
WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

CERRADO PROTECTED AREAS: CHAPADA DOS VEADEIROS AND EMAS NATIONAL PARKS (BRAZIL)

Background information: Chapada dos Veadeiros was nominated by Brazil in 2001 and IUCN, in its evaluation report to the June Bureau session, recommended the need to explore the possibility of nominating other relevant sites, which more adequately address the complexity of the cerrado ecoregion. The Bureau noted the high importance of the Cerrado ecoregion for the conservation of biological diversity and the need to enhance representation of this ecoregion in the World Heritage List. The Bureau decided to refer the nomination back to the State Party to prepare a serial nomination including Chapada dos Veadeiros National Park which more adequately addressed World Heritage criteria. In August 2001, the State party submitted a revised serial nomination including Chapada dos Veadeiros National Park and Emas National Park. This evaluation refers to this serial nomination.

1. DOCUMENTATION

- i) **IUCN/WCMC Data Sheet:** (12 references).
- ii) **Additional References Consulted:** Dinerstein, E. *et. al.* 1995. **A conservation assessment of the terrestrial ecoregions of Latin America and the Caribbean.** Washington D.C.; MMA/Funatura/CI, 1999. **Priority areas for the Conservation of Biodiversity of Pantanal and Cerrado regions.** Brasília; IBAMA and PROAVES. 1998. **Priority actions for the conservation of biodiversity of Cerrado and Pantanal,** Brasília; Minister of the Environment, CI and Funatura. 1999. **Plano de Manejo, Parque Nacional da Chapada dos Veadeiros,** Brasília; Governo do Estado de Goiás. 2000. **Reserva da Biosfera do Cerrado – Fase II,** Goiania; Governo do Estado de Goiás, WWF, and Oficina de Ciências e Artes. 2001. **Área de Proteção Ambiental Pouso Alto,** Goiania; Dardenne, M. D. and J.E. Guimarães Campos. 2000. **Geological and Paleontological Sites of Brazil: Chapada dos Veadeiros National Park, Goiás;** WWF. Ano II - Número III – December, January and February, 2001. **Veadeiros Jornal,** Alto Paraíso; WWF. 2001. **Chapada dos Veadeiros: estabelecimento de um projeto integrado de conservação e desenvolvimento no Cerrado (PICD).**
- iii) **Consultations:** 5 external reviewers contacted, National, State and Municipal Government officials, park staff, local NGOs and community representatives.
- iv) **Field Visit:** March 2001. Allen D. Putney. August 2001. Pedro Rosabal

2. SUMMARY OF NATURAL VALUES

The Cerrado is the second largest ecoregion in Brazil, after the Amazon basin. Most of the Cerrado ecoregion is located in the Brazilian Highland Central Plateau with a limited portion in Bolivia. This plateau is an ancient, pre-Cambrian geological structure with nutrient-poor and, moderate to highly acid soils. Throughout the Tertiary and Holocene ecological conditions in this region remained stable facilitating the development of a highly specialised flora and fauna. This formation corresponds to the Biogeographic Province of Campos Cerrados (Udvardy, 1975) and ranks among the world's richest in biological diversity. The WWF/World Bank conservation assessment of terrestrial ecoregions of Latin America ranked the Cerrado as "globally significant" The Cerrado flora is species rich, counting up to 350-400 vascular plant species per hectare. Throughout the world only a few tropical rain forests can boast a greater number of vascular plant species per hectare.

The WWF/World Bank conservation assessment also described the ecoregion as "vulnerable" and of the "highest priority for conservation action". Despite its biodiversity importance, much of the Cerrado has been converted to agriculture, cattle ranching and urbanisation. Very few large contiguous areas of undisturbed

natural ecosystems survive. Among the largest of these are the two sites included in this Cerrado Protected Areas (CPA) serial nomination. Both the Chapada dos Veadeiros National Park (CdVNP) and Emas National Park (ENP) are located in the geographical centre of the Brazilian Cerrado Ecoregion, and both are in Goiás State.

CdVNP includes the highest altitude of the Cerrado ecoregion and covers an extension of 235,970ha, which makes it the largest National Park within this ecoregion. CdVNP is surrounded by the Environmental Protection Area (EPA) of Pouso Alto with 872,000ha, which corresponds to IUCN Protected Area Management Category VI (IUCN, 1994). The area covered by CdVNP and Pouso Alto is extremely important in the regional context for maintaining the hydrological regime, as due to its geology and soils characteristics it is a key area for recharging the existing aquifers while contributing to a number of rivers that flow into the Amazon basin. The altitude in CdVNP varies from 400 to over 1,600m. It contains a rich mosaic of cerrado landscapes and habitat types including: wooded savannah; grasslands; scrublands; dense wooded savannah; gallery forest; semi-deciduous forest; wetlands; and exposed rock.

This mosaic of landscapes and habitats, which overlays a variety of geological structures (including some of the oldest rock formations in the world) gives the CdVNP its high biological diversity. Endemism is high in the park, especially in areas above 1,200m. A biodiversity survey conducted in 1997 revealed 1,476 species of vascular plants, 50 of which are rare or endangered. Samples from gallery forest showed 145 species/ha, with are close to the figures in the Amazon Basin. Fauna includes: 45 species of mammals, eight of which are rare or endangered; 306 species of birds, 20 of which are rare or endangered; 49 fish species, of which 38 could not be identified at the species level and are probably highly localised endemics; 34 species of amphibians, of which eight are possibly new species; approximately 1,000 species of moths; and 160 species of native bees of which 6 are new to science. The CdVNP contains populations of several large mammals, including giant anteater, giant armadillo, maned wolf, spotted jaguar and pampas deer. The EPA of Pouso Alto has recently been established (May 2001) to enhance conservation outside the park and so help ensure the long-term viability of these populations.

ENP covers 131,868ha and is located at the northwest of the Brazilian Plateau within the Sierra dos Caipaós. This plateau reaches 880m within the park before it falls south to the Paraná River Basin and the vast inland wetlands of the Brazilian Pantanal, thus conferring on ENP an important regional hydrological function. Compared to CdVNP, the dominant landscape of ENP can appear monotonous with savannah formations (*cerrado sensu stricto*) dominating the area, but there are also important local variations in the vegetation, mainly as a result of soils and hydrological factors. In areas with the richest soils, semi-deciduous forest is found. Results from monitoring and research of the movement of key species in ENP indicates the high importance of this forest for species such as the spotted jaguars, pumas and ocelots. The floristic survey conducted in the open savannah reported 601 species of vascular plants with seven of these being newly-discovered species. According to the findings of CI's biodiversity assessment, the total number of plants for ENP probably should reach over 800 species once the riparian and semi-deciduous forest zones have been fully studied.

ENP has become internationally known for its rich vertebrate fauna. It is considered one of the most important sites for conservation of large mammals in South America and the only national park in the Neotropics where large mammals are easily visible. There are 78 species of mammals reported from ENP, some of which also occur in CdVNP. Endangered species include the maned wolf - considered the Cerrado's flagship species - spotted jaguar, puma, ocelot, giant ant-eater, giant armadillo, giant rat, pampas deer, marsh deer, river otter, agouti, flower bat and short-tailed opossum. Four new species of small mammals were recently discovered in the park, including a rodent and an opossum. According to researchers working on CI's biodiversity assessment of ENP, more new animal species may also be discovered as it is considered that around 30% of the park has not been subject of adequate surveys and systematic research. It is therefore very important to further support biodiversity research at this site, as it would help to better understand the ecology and biodiversity values of the entire cerrado ecoregion.

Of the 354 bird species registered in ENP, 12 are endangered species including the black and white hawk-eagle, the crowned solitary eagle and the yellow-faced amazon parrot. ENP is an important site for bird conservation in the Neotropics, containing many endemic species of specialist grassland birds. This is particularly important in view of the loss of grassland generally in the Cerrado ecoregion. There are 69 reptile species reported for ENP, of which ten are very rare and 15 (22% of the total) are endemic to the Cerrado ecoregion. Four new species of reptiles have recently described for the Cerrado. CdVNP and ENP together account for 84 reptile species but only 25 of them are common to both areas. For the whole Cerrado ecoregion around 110 reptiles species have been reported; the two nominated areas contain a remarkable sample of reptiles (73%) of this ecoregion.

One of the reasons the Cerrado Ecoregion is globally significant is because it is perhaps the oldest of the major tropical ecosystems. Changes in world climate over geological periods have moved central South America's ecosystems south to north and east to west, and back again, several times. Within the Cerrado Ecoregion, CPA is centrally located. Moreover, because of the altitudinal range which occurs in these areas, they are probably the only areas within the Cerrado ecoregion where species and habitats have been able to adjust to climate changes by vertical movement rather than by moving to different longitudes or latitudes. This has permitted the survival of rare and relict life forms, and encouraged the development of a number of endemics that exist in the proposed serial site. Experts in Cerrado ecology predict that CPA is a key site for Cerrado species adapting to climate change. CPA is very important as a base from which key species of fauna can move out to re-populate surrounding areas and remaining "islands" of natural and semi-natural vegetation within the Cerrado ecoregion. This role has been demonstrated in the case of ENP by a Conservation International (CI) biodiversity research programme, designed to help develop a Cerrado-Pantanal biological corridor. While similar research has not yet taken place in CdVNP, it is believed that this site plays a similar role.

3. COMPARISON WITH OTHER AREAS

The Cerrado Ecoregion is partially represented in two existing World Heritage Sites, the Noel Kempff Mercado National Park (NKMNP) in Bolivia and the Pantanal Conservation Complex in Brazil. Both of these areas are on the fringes of the Cerrado while CPA is located in the core of this ecoregion. The Pantanal Conservation Complex includes only small areas of Cerrado, while NKMNP contains a good portion of this kind of ecosystem, thus its more appropriate to compare this serial site with NKMNP. In more general terms, CdVNP can also be compared with Canaima National Park (Venezuela), which includes a large area of tropical savannah (the Gran Sabana) but of different biogeographic characteristics than Cerrado (Los Llanos and Guyanan Biogeographic Provinces, Udvardy 1975).

NKMNP is a composite of different ecoregions, mainly Amazonian (80% of the site), Cerrado and Chaco. The Cerrado portion is limited to 272,000ha on the Huanchaca Plateau; therefore a proper comparison should be mainly focused on this part of NKMNP. The 540 species of vascular plants reported from the Huanchaca Plateau is relatively few compared to almost 1,500 species recorded in CdVNP alone. Of the 125 mammal species found in NKMNP, only 25 occur in Cerrado habitats compared to the 78 mammal species found in ENP. The habitats and landscapes of the Cerrado, which are protected in NKMNP, are less diverse than those protected in CdVNP. On the other hand, ENP contains the best remaining sample of the Cerrado *sensu stricto*, which is only to be found in Brazil and that it is not at present represented in the World Heritage List.

While there are other protected areas in the Brazilian Cerrado, the nominated site stands out for its exceptional place in conserving the flora, fauna and altitudinal range of this ecoregion. Also, no other protected areas contain an equivalent mosaic of ecosystems; nor are they so representative of the Cerrado. For example Pacaas Novos National Park is an enclave in the Amazonian ecoregion, and Chapada Diamantina National Park contains a mixture of Cerrado and Caatinga ecosystems. Furthermore, other protected areas in the Cerrado ecoregion, such as Brasilia National Park, Chapada dos Guimaraes National Park and Grande Sertao Veredas National Park, suffer from a number of integrity issues and some uncertain land tenure questions that limits the effectiveness of their management.

While the areas forming this serial site contain a variety of geomorphological features that are important to understanding the origin and evolution of the region, these features are not comparable to those of other World Heritage sites inscribed on the World Heritage List under this criterion, for example, Ischigualasto-Talampaya in Argentina.

4. INTEGRITY

4.1. Boundaries:

At the time of the first IUCN evaluation in May 2001, CdVNP covered an area of 65,515ha and IUCN noted the "difficulty in maintaining biodiversity in such a limited area." In May 2001, the Pouso Alto EPA buffer zone for CdVNP was established, the area being a continuation of the existing Cerrado ecosystems protected by CdVNP. This area is well protected from exploitation due to its poor soils and complex relief. Furthermore, in September 2001 a Federal Decree expanded the size of CdVNP to 235,970ha, making CdVNP the largest National Park in the Cerrado ecoregion. The reason for the creation of the Pouso Alto EPA and the extension of the size of the

Park has been to include all important areas required for the long-term survival of key species, particularly large predators.

ENP is almost entirely surrounded by agricultural areas and thus does not have the additional support provided by a buffer zone. However, the management of ENP has been carefully planned so as to avoid impacts from outside, particularly from fires (see point 4.3). Research conducted in the area by the Emas Foundation, revealed that large predators are using this area for feeding and breeding, which is evidence that the size is sufficient to meet the biological needs of these species. This is supported by the rarity of attacks by large predators on cattle outside this area.

4.2. Management

A management plan was prepared for CdVNP in 1998 but has not been fully implemented due to the lack of financial resources. However, the plan is in the process of being reviewed to take account the recently approved extension of the CdVNP. A participatory process to prepare this new management plan has already started. WWF/Brazil and Pro-Nature Foundation (FUNATURA) also support the on-going management of CdVNP. The CdVNP has a relatively small, but highly motivated, staff of two technical staff, including the Park's Director, and three rangers working on-site. Personnel from WWF/Brazil, the Chapada dos Veadeiros Tourist Guide Association and the Flower Collectors Association support the park's staff. This team has built constructive relationships with surrounding communities, which has helped to reduce threats to the park.

The park has adequate infrastructure for management activities with entrance stations, a visitor centre, housing for staff and researchers, guard posts, and trails to major visitor attractions. There are no human inhabitants within the park, and important segments of the local population in the eight surrounding communities are effectively involved with park management activities.

Financing of park management depends on the budget received from IBAMA for operations and park staff salaries funded by the National Treasury. In recent years, the annual budget has varied between US\$60,000 and US\$120,000. However, a large proportion of this budget is dedicated to salaries and it is not sufficient to maintain and operate the park. The new management plan for this site envisages developing the financial sustainability of CdVNP through revenue generation schemes.

In the case of ENP, a management plan was prepared in 1981 and updated in 1996. IBAMA and Emas Foundation aim to review the existing management plan to incorporate results from on going research projects of ENP's biodiversity. This is planned to begin in December 2001 and will also involve a participatory process, including neighbouring farmers who will be encouraged to develop better agricultural practices that would avoid impacts on ENP. The preparation of the new management plan is also linked to the implementation of the CI project to establish a biological corridor linking the Cerrado ecosystem to the Pantanal. There are two technical staff, including the Park's Director, and six rangers working on-site. In addition between 9 and 11 researchers are permanently working in research projects providing additional support to park management activities.

As in the case of CdVNP, the financing of ENP depends on the budget received from IBAMA for operations and park staff salaries funded by the National Treasury. The annual budget for the ENP has varied between US\$40,000 and US\$80,000 in recent years. Emas Foundation provides additional funding support for research, which is linked to the implementation of CI's project on the Cerrado-Pantanal biological corridor, funded by USAID. While the park's administration considers the available funding sufficient for key management activities, more is required to support the research programme on ENP biodiversity. There are also emerging challenges related to the potential impact of invasive species to the Park that would certainly require additional funding support.

4.3. Threats

There were a number of threats to CdVNP integrity, mainly related to fires, mining, flower collecting, hunting and uncontrolled tourism. These have been reduced significantly in recent times. This has been accomplished mainly by positive interaction with local communities that at present are actively involved in the conservation and management of this area. Perhaps the most effective strategy has been to give local communities an effective financial stake in the park's tourism activities. The commercial collection of flowers is a major source of income in the region, but considerable effort has been made to divert this activity to areas outside the park where sustainable management practices are pursued.

The main threat to CdVNP is the increasing level of visitation. In the past, uncontrolled public-use damaged a few small areas within the park. However, the closing of access roads and imposition of strict controls have improved this situation. Since 1995, when the monitoring of visitor numbers began, park visitation has varied from 8,000 to 26,000 people per year. Most are from Brasilia, but increasingly visitors come from São Paulo and Rio de Janeiro. Public use is limited to the park's major attractions, which occupy only 2% of the park's area. The focus is on the spectacular rapids, waterfalls, natural pools and canyons of the Preto River. Visitors are not permitted in the park unless accompanied by a guide; there are over 200 self-employed guides in the Chapada dos Veadeiros Guide Association. Their services include interpretation; garbage collection, fire control, trail maintenance and visitor safety, but they have no law enforcement powers. A new plan for park visitation, which is currently under review as part of preparation of the new management plan for CdPVNP, makes provision for: viewing points along the paved highway on the eastern border of the park; a trekking trail that will cross the park from the southeast to the northwest; additional visitor sites; and enhancing the capacity of the guides working in the park. These provisions are intended to manage and control visitation, thus reducing damaging impacts to the park's integrity.

The situation for ENP is quite different. Despite being the only national park in the Neotropics where large mammals are easily visible, the level of visitation is very low: only 60-80 people visit the site annually, most of them specialised visits focused on the charismatic fauna. A key threat to ENP integrity is the impact of fires coming from nearby agricultural areas. After a fire in 1990 that affected almost half the park, the need for a comprehensive fire control programme was highlighted. The fire control programme that is now in place is based on results from research on the role of natural fires in Cerrado's ecology. It is an effective programme and a useful model to apply in other Cerrado parks. No fires affecting the site from nearby agricultural areas have been reported since 1994.

The ecological isolation of ENP – it is almost entirely surrounded by farmland – can also be considered a threat to this site. This has been partially solved through good management practices aimed at reducing impacts coming from surrounding agricultural areas. Moreover, the Emas Foundation, with CI, is implementing a project, which aims to link ENP with other semi-natural areas, mostly state reserves, to develop a Cerrado-Pantanal biological corridor, which would help to overcome the isolation of this site.

Another emerging threat to ENP is the increasing presence of exotic grasses species. It has so far affected only the boundary zone, and is still absent from most of ENP. However, a monitoring system is in place to prevent further invasion, as grass seeds are brought into the park by wind and by animals that move across park boundaries.

4.4. Serial Site

When IUCN evaluates a serial nomination it asks the following questions:

a) What is the justification for the serial approach? The Cerrado ecoregion is the second largest of Brasil after the Amazonian basin. This is a complex ecoregion with a variety of habitat types that are impossible to be represented by a single site but rather by a serial site as CPA. While separated by around 400km both CdVNP and ENP occur in the Brazilian Highland Central Plateau, which is considered the core of the cerrado ecoregion. CPA covers all habitat types identified for the Cerrado and most of the flora and fauna species described for this ecoregion, including a number of endangered species of global significance.

b) Are the separate elements of the site functionally linked? All areas within the cerrado ecoregion have been functionally linked throughout the Tertiary and Holocene and the ecological conditions in this region remained stable facilitating the development of a highly specialised flora and fauna. These linkages still exist as CdVNP and ENP play a key role in the repopulation of cerrado's flora and fauna to the remaining semi-natural areas associated with them. They are also functionally linked in relation to the maintenance of the hydrological regime of the cerrado while also contributing to the Amazon and Pantanal basins.

c) Is there an overall management framework for all the units? The two areas of this site have separate management plans and management regimes. For practical, logistical and financial reasons it is difficult at present to have an integrated management plan for both sites. However, this may be achieved in the near future through the implementation of the proposed projects for the Pantanal-Cerrado Biosphere Reserves and the CI's project to develop a Cerrado-Pantanal Biological Corridor.

5. ADDITIONAL COMMENTS

It is widely believed in the region of CdVNP that the quartz crystals, which are found in the park and surrounding area, are a potent source of bioenergy that has therapeutic and restorative effects on humans. The community of Alto Paraíso, on the eastern boundary of the park, caters to visitors seeking guidance in meditation, enlightenment, and physical and spiritual renewal. They have thus created a specialised niche in the tourism market for “spiritual” tourism. Park management has now recognised the potential and requirements for this specialised form of tourism. Discussions are being held to develop special management arrangements for park visitation by these groups. There is also an effort underway to harness the potential of this type of tourism for developing innovative environmental education and visitor interpretation programmes.

6. APPLICATION OF CRITERIA/STATEMENT OF SIGNIFICANCE

CPA has been nominated under all four natural criteria. IUCN considers that criteria (ii), (iii) and (iv) are most relevant.

Criterion (ii): Ecological processes

CPA has played a key role for millenia in maintaining the biodiversity of the Cerrado Ecoregion. Due to its central location and altitudinal variation, it has acted as a relatively stable species refuge when climate change has caused the Cerrado to move north-south or east-west. This role as a species refuge is ongoing as Earth enters another period of climate change. IUCN considers that the nominated site meets this criterion.

Criterion (iii): Site containing superlative natural phenomena or exceptional natural beauty

The CdVNP contains a variety of features, such as waterfalls, cliff faces, inselbergs, and a meteorite crater that are interesting landforms which contribute to the natural beauty of the site. However, these features are not comparable to those existing in other World Heritage sites, such as the Pantanal Conservation Complex in Brazil and Canaima National Park in Venezuela. Moreover, the landscapes of ENP may appear somewhat monotonous and lacking in striking landforms. IUCN considers that the nominated site does not meet this criterion.

Criterion (iv): Biodiversity and threatened species

CAS contains samples of all key habitats that characterise the Cerrado ecoregion – one of Earth’s oldest tropical ecosystems. It contains over 60% of all floral species and almost 80% of all vertebrate species described for the Cerrado. With the exception of the Giant Otter, all of the Cerrado’s endangered large mammals occur in the site. In addition, the site supports many rare small mammals and bird species that do not occur elsewhere in the Cerrado and a number of species new to science have been discovered in CPA. IUCN considers that the nominated site meets this criterion.

7. RECOMMENDATION

That the Bureau recommends to the Committee the **inscription** of the Cerrado Protected Areas on the World Heritage list under natural criteria (ii) and (iv). IUCN considers that there is a strong case for including the “buffer zone” of CdVNP (Pouso Alto EPA) within the site, as this area shares key natural values of CdVNP and adds substantially to its protection.

The Committee may also wish to request the State Party:

- To provide additional support to CdVNP so as to help finalise and implement the revised management plan for the enlarged site. This plan should give particular attention to issues of tourism and visitor management. The State Party, if it wishes to do so, should consider making a request for assistance from the World Heritage Fund to support this process;
- To further encourage and support the development and implementation of the project for the Cerrado and Pantanal Biosphere Reserves that would help to promote an overall management framework for CPA;

- To further encourage and support the development and implementation of the CI project to establish a Cerrado-Pantanal biological corridor which, in the medium and long-term, would help to overcome the relative isolation of Emas National Park, and;
- To provide greater support to the research programmes underway in ENP.