largely of sedimentary deposits from the Palaeocene and Pleistocene. While the addition of Anavilhanas and its unique archipelago of constantly changing islands add to the diversity of the geologic features of the site, these islands are constantly changing and are somewhat ephemeral in nature. IUCN does not consider that the nominated site meets this criterion.

### **Criterion (ii): Ecological processes**

The *varzea* and *igapó* forests, lakes, rivers, and islands of the proposed site together constitute physical and biological formations and demonstrate ongoing ecological processes in the development of terrestrial and freshwater ecosystems. They include a constantly changing and

evolving mosaic of river channels, lakes, and landforms. The floating (and constantly moving and changing) mats of vegetation typical of the *varzea* watercourses include a significant number of endemic species, including the largest array of electric fishes in the world. Anavilhanas contains the second largest archipelago of river islands in the Brazilian Amazon and this group of islands is much better preserved than the somewhat larger Maricua archipelago and demonstrates processes of colonization and vegetative evolution on new landforms. IUCN considers that the nominated site meets this criterion.

**Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance**

As for the case of Jaú National Park the nominated extension includes 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. The Anavilhanas archipelago and Amana Lake add some natural features that are not present in Jaú. However all of these natural features are also found in other large rivers in the Amazon basin. IUCN does not consider that the nominated site meets this criterion.

**Criterion (iv): Biodiversity and threatened species**

The expanded nomination substantially increases the already impressive protection offered by Jaú National Park to the biological diversity, habitats, and endangered species found in the Central Amazon region. The nominated area is one of the Endemic Bird Areas of the World, is considered as one of WWF's 200 Priority Ecoregion for Conservation, and it is also a Centre of Plant Diversity. The expansion of Jaú National Park to include an important sample of *Varzea* ecosystems, *igapó* forests, lakes and channels significantly increases the representation of the aquatic biodiversity of the Central Amazon region. Expansion of the site also enhance the protection of key threatened species including giant arapaima fish, the Amazonian manatee, the black caiman, and two species of river dolphin. IUCN considers that the nominated site meets this criterion.

The nominated area of Anavilhanas Ecological Station and the “subsidiary area” of the Mamirauá Sustainable Development Reserve, however, do not meet the conditions of integrity as provided in the Operational Guidelines paragraph 44b.

## 7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee:

- (a) **inscribe** Amana Sustainable Development Reserve and the demonstration area of Mamirauá Sustainable Development Reserve as an extension of Jaú National Park under natural criteria (ii) and (iv).
- (b) **does not inscribe** Anavilhanas Ecological Station and the subsidiary area of Mamirauá Sustainable Development Reserve.

The extended site would therefore consist of the following components:

- Jaú National Park (2,272,000ha)
- Amana Sustainable Development Reserve (2,350,000ha)
- Demonstration area of Mamirauá Sustainable Development Reserve (260,000ha)
- TOTAL AREA: 4,882,000ha.

This extended site should thus be inscribed under the name “Central Amazon Conservation Complex”.

The Committee may also wish to note that IUCN believes that the area of Anavilhanas Ecological Station and the subsidiary area of Mamirauá Sustainable Development Reserve of also meet natural criteria (ii) and (iv) but that IUCN considers that their inscription at this time is premature. The State Party may wish to re-nominate these areas once they fully meet the conditions of integrity. The State Party may wish to consider as guidance for meeting the conditions of integrity in future the following management recommendations:

- The State Party should consider strengthening management and protection of the subsidiary area of Mamirauá Sustainable Development Reserve and the Anavilhanas Ecological Station. In the case of Anavilhanas this should include the placement of buoys to direct commercial boat traffic away from the protected islands in the archipelago.
- While Mamirauá, Jaú and Anavilhanas all have recently prepared and published management plans, completion of a compatible plan for Amana, and an overall management strategy for the entire Central Amazon Conservation Complex, is recommended as early as possible.
- The State Party may wish to consider changing the management category of Anavilhanas to National Park to allow for careful development of the ecotourism potential of the area, or to modify the zoning scheme to allow limited and carefully controlled ecotourism and environmental education activities in a very limited sector of the reserve. This will also serve to promote public support for the conservation of this area.
- The State Party should explore options, as part of the Central Amazon Ecological Corridor Initiative, to link the terra firme upland forests of Anavilhanas with those of Jaú National Park, through stricter zoning, protection, the potential re-categorisation of the extractive reserves linking these two core conservation areas, and through cooperative efforts with the indigenous reserve located within this corridor to ensure sustainable land use patterns on tribal lands.
- The State Party may also consider the feasibility of creating a coordination mechanism, such as a management council of some type, to coordinate management and protection of the entire Central Amazon Conservation Complex. Such mechanisms may develop an early warning system for threats, discuss potential joint funding opportunities, and share research and monitoring results. The development of such a council, as well as a funding strategy for the Central Amazon Conservation Complex, may merit support through the joint United Nations Foundation-UNESCO project to support natural World Heritage sites in Brazil.