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Pantanal (NT0907)

Peer review in process - unreviewed document presented



Rio Pimiento, Bolivia

Photograph by Steffen Reichle/WWF-Bolivia

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The Pantanal is the largest wetland in South America, and the largest wetland in the world that has not been substantially modified by humans. While endemism in the area is low, the sheer abundance of large birds, reptiles and mammals mark its importance as a huge reservoir of biodiversity. Much of the ecoregion remains intact; however, pesticide runoff constitutes a major threat to the watershed of the Rio Paraguay. Also, a project by several governments plans to provide navigable waterway for

shipping and dams for hydroelectricity generation, which would drastically alter this pristine habitat.

+ WHERE

Central South America:
Southwestern Brazil, into Bolivia and Paraguay

+ SIZE

66,100 square miles (171,100 square kilometers)
-- about the size of Washington

+ BIOME

Flooded Grasslands and Savannas

+ CONSERVATION STATUS

Critical/Endangered

▼ Location and General Description

Located roughly in the center of South America, near the borders of Brazil, Bolivia, and Paraguay, the Pantanal stretches from 16° to 20° S latitude. The majority of the ecoregion occurs in Brazil as a floodplain around the Rio Paraguay and tributaries. The terrain is essentially flat, ranging from 75 to 200 m above sea level. This elevation coupled with the gentle slope of the rivers in the area, account for the massive flooding during the annual wet season when up to 78 % of the area can be submerged (Hamilton et al.

1996). The Pantanal is bordered on the north and east by uplifted areas which are part of the Central Brazilian Shield -one of the oldest continental areas on Earth, and to the west by ranges of heavily eroded ancient volcanic mountains (Heckman 1998).

Sediment cores suggest that the Pantanal was covered by sandy desert as recently as the last glacial period (13,000-23,000 to years ago). This period was followed by another period (7,000 to 5,000 years ago) of increased rainfall, humidity, and temperature that probably left the area covered with more extensive and permanent large lakes (Por 1995). The current tropical semihumid climate is dominated by a highly seasonal pattern of rainfall with over 100 mm falling per month between November and March, followed by a much drier winter during which the temperature occasionally drops to near 0 °C (Por 1995).

The vegetation communities in this area are divided by small changes in topography that determines the frequency and duration of flooding they experience (Alho and Vieira 1997). In the lowest areas, the Pantanal is covered by thousands of permanent and semi-permanent lakes, oxbows, and ponds ranging from a few meters to tens of kilometers in diameter. These are often covered with vegetation representing the most diverse floating aquatic plant community in the world (Por 1995). These floating plants are the most important primary producers in the ecoregion. Common floating species include

Eichhornia crassipes

Salvinia auriculata

Pistia stratiotes

growing near lake edges and in shallower waters include

Cyperus giganteus

Scirpus validus

Typha dominguensis

seasonally flooded grasslands are dominated by herbaceous plants that can tolerate extremes of flood and fire. Typical grassland species include

Axonopus purpusii

Eleocharis acutangula

and *Panicum*

scabra

spp. The shrub *Vernonia* occurs in low densities (Pinder and Rosso 1998).

At slightly higher elevations, cerrado habitat ranges from a woodland savanna with scattered shrubs to savanna forest with almost complete tree cover. These characteristics make the area less exposed to flooding and more exposed to fire. This habitat type covers huge areas of Brazil and the plant community it supports is widely distributed throughout. The ground layer is usually dominated by grasses with shrubs and short trees covering 15 to 40 % of the surface (Sarmiento 1983). Grasses such as *Elyonurus muticus* and *A. purpusii* are often present (Pinder and Rosso 1998). Shrub and tree species include

Chomelia obtusa, *Qualea*
 spp., and *Curatella*
americana (Prance and Schaller 1982) The palm
Copernicia alba sometimes occurs in
 monotypic stands in this habitat. Finally semideciduous, deciduous, and gallery
 forests are found along rivers and on the highest ground where summer floods
 rarely reach. Tree species include *Psidium*
kennedyanum, *Acacia* spp.,
Ceiba pentandra,
Enterolobium,
contortisiliquum,
Piptadenia macrocarpa,
Caesalpinea,
paraguariensis, and *Mimosa*
 spp. (Prance and Schaller 1982).

▼ Biodiversity Features

Levels of endemism are below 5 % for most taxa because the Pantanal has only existed as an extensive wetland since the last glacial period. Today the region experiences extreme seasonality and unpredictability in rainfall, and constantly shifting topography (Por 1995). However, there is high species diversity with over 400 plant, 500 lepidopteran, 400 fish (including some endemic freshwater stingrays, lungfish, and flatfish), 30 frog, 80 reptile, 650 bird, and 75 mammal species (Lutz 1946, Brown 1986, Por 1995, Heckman 1998)

Life histories of species in the Pantanal are driven by the extreme fluctuations in water level throughout the year. As the waters recede at the end of the dry season, many fish species migrate hundreds of kilometers upstream, and then reproduce during the early wet season. Adult and young fishes enter the flooded areas during the wet season before returning to permanent rivers as the waters recede. This migration or "piracema" occurs every year (Por 1995). In contrast to single annual fish migration, there are three migration routes bringing birds to the Pantanal during either the wet or dry season depending on the type of prey they utilize and the areas from which they are coming (Antas 1994, Alho and Vieira 1997). At least 86 species including some from the Arctic and Patagonia migrate to the area (Antas 1994). Species such as the Roseate Spoonbill (*Platalea ajaja*) and Wood Stork (*Mycteria americana*) have there largest breeding populations in the Pantanal and time their reproduction to coincide with a period of high prey abundance.

With the exception of two caiman species, most of the native large animals that were present before European arrival are still present in the Pantanal (Heckman

1998). In addition, there are a number of endangered or threatened species with substantial breeding populations in the area. These include the jaguar (*Panthera onca*), giant otter (*Pteronura brasiliensis*), hyacinth macaw (*Anodorhynchus hyacinthus*), giant armadillo (*Priodontes giganteus*), marsh deer (*Blastocerus dichotomus*), and pampas deer (*Ozotocerus bezoarticus*) (Mourao and Campos 1995, IUCN 1996). The population of Jaguars is particularly large in the NW and SE of the region where they prey on the abundance of capybara (*Hydrochaeris hydrochaeris*) and other medium sized mammals (Quigley and Crawshaw 1992).

▼ Current Status

While cattle ranching is not intense, this type of land use causes some degree of habitat modification. The majority of the Pantanal is in close to pristine condition with most of its biota still extant. Only two dirt roads cross the area from the northern end near Cuiabá, and one road bisects the area between Campo Grande and Corumbá (Heckman 1998). Less than 3 % of the Pantanal is currently included in protected areas; the remainder of the land is privately owned (Quigley and Crawshaw 1992). The Pantanal National Park covers 1,370 km² area along the Rio Paraguay, but unfortunately it is dominated by areas completely inundated during the wet season and protects little savanna or forest habitat (Por 1995).

▼ Types and Severity of Threats

The principle threats currently affecting the Pantanal are pesticide runoff from agricultural lands within the 500,000 km² watershed of the Rio Paraguay and gold mining. Pesticides such as DDT, Parathion, and possibly Agent Orange have been used in great quantity within the Pantanal watershed. But there has not been any pollution monitoring and its effect on the biota (Por 1995). In 1996 there were over 700 gold-mining dredges operating along the Cuiabá River alone, and the mercury used to separate out gold is now found at high levels in many fish populations. In one survey, over 50% of fish collected had tissue mercury levels higher than the limit set by the Brazilian government and World Health Organization (Alho and Vieira 1997). Legal and illegal poaching has also had an impact within the

area. Up to 1,000,000 caiman were killed each year during the 1970s and 1980s until the government attempted to control trade and facilitate the farming of caiman on ranches (Mourao-Guilherme et al. 2000). Predators such as jaguar continue to be killed for trade and for their perceived threat to cattle (Quigley and Crawshaw 1992).

Perhaps the greatest future threat to the Pantanal is the possibility that the Brazilian, Bolivian, and Paraguayan governments will attempt a massive modification of the Rio Paraguay and Paraná Rivers to provide a navigable waterway for shipping, and dams for hydroelectricity generation. This project, known as the "Hidrovia", has the potential to completely alter the entirety of the Pantanal wetlands. But there are hopes that the increase in ecotourism in the Pantanal and the more efficient network of roads being developed outside the area will negate any need for such a potentially catastrophic project (Heckman 1998).

▼ **Justification of Ecoregion Delineation**

This extensive wetlands extends from Brazil into Bolivia and Paraguay in an otherwise dry landscape. These seasonally flooded wetlands are renowned for extensive flooding – which during the wet season changes the landscape from woody savanna to a mosaic of lakes and islands. In Bolivia our linework follows Ribera et al (1994) who classify the region as "savannas of the Pantanal". Initial linework for the Paraguayan and Brazilian portion of this ecoregion originated from the UNESCO (1980) classification of "tropical tall flooded grasslands (Pantanal)". This linework was compared with the IBGE (1993) maps, however our classification follows UNESCO (1980). The pantanal region is internationally recognized for its unique processes and species.

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For more general information on this ecoregion, go to the [WildWorld](#) version of this description.

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