IUCN Conservation Outlook Assessment 2017 **(archived)**
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Pantanal Conservation Area

SITE INFORMATION

Country:
Brazil
Inscribed in: 2000
Criteria:
(vii) (ix) (x)

Site description:

The Pantanal Conservation Area consists of a cluster of four protected areas with a total area of 187,818 ha. Located in western central Brazil at the south-west corner of the State of Mato Grosso, the site represents 1.3% of Brazil's Pantanal region, one of the world's largest freshwater wetland ecosystems. The headwaters of the region's two major river systems, the Cuiabá and the Paraguay rivers, are located here, and the abundance and diversity of its vegetation and animal life are spectacular.
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SUMMARY

2017 Conservation Outlook

Significant concern

The property has a relatively effective management system in the conventional sense of the term despite budget and staffing constraints in both the privately and the federally owned and managed protected areas. The impacts of poaching, wildlife trade and invasive alien species are important but not out of line with challenges in many protected areas across the world. There is, however, widespread consensus that major current and future threats stem from the individual and cumulative impacts of major development pressures. These include loss and degradation of native forest and grassland systems across vast expanses of the Brazilian Pantanal, the intensification of large-scale commercial agriculture and meat production, major ecohydrological alterations, sedimentation and pollution. In terms of hydrological alterations, the enormous number of existing and proposed dams upstream of the property deserve to be singled out. The controversial debate about a major modification of the Paraguay River so as to serve as a major commercial transportation route for minerals and agricultural export commodities to the Atlantic via the River Plate remains open, casting a shadow on the integrity of the entire Pantanal and the basin of the mighty Paraguay River.

Current state and trend of VALUES

High Concern
Trend: Deteriorating

Overall, the natural beauty and aesthetics of the property remain intact. However, key natural phenomena and processes, as well the biodiversity of the property are being impacted by structural anthropogenic changes. Rather than meeting management responses, the key drivers of change are increasingly powerful.

Overall THREATS

Very High Threat

Even though the property itself is not directly subject to the many threats facing the broader Pantanal region, the individual and cumulative threats from land use changes, alterations of the wetland hydro-ecology, contamination and invasive alien species give rise to major concerns. In the absence of decisive management responses, the continuation and intensification of the current threats is a realistic scenario, aggravated by the anticipated impacts of climate change. The longstanding proposal to invest in the development of a major commercial shipping corridor known as Hidrovia has the potential to result in devastating impacts.

Overall PROTECTION and MANAGEMENT

Some Concern

The property has a comparatively effective management system and is not particularly and directly exposed to the many threats facing the Pantanal. Therefore, the concerns are minor from a conventional protection and management perspective of the property per se. The unresolved dilemma is that the main threats cannot be addressed at the site level by their very nature, but inevitably require responses at the regional, national and even international level.

FULL ASSESSMENT

Description of values

Values

World Heritage values

▶ **Outstanding landscape beauty**
Criterion:(vii)

The Pantanal Conservation Area stands out as a visually overwhelming representation of a globally important wetland covering a broad range of the diverse landscape features of the Pantanal, including some, which are restricted to the property. Next to almost permanently flooded areas are small forests and savannas against the backdrop of the Serra do Amolar mountain range with its distinct dry forests. The possibility to see the iconic Giant Water Lily (Victoria amazonica) in the immediate vicinity of cacti species epitomizes the aesthetic landscape mosaic (World Heritage Committee, 2015, IUCN, 2000).

▶ **On-going ecological processes**
Criterion:(ix)

The property demonstrates a broad range of the characteristic processes of the Pantanal (Padovani, 2010) despite its modest size in comparison to the entire wetland. Despite covering only between 1 and 2 percent of the Pantanal, the property epitomizes major on-going ecological, biological and hydrological processes. The most striking process is the constantly changing hydrology according to a seasonal cycle of torrential rainfall in the Pantanal and surrounding uplands followed by slowly receding waters in the dry season. The property is recognized for an important role in the dispersion of nutrients to the entire basin and is an important reserve for maintaining fish

stocks in the Pantanal. The property is also noteworthy for an extensive area that remains partially flooded during the dry season, thereby triggering migrations and serving as a refuge for many wildlife species (UNEP-WCMC, 2011). The association of rare lowlands areas inundated at all times with the seasonally dry Amolar Mountains provides a unique contrast and mosaic of ecosystems.

► High biodiversity and large wildlife aggregations

Criterion:(x)

The Pantanal is an ecological meeting point bringing together elements of vegetation and species of the Amazon, Cerrado, Chaco and even the Atlantic Forest. While the Pantanal shows a remarkably low degree of endemism, it is renowned for an enormous diversity and abundance at all organizational levels of life. The property is a particularly rich, well-protected and intact sample of many of the diverse and seasonally dynamic habitats of the Pantanal, ranging from aquatic to extremely dry systems and several semi-deciduous forest types. The highly diverse assemblage of neotropical plants includes an exceptionally high number of aquatic species. The IUCN evaluation (IUCN, 2000) suggests 80 mammal species, 50 reptiles and more that 300 freshwater fish species while acknowledging the high probability of further records. The freshwater fish diversity of the property is noteworthy for at least two reasons. First, the property remains partially inundated even during dry years and thus serves as critical habitat. Second, as subsistence, commercial and recreational fishing increases, the property is among the few areas without any direct use pressure. The most conspicuous mammals include several felids, such as jaguar (Panthera onca, NT), puma (Puma concolor, LC), jaguarundi (Herpailurus yagouaroundi, LC) and ocelot (Leopardus pardalis, LC). Large concentrations of Yacaré (Caiman yacare, LC) and Capybara (Hydrochoerus hydrochaeris, LC) have been recovering from commercial hunting and are a common sight in the property again. Also common are white-lipped and collared peccary (Tayassu pecari, VU and Pecari tajacu, respectively, LC), the endangered giant river otter (Pteronura brasiliensis), maned wolf (Chrysocyon brachyurus, NT), giant armadillo (Priodontes giganteus, VU), giant anteater (Myrmecophaga tridactyla, VU) and marsh deer (Blastocerus dichotomus, VU), one of several deer species. The avifauna is remarkable not only for its enormous diversity but for very large nesting and migratory aggregations (UNEP-WCMC, 2011, Junk et al.,

2006, Mittermeier et al., 2005, Por, 2003, IUCN, 2000).

Assessment information

Threats

Current Threats

Very High Threat

While the property itself is not subject to major direct impacts, there are important concerns about a multitude of individual and cumulative threats to the entire wetland system. The major threats stem from land use change resulting in loss and degradation of native forests and grasslands in favor of industrial export-oriented agriculture; various forms of alterations of the hydro-ecology of the wetland; water contamination from multiple sources, invasive alien species and poorly controlled and managed natural resource management.

► Mining/ Quarrying, Renewable Energy

High Threat
Outside site

The delicate balance of the periodic and episodic flooding of large areas of the Pantanal is threatened by increasing numbers of dams in the headwaters of tributaries of the mighty Paraguay River. As for mining, water abstraction and contamination are the main threats even though there is no risk of mining in the property in the foreseeable future.

► Roads/ Railroads, Dams/ Water Management or Use

Very High Threat
Inside site, extent of threat not known
Outside site

Water is the key driver of the constantly dynamic wetland with both quantity and timing influencing the ecosystems in countless ways. There is an increasing intensity of human-induced modifications of the hydrology. They

include dykes and canals to claim farmland and pastures, upstream hydropower development, water abstraction for irrigation and construction of elevated roads (Petry et al. 2012, UNEP-WCMCM, 2011, Tomas et al., 2009). The impacts add up to a considerable alteration of the natural flood regime and drainage patterns at a time when proposals to convert the Paraguay River into a major commercial shipping route raise even more fundamental question marks on the future of the Pantanal.

► Invasive Non-Native/ Alien Species

Data Deficient
Inside site, extent of threat not known
Outside site

The literature provides numerous hints at terrestrial and aquatic alien species. For example, the invasive Asian golden mussel (Limnoperna fortune) is assumed to have been introduced through ballast water in several locations via ship traffic on the Paraguay River (Alho, 2011; Tocantins, 2006). Alho et al. (2011) provide a useful overview of alien species, which include the Amazonian fish tambaqui (Colossoma macropomumtucunaré) and tucunaré (Cichla sp.), the latter described as a “voracious predator”; several introduced Brachiara grasses used to convert natural vegetation into cultivated pastures to feed cattle and water buffalo; feral pigs, dogs, cats, rats and mice; hybridizing African and European bee species (see also Boff et al., 2013, for the latter). While there can be no doubt that the alien species change the communities and ecosystems, the exact situation in the Pantanal remains poorly understood.

► Shipping Lanes

Low Threat
Inside site, localised(<5%)
Outside site

Heavy barge traffic is resulting in bank erosion along the Paraguay River. Proposed projects to facilitate the full commercial navigability of the Paraguay River by straightening and dredging the Paraguay River may alter the hydrology of the entire Pantanal (Gottgens et al. 2001, IUCN, 2000). The current situation is not considered a high threat while fully acknowledging that major modifications of the main river has the potential to significantly

alter the ecosystem.

► Erosion and Siltation/ Deposition

Very High Threat
Inside site, throughout(>50%)
Outside site

Erosion and sedimentation associated with an increase in exotic grass-based cattle grazing and large-scale commercial crop production in the uplands of the Cerrado and other areas draining into the Pantanal are a significant threat to the property. Large areas of Cerrado have been logged and cleared for massive agribusinesses, mostly soybean production for export. Deforestation within the Pantanal region is also a growing threat. Combined with ongoing deforestation in and near the Pantanal, such massive land use changes alter flood pattern and dramatically increase siltation of major rivers. Some areas of the Pantanal which used to experience a seasonal flood cycle now remain flooded throughout the year (UNEP-WCMC, 2011).

► Crops

High Threat
Outside site

While there is no risk of land conversion in the property in the foreseeable future, the Pantanal is increasingly affected by the large scale development of industrial agriculture, such as in the Cuiabá River Basin (UNEP-WCMC, 2011, Conservation International et al., 2009, International Rivers, 2006). Such land conversion comes with ecological impacts, such as habitat loss, alteration of hydrological regimes and agrochemicals. An indirect effect is the political pressure to invest in the enhanced commercial navigability of the Paraguay River.

► Water Pollution, Household Sewage/ Urban Waste Water, Agricultural effluents

High Threat
Inside site, throughout(>50%)
Outside site

While the property itself is not subject to direct pollution, water pollution from the growing urban centers, mining and agrochemicals have been constantly increasing fro decades (Sartini Dutra Pimenta et al., 2013,

Bertassoni et al., 2012, Mittermeier et al. 2005, ICMBio, 2003, IUCN, 2000). Millions of gallons of untreated wastewater, sewage, organic wastes, agrochemicals, and storm run-off constantly enter the waterways and flooded areas (UNEP-WCMC, 2011). Upstream gold mining releases huge quantities of toxic mercury into the Pantanal confirmed by documentation of high levels of mercury in kingfishers, raptors and native fish (UNEP-WCMC, 2011).

► Livestock Farming / Grazing

Very High Threat
Inside site, not applicable
Outside site

Cattle ranching has been a common land use for some two centuries across large areas of the Brazilian Pantanal. Traditionally, native pastures are being used for grazing in line with flooding patterns, which resulted in a land use compatible with the maintenance of many of the Pantanal’s conservation values despite impacts on vegetation and competition with native grazers. However, traditional is increasingly giving room for more intensive forms of cattle ranching based on drainage and introduced grasses permitting higher stocking levels. The more intense the ranching the higher the impacts on and forest and wetland vegetation, wildlife habitats, forest frugivores and the higher the eutrophication of aquatic environments (Eaton, 2013). Other direct and indirect impacts of high-intensity cattle ranching for commercial meat production are the use of fire to stimulate growth of grass, soil compaction and decreased soil infiltration and erosion. An increasingly large area of the Pantanal and adjacent lands has been converted into homogenous and species-poor grasslands dominated by a small number of introduced grasses. These areas are poor in biodiversity and ecosystem services, such as water provision, regulation and purification, as well as carbon sequestration.

► Logging/ Wood Harvesting, Fishing / Harvesting Aquatic Resources, Hunting (commercial/subsistence), Poaching

High Threat
Outside site

Hunting and harvesting have been a part of the Pantanal since the beginning of its human history. For many decades, large-scale commercial harvesting

of feathers and skins took place and partially continued after it was legally banned in 1967 (Mittermeier et al. 2005). Subsistence hunting of game species and harvesting of a broad range of wild biodiversity products remains an integral part of local livelihoods. Retaliation killings of large cats remain common in response to conflicts with livestock and are difficult to control in remote areas. Fishing is particularly complex, as subsistence, commercial and recreational fishing are all on the rise. The live pet trade continues to be a challenge for selected primate, bird, reptile and amphibian species (UNEP-WCMC, 2011; Mittermeier et al. 2005).

► Other

High Threat
Inside site, throughout(>50%)
Outside site

Ioris (2013) plausibly argues that existing academic and political analysis remained superficial due to "major shortcomings (...) in the understanding of intersectoral and multiscalar connections". Based on research in the Cuiabá River Basin, the author summarizes his perception of the underlying obstacles for the conservation of the Pantanal as follows: "(a) the conflicting assessment of environmental problems and the contrasting perception of different social groups about who is to blame for them; (b) the inadequacy of existing policy responses imported from geographically different regions; and (c) the uncertain and vague allocation of responsibilities that happens through an unfortunate chain of “otherness-noneness-nothingness.”

Potential Threats

Very High Threat

Other than climate change as an overarching concern, the potential threats in essence boil down to the continuation and intensification of the existing threats, primarily deforestation and land conversion, modification and intensification of land and resource use, as well as water contamination. Major modification of the still natural course of the Paraguay River in order to facilitate large-scale commercial navigability could have devastating effects.

► Dams/ Water Management or Use

Very High Threat

Outside site

As noted above, dam construction in the Upper Paraguay River Watershed outside the property already have changed the flow regimes and thereby altered the timing and intensity of flood pulses defining the dynamics and productivity of the Pantanal. Beyond this existing threat and impact, large numbers of additional dam projects have been proposed, the cumulative impacts of which constitute a significant threat to the future integrity of the Pantanal's complex hydrological regime. Calheiros et al. (2012) report a total of 135 hydropower projects in the Brazilian section of the Upper Paraguay River Basin alone under construction or consideration at the time of writing, of which 38 were in operation.

► Habitat Shifting/ Alteration, Droughts, Temperature extremes

Data Deficient
Inside site, throughout(>50%)
Outside site

Climate change is an overarching concern expected to disproportionately affect the complex wetland system which is already under increasing pressure from multiple threats.

► Shipping Lanes

Very High Threat
Inside site, extent of threat not known
Outside site

The term "Hidrovia" creates some confusion as even the natural course of the Paraguay River serves as a de facto waterway (or hidrovia). Furthermore, infrastructure projects ranging from local to international level have used the name. This assessment defines the Hidrovia project as the megainfrastructure proposal also known as the Paraguay-Paraná Waterway, which would bring together Argentina, Bolivia, Brazil, Paraguay, Uruguay in an effort to allow passage of large vessels transporting minerals and agricultural crops to the Atlantic coast. This would require massive dredging, change of course and removal of natural obstacles, which would massively change the still free-flowing Paraguay River (Mittermeier et al., 2005).

Protection and management

Assessing Protection and Management

► Relationships with local people

Mostly Effective

Interests and perceptions of the past, current situation and desired future of the Pantanal sharply differ between stakeholders and rights-holders (Ioris, 2013). Conflict lines include subsistence versus industrial agriculture and ranching and conservation versus narrow private sector development models. The property itself is very small in comparison to the overall area of the Pantanal. It is owned and managed by federal and private conservation actors, respectively, and neither inhabited nor subject to land claims. There are no inhabitants within the Park and only occasional incursions of cattle from neighboring ranches occur. An Advisory Council brings together relevant government agencies, non-governmental organizations and local community representatives to advise on management (World Heritage Commitee, 2015; Tazik et al., 2004).

► Legal framework

Mostly Effective

The Pantanal enjoys explicit protection as national heritage according Art. 225, § 4 of Brazil’s Constitution dated 1988, which stipulates its conservation and sustainable use. Matogrossense National Park was established by Federal Decree in 1981 while the three contiguous private protected areas were formally recognized by IBAMA (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis) in 1997 as so-called Reservas Particulares do Patrimônio Natural (RPPN), a category according to Brazil's protected area law SNUC. The national park was declared a Wetland of International Importance (Ramsar Site) in 1993 and designated as one of multiple core zones of a biosphere reserve simulataneously with the World Heritage inscription in 2000, adding several layers of international recognition.

► Enforcement

Some Concern

While law enforcement in the property itself is not considered a major concern, limited law enforcement in the wider Pantanal is an important concern, for example as regards compliance with environmental legislation, widespread poaching and wildlife trade.

► Integration into regional and national planning systems

Serious Concern

Given that the property covers a small part only of a vast and extraordinarily complex wetland system extending over territories of three countries, the main factors determining its future are beyond the control of site management. Limitations in terms of coherent planning at both the national and the transboundary level are thus a major concern.

► Management system

Some Concern

Pantanal National Park is managed by the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), a semi-autonomous agency under the federal Ministry of the Environment (MMA). Management is guided by a management plan adopted in 2003. The ECOTRÓPICA Foundation, a Brazilian non-profit NGO, manages the three private reserves (Acurizal, Penha and Dorochê) all integral parts of the property (UNEP-WCMC, 2011). No major challenges are known in terms of the coordination between the federal and private (NGO) management set-ups.

► Management effectiveness

Some Concern

Formal evaluations of management effectiveness for the Pantanal National Park in 2005-2006 and 2010, using the RAPPAM method, found overall management effectiveness of the property to be good for both evaluations, though the rating had slipped from the 1st to the 2nd evaluation (70% to 64%). The 2010 ratings were highest (above 70%) for biological and socio-economic importance, legal support, initial design and planning of the area,

objectives (clarity and appropriateness), decision-making and results. It received the lowest scores (50% or lower) in terms of infrastructure, financial resources, and human resources (ICMBio, 2012).

▶ Implementation of Committee decisions and recommendations

Data Deficient

No Committee decisions have been taken on the property since its inscription other than the adoption of the retrospective Statement of Outstanding Universal Value in 2015.

▶ Boundaries

Some Concern

The boundaries are clear and well planned, as well as demarked on the ground, with buoys used for demarcation during high waters (UNEP-WCMC, 2011). While it is clear that protected areas covering a humble surface of less than 2 percent of a major ecosystem inevitably come with shortcomings, the site selection and configuration represents a plausible and coherent conservation planning approach.

▶ Sustainable finance

Serious Concern

Finances were inadequate for implementing the management plan even before the current economic crisis (ICMBio, 2012), suggesting major challenges. The private NGO owning and operating the three private protected areas contiguous to the national park benefited from temporary support from the Rapid Response Facility in 2012, likewise indicating financial challenges.

▶ Staff training and development

Some Concern

The federal institution in charge of managing the national park acknowledges insufficient staffing levels as one limiting factor of the full implementation of the management plan (ICMBio, 2012). The ECOTRÓPICA Foundation cooperates with Everglades National Park to improve staff training and park

management (UNEP-WCMC, 2011).

▶ Sustainable use

Mostly Effective

Consumptive uses are severely limited besides scattered cattle-grazing with the main uses being tourism and research (ICMBio, 2012). The site is a rare no-take zone for fishing and as such serves as an important reserve and reference area (UNEP-WCMC, 2011).

▶ Education and interpretation programs

Some Concern

Environmental education is an explicit management objective for both of the protected area categories comprising the property. The management plan states the absence of a structured environmental education programme, referring to corresponding activities as "isolated and unsystematic" (ICMBio, 2003).

▶ Tourism and visitation management

Mostly Effective

The National Park is not open to tourism at present (ICMBio, 2012), confirmed by ICMBio's website at the time of writing. ECOTRÓPICA explicitly endorses ecotourism but offers limited visitation options at this stage beyond a visitor center at Acurizal. Elsewhere in the Pantanal privately run estates offer a broad range of touristic options. It can be argued that the property avoids the well-documented impacts of tourism, while missing out on opportunities in terms of conservation financing and visitor education.

▶ Monitoring

Some Concern

Research and monitoring are rated as fair by the assessment of management effectiveness (ICMBio, 2012). Periodic monitoring is done by ICMBio and the Forest Police, by photographic survey, satellite image analysis and by water quality specialists (UNEP-WCMC, 2011).

► Research

Mostly Effective

The property has good infrastructure for researchers. The ECOTRÓPICA Foundation headquarters in the Acurizal Reserve was renovated in 1995-96, with funds from the National Environment Program, and has excellent facilities for visitors and scientists. A Research Plan for the National Park was drawn up in 1997 with the assistance of the Nature Conservancy (TNC) (UNEP-WCMC, 2011). Elsewhere in the Pantanal, several research institutions have been involved in research for decades, often in close cooperation with renowned research institutions from all over the world.

Overall assessment of protection and management

Some Concern

The property has a comparatively effective management system and is not particularly and directly exposed to the many threats facing the Pantanal. Therefore, the concerns are minor from a conventional protection and management perspective of the property per se. The unresolved dilemma is that the main threats cannot be addressed at the site level by their very nature, but inevitably require responses at the regional, national and even international level.

► Assessment of the effectiveness of protection and management in addressing threats outside the site

Serious Concern

The major threats originating from outside the property, such as land use change, hydrological alterations, sedimentation and pollution, are largely beyond the scope and mandate of site management and the Brazilian federal protected area agency ICMBio. Given multiple and increasing threats without a coherent management response, there is serious concern about the effectiveness of addressing external threats.

► Best practice examples

The property consists of a functional contiguous cluster of several protected

areas with differing governance set-ups bringing together governmental and non-governmental conservation together, including under a World Heritage umbrella.

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Outstanding landscape beauty**

Low Concern
Trend:Deteriorating

It can be argued, somewhat superficially, that the scenic beauty and aesthetic importance is still mostly intact as no land use changes or major visible deterioration has occurred in the property itself (ICMBio, 2012; UNEP-WCMC, 2011).

▶ **On-going ecological processes**

High Concern
Trend:Deteriorating

The ecohydrological regime and associated processes have been affected by deforestation and other land use changes, water pollution, as well as numerous dams in many of the tributaries of the Paraguay River (Tazik et al. 2004).

▶ **High biodiversity and large wildlife aggregations**

High Concern
Trend:Deteriorating

To the degree known, the biodiversity of the property is primarily being impacted by changes to the natural ecosystems being brought about altered water regimes, water pollution and several invasive species of both flora and fauna. Unless ongoing patterns are reversed, halted or at least slowed down, the multiple pressures on biodiversity values is likely further increase,

aggravated by the expected of climate change.

Summary of the Values

▶ **Assessment of the current state and trend of World Heritage values**

High Concern

Trend: Deteriorating

Overall, the natural beauty and aesthetics of the property remain intact. However, key natural phenomena and processes, as well the biodiversity of the property are being impacted by structural anthropogenic changes. Rather than meeting management responses, the key drivers of change are increasingly powerful.

Additional information

Benefits

Understanding Benefits

▶ **Importance for research, Contribution to education**

The entire Pantanal is of extraordinary scientific importance as one of the largest and most complex wetlands of the world. The property offers a particularly interesting potential due to its high degree of naturalness and effective long-term protection. Both the national park and the adjacent private protected areas (RPPNs) promote environmental education among their key management objectives. Education is furthermore an explicit objective of the overlapping biosphere reserve.

▶ **Carbon sequestration, Flood prevention, Water provision (importance for water quantity and quality), Pollination**

While best known for its open, seasonally flooded wetlands, both the wider Pantanal and the property boast important forests of diverse types. Both the

wetlands and forests ensure carbon sequestration. Among the regulatory services is the buffering of heavy seasonal rainfalls and river flows. This buffering results in both flood prevention and water provision and purification for ecosystems and people in the entire Paraguay River watershed all the way to the Atlantic.

▶ **Collection of wild plants and mushrooms, Fishing areas and conservation of fish stocks, Traditional agriculture, Livestock grazing areas**

The Pantanal - rather than the property itself - is of critical importance to local communities which depend on the wetland's natural resources, including non-timber forest products and fish, for food. Agriculture and cattle ranching ranges from the level of local subsistence to the large-scale commercial.

▶ **History and tradition, Sacred natural sites or landscapes, Cultural identity and sense of belonging**

Prior to European colonization indigenous peoples have been using the natural resources of the Pantanal for more than 5,000 years (Mittermeier et al., 2005) and continue to do so in some areas. The few remaining Gató live around the property (Mittermeier et al., 2005). The more recent history has shaped a very particular "Pantaneiro" culture, which is today being replaced by modern agriculture. It is interesting to note that the Brazilian Constitution recognizes the Pantanal as one a a handful of landscapes as natural heritage, illustrating its iconic nature. As a comparatively wild place of global conservation significance, the Pantanal has been receiving international attention for decades.

▶ **Outdoor recreation and tourism, Natural beauty and scenery**

Tourism and recreation are localized due to the remoteness and limited infrastructure, the property being one hub in the Brazilian Pantanal.

▶ **Direct employment, Tourism-related income, Provision of jobs**

While modest, the national park and the contiguous private protected areas are a source of direct and indirect employment and income.

Summary of benefits

It is difficult to separate the benefits of the property from the benefits of the wider Pantanal. The wider Pantanal, which in turn cannot be separated from the Paraguay River watershed, is of enormous ecological and economic importance for millions of people in Bolivia, Paraguay, Brazil, as well as downstream in Uruguay and Argentina across a broad range of environmental services. The property itself protects a particularly valuable representation of the Pantanal with enormous conservation, research and education benefits.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	Centro de Pesquisa do Pantanal (CPP) / Pantanal Research Center		The CPP is a non-profit research center dedicated to generate knowledge about wetlands so as to contribute to their sustainable use.
2	Embrapa Pantanal		Embrapa (Brazilian Agricultural Research Corporation, linked to the Ministry of Agriculture, Livestock, and Food Supply) has been operating a unit in the Brazilian Pantanal since 1975. The unit has generated a wealth of readily available information information about the region.
3	Wildlife Conservation Society of Brazil (WCS-Brasil)		WCS-Brasil conducts research and monitoring in the Pantanal WCS. Publications include the Revista Ciência Pantanal.
4	Instituto Homem Pantaneiro		Various. For example, The Institute donated to the Jatobazinho School native fish species of the Pantanal. The Fish Culture project aims to decrease overfishing and increase family income, stimulating and training the population on fish farming.

№	Organization/ individuals	Project duration	Brief description of Active Projects
5	REPAMS Incentive Programme for Private Protected Areas (Programa de Incentivo às RPPNs do Pantanal)		REPAMS is the association of owners of private protected areas in the Brazilian state of Mato Grosso do Sul (MS). Along with several partners it runs a programme to create incentives for private protected areas among other activities.
6	ECOTRÓPICA - Fundação de Apoio à Vida nos Trópicos		The non-profit foundation has been active since 1989 and owns and manages the three private reserves forming the Pantanal Conservation Area jointly with the Pantanal Matogrossense National Park. More recently, after World Heritage inscription, the foundation acquired another contiguous area named RPPN Rumo ao Oeste. All these areas are formally recognized as so-called Reservas Particulares do Patrimônio Natural (RPPN), a protected area category under Brazilian legislation.
7	WWF Brasil		WWF Brasil has a long history of involvement in the Pantanal. Important contributions include a conservation priority setting exercise for the Pantanal and the adjacent Brazilian Cerrado (WWF Brasil, 2015).

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years

1	Harmonization with the overlapping Pantanal biosphere reserve	The vast Pantanal biosphere reserve was designated in 2000, the year of the World Heritage inscription. Its multiple core zones comprise 664,245 hectares which have been selected according to their high conservation values and conservation status. The core zones thereby can be considered as a protected area system or network within the Brazilian Pantanal. Some of the core zones may lend themselves as possible extension areas of the World Heritage property. Comprehensive recent studies guiding the identification of areas for potential serial or contiguous extensions of the World Heritage property are readily available (WWF Brasil, 2015).

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