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Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: 30 April 2001
2. Country: Bolivia
3. Name of wetland: Bolivian Pantanal (Pantanal Boliviano)
4. Geographical coordinates:

Pantanal de San Matías
17° 27' South latitude
58° 32' West longitude

Pantanal de Otuquis
19° 25' South latitude
58° 10' West longitude

5. Altitude: 100 metres
6. Area: 3,189,888 hectares
7. Overview:

The Bolivian Pantanal is a highly complex and seasonally dynamic mosaic of lakes, pools, swamps, flooded grasslands, palm groves, dry forest and cerrado¹. It is the habitat for a complete range of plant and animal communities typical of the Brazil-Paraná biogeographic region in excellent status of conservation.

8. Wetland type:

Continental: O, M, N, Tp, Ts, W, Xf

Types of wetlands by decreasing order of importance: Ts, Tp, Xf, W, O, N, M

9. Ramsar criteria: 1, 2, 3, 4, 5, 7, 8

Criteria that best characterize the site: 1

10. Map of site included? Please tick yes -or- no

¹ [A type of savannah found in Brazil, in which trees (9–15 metres in height) are intermixed with tall grassland.]

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12. Justification of the criteria selected under point 9, on previous page:

Criterion 1: The Bolivian Pantanal contains a complete range of all types of plant communities typical of wetlands in the Brazil-Paraná biogeographic region and contains excellent and extensive examples of the same, especially flooded woodlands and palm groves (Rivas-Martinez and Navarro, 1994). Although this wetland is smaller, Parker et al. (1993) hold that the Bolivian Pantanal could be of greater biological importance than the Brazilian Pantanal because of its contiguity with large areas of Chiquitano forests and cerrado in good conservation status.

The Bolivian Pantanal is of great hydrological, biological and ecological importance. Through a complex of rivers, lakes, swamps and flooded woodlands and grasslands, it provides a large proportion of the water of the Paraguay River (part of the River Plate basin shared by five Neotropical countries), regulating flooding and drought in a large part of eastern Bolivia. It influences the regional mesoclimate and retains sedimentation and nutrients necessary for maintenance of the region's trophic chain, biodiversity and human population (Museo de Historia Natural Noel Kempff Mercado, 2000; Montes de Oca, 1997).

Criterion 2: The Bolivian Pantanal sustains populations of the following six species considered by IUCN to be endangered (Parker et al., 1993; MHNNKM, 2000).

Hyacinth macaw (*Anodorhynchus hyacinthinus*): EN endangered
Crowned eagle (*Harpyhaliaetus coronatus*): VU vulnerable
Polystictus pectoralis: LR at risk
Porophyraspiza pectoralis: LR at risk
Common rhea (*Rhea americana*): LR at risk
Sporophila ruficollis: LR at risk

In addition to these species and the waterfowl described below, the proposed Ramsar site sustains another group of very important birds. The communities of birds in the fields and cerrados are now considered to be some of the most endangered in the Neotropical world because of loss of habitat (Stotz et al., 1996).

The Bolivian Pantanal has populations of nine large mammals considered to be threatened by IUCN (MHNNKM, 2000; Parker et al., 1993).

Marsh deer (*Blastocerus dichotomus*): EN endangered
Maned wolf (*Chrysocyon brachyurus*): LR at risk
Giant anteater (*Myrmecophaga tridactyla*): VU vulnerable
Pampas deer (*Ozotoceros bezoarticus*): LR at risk
Jaguar (*Panthera onca*): LR at risk

Giant armadillo (*Priodontes maximus*):EN endangered
Giant Brazilian otter (*Pteronure brasiliensis*):EN endangered
Bush dog (*Speothos venaticus*): VU vulnerable
Brazilian tapir (*Tapirus terrestris*): LR at risk

Criterion 3: The Bolivian Pantanal is characterized by a broad diversity of communities and types of vegetation because of the overlapping in this area of the Brazil-Paraná (including the cerrado and the Chiquitano woodlands) and the Chaco biogeographic region (Navarro, 1997; Rivas-Martinez, 1994). In general, vegetation in the Bolivian Pantanal is in good conservation status because of the low anthropogenic pressure in the area (Parker et al., 1993). As a result, it supports a high diversity of animals, including at least 197 species of fish, more than 70 species of herptiles, more than 300 species of birds and more than 50 species of large mammals (MHNNKM, 2000). It is also an ecologic and genetic corridor for many species common to more than one geographic region.

Criterion 4: The Bolivian Pantanal fully meets this criterion because it is a seasonal refuge, a breeding area for thousands of waterfowl (see criterion 5) and a refuge for several species of large mammals during the dry season, for example *Blastocerus dichotomus*, *Chrysocyon brachyurus*, *Ozotoceros bezoarticus*, *Panthera onca*, *Puma concolor*, *Tapirus terrestris* and *Tayassu tajacu*.

This is an area of breeding, growth, feeding and migration for many species of fish (see criteria 7 and 8 below) and a breeding and growth area and corridor for migration for many species of amphibians and reptiles (MHNNKM, 2000; Parker et al., 1993).

Criterion 5: Despite a lack of studies over time, there is no doubt that this large and very diverse wetland regularly sustains more than 20,000 waterfowl. The most important survey was made by Parker et al. (1993). In a lake south of Cerro Mutún (municipio of Puerto Suárez), the most important group of Ciconiiformes (storks and cranes) ever seen during decades of work in the western hemisphere (at least 6000 specimens) was recorded. The Ciconiiformes are large predators at the top of the food chain, and, depending on the time of year, they are significantly fewer than other species of smaller aquatic birds, such as Anatidae (ducks), Jacanidae, Rallidae (rails), Scolopacidae (curlews) and Charadriidae. Researchers with the Museo de Historia Natural Noel Kempff Mercado (2000) recorded large numbers of waterfowl for all of the Bolivian Pantanal and confirmed an abundance of the following species: *Anhinga anhinga*, *Aramides cajanea*, *Ardea cocoi*, *Bubulcus ibis*, *Butorides striatus*, *Casmerodius albus*, *Chauna torquata*, *Dendrocygna autumnalis*, *D. viduata*, *Egretta thula*, *Jacana jacana*, *Phalacrocorax brasilianus*, *Tigrisoma lineatum* and *Vanellus chilensis*.

Criterion 7: Because of a large diversity of aquatic habitats, the Bolivian Pantanal has a high diversity and productivity of fish. Until now, 197 species of fish in 30 families and 10 orders have been identified in the Bolivian Pantanal (MHNNKM, unpublished information). Nonetheless, knowledge about fish in the Bolivian Pantanal is still very superficial, and it is very probable that detailed studies will significantly increase the number of species known at the proposed Ramsar site. At the present time, the Pantanal is an important area for contact between fish from three biogeographic

regions: the Chaco, the Amazon and the Brazil-Paraná region. The seasonal conditions in the Pantanal offer a favourable environment for several species of annual fish (Rivulidae) and the *pez pulmonado* (*Lepidosiren paradoxa*), which depend on seasonal aquatic ecosystems to complete their biological cycles.

Criterion 8: The diverse group of aquatic environments that form the Bolivian Pantanal provide areas for feeding, breeding and growth for many fish species (MHNNKM, 2000). In addition, the Bolivian Pantanal plays a role in the migration of species such as the *yatorana* (*Brycon microlepis*), *pacú* (*Piaractus mesopotamicus*), *sábalo* (*Prochilodus lineatus*) and *dorado* (*Salminus maxillosus*).

13. General location:

The Bolivian Pantanal is located in the eastern part of the department of Santa Cruz in the provinces of Angel Sandoval and Germán Busch with a small part in the province of Velasco. The two important towns located on the edge of the site are San Matías (11,300 inhabitants), which is located in the extreme northeastern corner of the site, and Puerto Suárez (22,300 inhabitants), which is located southeast of the site (PRIME et al., 2000). Both towns are located on the eastern edge of the site, which is the border with Brazil.

14. Physical features:

The Pantanal is one of the most important natural wetlands in the world with an area of more than 100,000 square kilometres, shared between the state of Mato Grosso in Brazil, the department of Santa Cruz in Bolivia and northeastern Paraguay (Parker et al., 1993). Most of the wetland is in western Mato Grosso. However, Parker et al. (1993) speculate that the Bolivian part of the Pantanal has the most biological importance because of its good conservation status and the large areas of well conserved cerrado and Chiquitano forest that are on the western edge of the wetland. These habitats form the Bolivian region known historically as Chiquitanía and that characterize the water basin of the Bolivian Pantanal. At the present time, because of the good conservation status of the natural habitats within the water basin, the water flowing into the Bolivian Pantanal is of good quality. Nonetheless, at the site, in the area near the towns of Puerto Suárez and Puerto Quijarro there are sources of water pollution because of industrial activity.

The site has an average annual precipitation of between 500 mm in the south and up to 1300 mm in the northeast with an average annual temperature between 25 and 26° C (Montes de Oca, 1997). The region's climate is characterized by its marked seasonality, with a dry period that corresponds to the southern winter and a rainy season that lasts from November to March. Several large bodies of water, the Cáceres, Gaiba, Mandioré and Uberaba lakes, which characterize the eastern shore of the site and the bed of the Paraguay River, are permanent. Nonetheless, most of the sites are characterized by habitats that are flooded only seasonally, for example grasslands and flooded woodlands, swamps and *curichales*, which can completely dry up during September and October.

15. Hydrological values:

From the point of view of physiography, the Bolivian Pantanal forms a large depression that accumulates runoff from the upper basin of the Paraguay River, which is part of the River Plate system (MHNNKM, 2000). The site is drained by a complex water system, formed by lake ecosystems of marshes (*bañados*), large lakes, small pools, streams, rivers and creeks, which in turn feed into the two main tributaries of the Paraguay River in Bolivia, which are the Río Candelaria in the municipio of San Matías and the Río Otuquis in the municipio of Puerto Suárez (op. cit.).

Conservation of the Gran Pantanal is a global priority because of its role in regulating water in the Paraguay River, in maintaining the trophic chain in the region (by supplying sedimentation and nutrients) and, as a result, of the quality of water in the Paraguay River.

16. Ecological features:

The Bolivian Pantanal is a highly complex and seasonally dynamic mosaic of lakes, pools, swamps, rivers, meanders, flooded grasslands, palm groves, dry forests and cerrados on flooded alluvial soils with emergent relief (MHNNKM, 2000). The two biogeographic regions of greatest influence are the Brazil-Paraná (including the Bosque Chiquitano and the cerrado, which incorporate the largest part of the water basin of the Gran Pantanal) and the Chaco. In addition, the flora of the Pantanal is very closely related to these two regions, especially on the non-flooded high ground that forms part of the mosaic of habitats. Studies available lead us to think that the following ecological and characteristic plant associations are present.

Cerrado woodland: On well-drained land with the following stages or features:

- Wooded pampa - (called *campo cerrado* in Brazil);
- Pampa matorral (*campo sujo*) - This is a predominantly herbaceous area in which sub-shrub woody species appear;
- Herbaceous pampa (*campo limpo*) - with an absence of woody vegetation;
- Rocky areas and rock vegetation - located in areas of rocky outcroppings, such as the Cerro Mutún.

Semi-deciduous forests: This is the Bosque Chiquitano, whose floristic composition varies slightly depending on the degree of drainage of the soil. Towards the south and in finer alluvial soils, there is an overlapping with Chaco flora. Categories of drainage are:

- Well-drained: Characterized by *Anadenanthera colubrina*, *Astronium urundeuva*, *Caesalpinia pluviosa* and others;
- Poorly drained: In the valleys and on the piedmonts, the proportion of species preferring finer soils increases and includes species such as *Acosmium cardenasii*, *Calycophyllum multiflorum*, *Gallesia integrifolia* and *Phyllostylon*

ramnoides. A community of this type has been reported in the former delta of the Otuquis (Navarro, 1997).

- Hygrophyte or riparian: Situated in enclosed streams in the hills. This habitat retains the group of semi-deciduous species but species with a broader distribution increase, including several Amazon species, mainly the *palmera motacú* (*Attalea phalerata*), *Ficus* spp., *Salacia elliptica* and *Vitex cymosa*.
- Hygrophyte forest of middle elevations: A community characterized by *Machaerium hirtum* and *Tabebuia heptaphylla*.

Flooded woodlands and shrub Brazil-Paraná matorrales: On fine textured alluvial soils, there is usually a gradient of communities of this formation, depending on the length of flooding. There are:

- Seasonally flooded woodlands and woodlands with palm groves: With an external strip with a period of flooding of between one and three months. They are characterized by *Coccoloba* spp., *Copernicia alba*, *Geoffroea striata* and *Tabebuia nodosa*.
- Riparian woodlands: In contact with the water, characterized by *Albizia inundata*, *Banara arguta* and *Crateva tapia*. On sandy soils, there is a different community formed by *Couepia uiti*, *Ficus* spp., *Guarea* sp., *Inga* spp. and *Rheedia* sp.
- Riparian matorral shrub: Characterized and dominated by pioneer species, such as *Bactris glaucescens*, *Combretum laxum*, *Senna pendula*, *Sphinctanthus hasslerianus* and *Triplaris gardneriana*.

Herbaceous and sub-brush aquatic vegetation:

- Communities of pleustophytes: Made up of small floating plants such as *Azolla* spp., *Salvinia* spp. and Lemnaceae;
- Communities of hydrophytes: Formed by submerged rooted plants, such as *Cabomba* sp., *Nymphaea* spp., *Nymphoides* sp., *Victoria cruziana* and others.
- Communities of pleustohelophytes: Formed by floating species that take root when the water recedes, such as *Limnobium* spp. and Pontederiaceae;
- Communities of helophytes (bog plants): These are the most diverse and consist of emerged but rooted plants. Some outstanding examples are:
 - Reeds and rice-type plants: Made up of Gramineae of medium to short height, such as *Hymenachne* spp., *Leersia hexandra*, *Panicum elephantipes* and *Paspalum repens*;
 - Reeds: Made up of Ciperaceae, such as *Cyperus giganteus*;
 - Matarales: Communities dominated by *Typha* spp.

Helophyte matorrales: They replace herbaceous plants through the progressive nitrification and overgrazing of cattle, but are of little or no grazing value. They are dominated by sub-fruit bearing species and sub-shrub frequently covered with *bejucos* and include:

- *Tararaquizales*: Dominated by *Ipomoea carnea fistulosa*.
- *Espinares*: formed by thorny species such as *Bauhinia bauhinioides*, *Mimosa* spp. and *Senna aculeate*.

Mixed formations: Geomorphologic and topographical factors form elevations or hills in the floodplains where various woody species grow, forming physiognomic complexes such as island pampas and termite pampas.

Swamps with palm groves (*alcornocales*): Associations in which more or less dense populations of the palm *Copernicia alba* are found in a matrix of aquatic herbaceous vegetation. In other sectors, *Tabebuia aurea* is either included among palms or substitutes for palms.

17. Noteworthy flora:

The plant communities of the Bolivian Pantanal are divided into two groups: non-flooded units on high land (cerrado and Bosque Chiquitano) and permanently or seasonally flooded units. Among the flooded communities are:

Seasonally flooded woodlands and palm groves characterized by *Coccoloba* spp., *Copernicia alba*, *Geoffroea striata* and *Tabebuia nodosa*. The proposed site has many good examples of these forests, which are of great biological and geographical importance (fish farms, flood control, retention of sedimentation) (MHNNKM, 2000).

Aquatic communities characterized by *Azolla* spp., *Cabomba* spp., *Limnobium* spp., *Nymphaea* spp. and *Salvinia* spp. These communities are also of high biological importance as breeding areas for fish and aquatic invertebrates and for the retention of sediments (PRIME et al., 2000). The Bolivian Pantanal sustains populations of several aquatic plants (*Bergeronia sericea*, *Sphinctanthus hasslerianus* and *Thevetia bicornime*), which are considered rare by IUCN and one that is considered endangered: *Paspalum wrightii* (Walter and Gillett, 1998). However, IUCN lists are preliminary and several other species recorded in the Bolivian Pantanal are also rare, such as *Leptochloa panichoides*, *Neptunia plena* and *Pontederia triflora* and were recorded in Bolivia for the first time by MHNNKM (2000).

18. Noteworthy fauna:

The Bolivian Pantanal is characterized by a wide diversity of habitats and because of this it sustains a high diversity of fauna.

It sustains a diverse fish fauna (197 known species) including several species of economic importance, such as the *pacú* (*Piaractus mesopotamicus*), **Guinea fowl** (*Pseudoplatystoma corruscans*), *surubí* (*P. fasciatum*) and *dorado* (*Salminus maxillosus*) (MHNNKM, 2000). It also sustains an abundant and diverse herpetofauna that includes healthy populations of several rare species, such as *Boa constrictor*, *Caiman yacare*, *Chelonoidis carbonaria*, *C. denticulate* and *Eunectes notaeus* (MHNNKM, 2000).

There is very diverse bird fauna (more than 300 species) because of the large diversity of habitats, which have large populations of aquatic birds. Up to now, 56 species of aquatic birds in 18 families have been identified in the Bolivian Pantanal (MHNNKM, 2000). In addition, there are large populations of predator birds linked to the aquatic environments, for example *Busarellus nigricollis* and *Buteogallus meridionalis*. The most distinct bird in the Pantanal is the hyacinth macaw (*paraba azul*) (*Anodorhynchus hyacinthinus*), which is endangered at the national level (Dammermann, 2000).

As for the large fauna, the Bolivian Pantanal sustains a large diversity of large mammals. The population of marsh deer (*Blastocerus dichotomus*) at the site is considered to be of world importance for the conservation of this species (Parker et al., 1993). Other endangered species (IUCN 2000) characteristic of the Bolivian Pantanal includes the maned wolf (*borochi*) (*Chrysocyon brachyurus*), the giant anteater (*oso bandera*) (*Myrmecophaga tridactyla*), Pampas deer (*gama*) (*Ozotoceros bezoarticus*), panther (*Panthera onca*), giant armadillo (*pejichi*) (*Priodontes maximus*) and the Brazilian tapir (*anta*) (*Tapirus terrestris*).

19. Social and cultural values:

Historically, the Bolivian Pantanal was inhabited by the Chiquitano and Ayoréode communities (southern shore, area of Chaco transition). During the previous century, the expansion of livestock raising and trade with Brazil led to colonization of the Bolivian Pantanal by people from outside the area and the creation of large holdings of private property (PRIME et al., 2000). Nonetheless, the rural population at the proposed site is still relatively low. The municipio of San Matías has 11,300 inhabitants, 36 per cent of which live in towns of more than 2000 inhabitants (op. cit.). The high proportion of rural inhabitants in that municipio is because of the importance of livestock raising in the local economy (op. cit.). To the south, the municipios de Puerto Suárez and Puerto Quijarro have 22,300 and 10100 inhabitants, of which 70 per cent (Puerto Suárez) and 80 per cent (Puerto Quijarro) live in towns of more than 2000 inhabitants (op. cit.). The concentration of inhabitants in these municipios in towns on the border is because of the local importance of trade with Brazil, facilitated by the railroad from Santa Cruz, which crosses the Brazilian border at Puerto Quijarro. As a result, the rural inhabitants of Puerto Suárez and Puerto Quijarro are not numerous (3400 and 2000 respectively), and the conservation status of large areas of these municipios remains excellent (Parker et al., 1993).

20. Land tenure/ownership of:

Most of the San Matías Area Natural de Manejo Integrado to the north of the site is divided into cattle ranches and is rather populated. However, the Pantanal de

Otuquis National Park is almost entirely public land. At the site, there is “*tierra comunitaria de origen*” (belonging to a group of Ayoréode) of 50,000 hectares in the area of Rincon del Tigre. The rest of the site is subject to requests by groups of Chiquitano Indians for the same status.

21. Current land use:

(a) In the municipio de San Matías (population 11,300), there are many ranches that occupy most of the northern part of the Bolivian Pantanal. In the municipios of Puerto Suárez and Puerto Quijarro, the population works in industry and international trade with Brazil and the rural population is low. However, the municipio of Puerto Suárez has very valuable mineral resources (platinum, palladium, amethyst and bolivianite) and as a result there are several mines at the proposed site, such as Cerro Mutún and in the area of La Gaiba and Mandioré lakes. Furthermore, along all of the western shore of the site there are forest concessions. However, until now most of these have not yet been used. For all the inhabited areas of the wetland, the rural inhabitants hunt, fish and practice subsistence agriculture.

(b) The main land use in the catchment basin of the Bolivian Pantanal is forest activity that is being rapidly developed in the Chiquitano forest to the west of the site and which harms the headwaters of the tributaries to the wetland. The rate of deforestation in the Chiquitano ranges between 150,000 and 200,000 hectares per year (PRIME et al., 2000).

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

a) The site has very valuable mineral resources whose extraction under Bolivian legislation is unavoidable and will require considerable energy resources. There are plans to clear large extensions of natural habitat at and outside the proposed site in order to provide firewood to the mining industry. It should be pointed out that the mining industry, especially the extraction of precious metals, uses heavy metals such as mercury, which are highly toxic, very stable and subject to accumulation in the soil, animals and aquatic birds in the wetland. Another effect of the development of industry in the area will be improvement of local transportation and the pavement of highways. Facilitation of access is one of the factors that most contributes to colonialization of areas of natural vegetation by poor local farmers and to the commercial and recreational exploitation of natural resources by inhabitants of nearby towns.

If the region were declared free from foot-and-mouth disease, it is conceivable that livestock ranching, currently little used, would expand intensively to all the pampas and savannahs of the Bolivian Pantanal. The sowing of introduced pastures, such as *Brachyaria* spp., annual burning, the clearing of the cerrado and overgrazing are several effects of intensive livestock raising leading to substantial changes in the flora and structure of the fields and cerrados.

At the proposed site, there are two types of hunting: subsistence hunting and commercial hunting (for pets). Subsistence hunting in the area primarily affects large species that are vulnerable because of their slow rate of reproduction. This includes

large mammals and birds, such as turkeys (Cracidae) and partridge (Tinamidae). Commercial hunting for pets is a problem that requires an urgent solution for all of Bolivia. The species that is most affected at the site is the hyacinth macaw (*paraba azul*) (*Anodorhynchus hyacinthinus*). Currently, there are about 200 specimens of this species in Bolivia, almost all in the Pantanal (Dammermann, 2000). The factor that most contributes to the decrease in the Bolivian population of the hyacinth macaw is illegal trade (Dammermann, 2000).

(b) Although the hydrographical basins of the Bolivian Pantanal are in much better conservation status than on the Brazilian side, deforestation of the headwaters of rivers and streams in the Chiquitanía directly cause degradation of the water quality of the Pantanal, which in turn affects the communities of fauna and flora. The rate of deforestation in the Chiquitanía ranges between 150,000 and 250,000 hectares per year (PRIME et al., 2000).

The possible improvement of the Hidrovía Paraguay-Paraná in Brazil and the proposed elimination of obstacles to navigation in Bolivia, which are rock outcroppings acting as natural dams to the flow of water, would imply changes in the Paraguay riverbed, which would result in a decrease of area, depth and duration of flooding throughout the Pantanal, in addition to affecting its function as regulator of the Paraguay River (MHNNKM, 2000).

It is still impossible to predict accurately the natural or man-made climate changes that will occur in the region during the next century and afterwards. However, it is well known that a small change in climate can have very significant consequences for local biodiversity. In the near future, it is possible that the protected areas now established to protect local biodiversity will not have the climatic conditions necessary to sustain the species that now characterize the area.

23. Conservation measures taken:

The Bolivian Pantanal has two protected areas that include almost all of the proposed Ramsar site. These are the national park and the Pantanal de Otuquis Area Natural de Manejo Integrado (ANMI) and the San Matías ANMI. The Pantanal de Otuquis National Park (903,350 hectares) and the Pantanal de Otuquis (102,600 hectares) cover a large area of the central Pantanal (about 44 per cent of the protected area). This is an area that has suffered little intervention, but the protected area still has no administration. The San Matías ANMI (2,900,000 hectares), which has an administration and six park wardens, is located in the northern part of the proposed site.

During recent years, WWF-Bolivia has financed the work of the Bolivian NGO Proceso, which promotes environmental education. They have trained 27 environmental educators in 17 communities of the San Matías ANMI and 30 in the Otuquis ANMI. In addition, they have provided environmental material to schools in the San Matías ANMI.

24. Conservation measures proposed but not yet implemented:

In July 2001, the Servicio Nacional de Areas Protegidas (SERNAP) of the government of Bolivia hopes to create an administration in the national park and the Pantanal de Otuquis ANMI.

25. Current scientific research and facilities:

The WWF-Bolivia is seeking financial support for long-term studies of several species that characterize the site, such as the marsh deer (*Blastocerus dichotomus*), the hyacinth macaw (*Anodorhynchus hyacinthinus*) and the yacare caiman (*Caiman yacare*). WWF is beginning a programme for monitoring the conservation status of the semi-deciduous forests in the basin of the Bolivian Pantanal using satellite images.

26. Current conservation education:

The San Matías and Otuquis ANMIs have teams of environmental educators whose role is to distribute information to the communities at the site on conservation activities in the ANMI and rational use of natural resources.

27. Current recreation and tourism:

Because of problems of access to the Bolivian Pantanal, the proposed site currently has very few tourist and recreational activities. However, the Servicio Nacional de Areas Protegidas (SERNAP) intends to develop ecotourism at the site in order to provide alternative income for local inhabitants.

28. Jurisdiction:

Government of Bolivia
Prefecture of the department of Santa Cruz
Sub-prefectures of the provinces of Angel Sandoval and Germán Busch
Alcaldías of San Matías, San Rafael (Angel Sandoval), Puerto Suárez and Puerto Quijarro (Germán Busch)

The administrative authority for the protected areas of the Bolivian Pantanal is the Ministerio de Desarrollo Sostenible y Planificación of the government of Bolivia through the Servicio Nacional de Areas Protegidas (SERNAP)

29. Management authority:

The local authorities responsible for the management of the site are the municipios of Puerto Suárez, Puerto Quijarro and San Matías. However, the authority responsible for the two protected areas in the wetland is the Servicio Nacional de Areas Protegidas of the government of Bolivia.

30. References: