

POLICY TOOLS FOR THE PROTECTION OF MIGRATORY WATERBIRDS IN RAMSAR PARNA PANTANAL SITE (MT, BRAZIL) FACE THE IMPACTS OF CLIMATE CHANGE AND LAND USE.

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Abstract

The solutions for the conservation of migratory waterbirds are in the domain of the political game and the challenge of sustainability is related to the use of regulatory tools for provide they adaptation and mitigation face the impacts of climate change and land use. This paper examined how occurs the management of the migratory waterbirds in Ramsar site of Brazilian Pantanal National Park (PARNA Pantanal) from global to local scale.

Keywords: Pantanal biome, wetlands, management, nearctic migratory birds.

1. INTRODUCTION

The management instruments for the conservation of waterfowl in wetlands are tools of command, control, evaluation, monitoring, mitigation, adaptation, communication and education that may be used in different scales to provide their conservation face the different types of pressures exercised.

Especially in the case of the pressure of climate change, there is a synchrony between the navigation system of these birds and the atmospheric variables such as temperature, precipitation and wind (Miller-Rushing et al, 2008). Therefore these animals have been documented as one of the best indicators to rapid global warming registered by the Intergovernmental Panel on Climate Change. The sun and the stars are responsible for their navigation guidance and the humidity for direction and speed. That means that good weather combined with a great physiological rate favors migration, while cloudy days with low visibility and rain prejudice it.

The migration of these birds is also synchronized to the biological cycle of plants and animals of their wintering sites, which provide fattening to acquire energy for the exchange of primary remiges, return to their breeding site and pass through the reproductive period. However there is a difference between the response of birds, plants and animals to climate change. According to Sparks et al, (2002), for each 1 degree of warming, the birds may arrive 1-2 days early in the wintering sites during the spring, while plants have shown a faster response of 6 to 8 days.

These different responses of organisms to the rapid climate change associated with the pressures of land use worries the scientific community (Root et al., 2003, Round & Gale 2008). The birds will be unable to modify their endogenous time to adapt to the synergy of these pressures.

As solutions for the conservation of migratory birds are in the domain of the political desire and the challenge of sustainability is related to the regulatory tools for adaptation and mitigation, this paper examined how the management of the Ramsar site of Brazilian Pantanal National Park (PARNA Pantanal) occurs from the global to local scale.

We analyzed public documents, laws, decrees, national reports from Brazil and PARNA Pantanal and documents and recommendations of the Ramsar Convention in relation to climate change impacts on migratory waterbirds. Participant observations (May, 2004) were made in the meeting of the Ramsar site managers in Brazil in 2010 and at the 11th Conference of Parties of Ramsar Convention in 2012 (COP11). The satellite image processing was performed according to Dubreuil et al (2002).

2. GLOBAL CONSERVATION OF MIGRATORY BIRDS IN WETLANDS

On a global scale, management tools were born from the concern of environmental security with the impacts of the development model of central and peripheral countries which exceeded territorial limits of political units without respecting the historical or geographical frontiers of the affected populations. The International Environmental Order was formed and a lot of treaties have been signed to regulate human action on the environment and to influence the development of legal instruments for protection and conservation of natural resources (Ribeiro, 2008).

In a scenario where the wetlands are the most fragile ecosystems to climate change due to the direct influence of increased temperature and CO₂ concentration in the atmosphere (Parry et al, 2007) and the indirect influence of rainfall patterns, evaporation, radiation, speed wind and changes in hydrological regimes (Weltzin et al, 2001, 2003, Gitay et al, 2001, Keller et al., 2004, Acreman et al, 2009), the Ramsar Convention has an important role for the conservation of biodiversity of these areas.

His Article 3.1 provides for the wide use of wetlands whose management must focus the context of sustainable development and enables the maintenance of ecological character through the implementation of the ecosystem approach (Finlayson et al., 2011, Gardner & Davidson, 2011). The intent is to escape from the predatory, socially unjust and politically perverse model of actual development.

To ensure the political potential and legal force for the conservation and management of wetlands, the Ramsar Convention made alliances with other international treaties. A mixed group of cooperation between the Ramsar and the Convention on Climate Change (UNFCCC) have been working. After the adoption of Resolution VII.27 of the seventh Conference of Parties (COP7) in 1999, the impacts of climate change on migratory birds were evidenced in DOC11 and DOC40 of COP8 and DOC25 of COP10. These information resulted in the approval of Resolution VIII.3 “Climate change and wetlands: impacts, mitigation and Adaptations”, Resolution X.24 “Additional information on climate change and wetlands issues” and Resolution XI.14 “Climate change and wetlands: Implications for the Ramsar Convention” (COP11). All urges adaptation and mitigation to ensure the maintenance of populations of migratory waterfowl.

3. BRAZIL'S POLICY POSITION FOR THE CONSERVATION OF WETLANDS

Brazil has 57 complexes of wetlands (Diegues, 2002) and a part of them (11 sites) was named as wetlands of international importance in the Ramsar Convention. The country signed the Convention in 1993 and ratified in 1996 by the Decree 1905/96. This adhesion occurred during the peak of the transformation of environmental Brazilian external policy when the country changed from a game marked by a disregard environment, national sovereignty and absolute impediment to international cooperation in the military dictatorship (1964-1985) for a game of multilateral relationships and diplomatic success (França, 2010).

At the early 80s, environmentalism has come to be regarded as a necessity for a better future with social justice in Brazil. The preservation of natural resources as the protection of rivers was to ensure de supply of cities (Mello, 2006). In a scenario of internal pressures and external environmental discredit that interfered in the negotiations in the late 80's, for example with the World Bank (Seixas Corrêa, 2006), the Itamaraty (Ministry of Foreign Affairs of Brazil) was forced to modify his political position. The Brazilian Constitution of 1988 was formulated with an environmental chapter, Brazil hosted the Rio 92 Conference with an active posture and a series of multilateral environmental agreements were signed.

But it seems that Brazil's position on the Conference of Parties of Ramsar Convention has been conservative for driving comfortable environmental initiatives. Only after 20 years, the country established the National Strategic Plan for Protected Areas in 2006 (Decree 5.758 of 2006) which has the role of formulate a National Policy of Wetlands in the scope of the Ramsar Convention. The National Committee on Wetlands (CNZU) made five recommendations, among them the request to appoint more 11 protected areas in freshwater ecosystems and 20 in coastal environments in 2012.

Even with these efforts, until today there is no specific National Policy for the conservation of wetlands in Brazil. Its management has the legal framework grounded in environmental laws such as the National Policy of Environment (Law 6.938 of 1981) which provides tools for monitoring, command and control, environmental assessment, the National Plan of Coastal Management (Law 7.661 de 1988), which prioritizes the preservation and protection of natural resources aquatic coastal, the National Policy of Water Resources (Law 9.433 of 1997) that manages the water for use in the productive sector but does not mention the preservation for wildlife and flora, the National Environmental Education (Law 9.795 of 1999) that met

the environmental discussion in the teaching, and the Law of Protection and Sustainable Use of Forests in harmony with the Promotion of Economic Development (Law 12.651 of 2012). This last law resulted from the modification and flexibilization of Brazilian Forestry Code (Law 4.771 of 1965) and showed the low political force of the Ministry of Environment, scientists and academics in making major decisions on environmental management in the country.

During COP11 of the Ramsar Convention in 2012 Brazil's position in relation to the conservation of wetlands has not changed. Especially in relation to the approval of Resolution XI.14 the Itamaraty intervened saying that it would be impossible to agree with their recommendations because they did not resembled with the recommendations of Climate Change Convention signed by him in 1992 and that resulted in the Brazilian National Policy on Climate Change (Law 12.187 of 2009). This law covers the thematic areas of mitigation, vulnerability, impact and adaptation, but does not mention goals, deadlines and conservation strategies. Currently the Sector Plans (Industry, Mining, Health and Transport) of Mitigation and Adaptation to Climate Change in Brazil are in process of public consultation. None of them has specific guidelines for the protection of fauna and flora.

There is no specific legislation in Brazil for the conservation of migratory birds as suggested by Marini & Garcia (2005) or as exists in the USA (Neotropical Migratory Bird Conservation Act of 2000 - Public Law 106-247). However in 2007 the Ministry of Environment used the birds as a criterion for defining more areas for conservation (Ordinance 9 of 2007) in order to guide public policy.

3.1 The local scale for conservation in Brazil - the example of the Ramsar site PARNA Pantanal and the conservation of nearctic waterbirds

The Ramsar site Pantanal Matogrossense National Park (17°39'S 057°25'W) was established by Federal Decree 86.392/1981, declared a Ramsar site and nominated World Natural Heritage. It has 135.000 ha of the Pantanal biome in Poconé city, southern State of Mato Grosso, Brazil, on the border with the State of Mato Grosso do Sul (Corumbá city) and Bolivia (Puerto Suarez city) (Figure 1).

The Pantanal biome is the largest continues wetland in the world and has a mosaic of forests, savannas, flooded grasslands of various types, wetlands. Species of Biomes Cerrado, Amazonia, Atlantic Forest and Chaco can be found. It's a Biosphere Reserve and the largest and most important wetland for waterfowl in South America (Scott & Carbonell, 1986). Displays state, federal, public and private protected areas and the Pantanal National Park (PNPM) is the largest of them.

The PNPM is in the Pantanal of the Paraguay River (Silva & Abdon, 1998). Its hydrology is powered by the flow of the rivers Paraguay and São Lourenço, rainfall and groundwater. The dominance of hydromorphic soils and low slopes provides a flood of eight months with a peak between March and May. The dry season occurs between September and October (IBAMA, 1993). The abundant supply attracts dispersive and migratory species like the 22 species of nearctic migratory waterbirds listed in Poconé city by Cintra (2011) that migrate from the Northern Hemisphere (Canada, USA and Mexico) for the Southern Hemisphere.

Especially in the PARNA Pantanal, IBAMA (2003) recorded four of them: *Pandion haliaetus* (Águia-pescadora/Osprey, Falconiformes: Accipitridae), *Actitis macularius* (Bate-bunda/ Spotted sandpiper, Charadriiformes: Scolopacidae), *Tringa solitaria* (Maçariquinho/Solitary sandpiper, Charadriiformes: Scolopacidae) and *Tringa flavipes* (Maçarico/Lesser yellowlegs, Charadriiformes: Scolopacidae).

Inside the PNPM these birds are legally protected by the National System of Conservation of Nature (Law 9.985 of 2000), which it characterizes as a unit of integral protection (it is admitted only the indirect use of its natural resources and activities provided in the Park Management Plan approved in 2004). The inspection agencies are the Environmental Military Police and ICMBio.

Some internal difficulties of the Park are a) deficiency in interinstitutional relations between local, and national state scales b) disrespect for the law by activities such as tourism and agribusiness, c) conflicts and difficulties for community involvement, d) absence or inadequacy of financial resources, which reflects the lack of equipment, materials and infrastructure, e) downgrading management tools f) lack of personnel and rotating of teams.

Another problem is the focus of natural fires within the PARNA Pantanal mainly during the dry season. The years 2000, 2001, 2002, 2005 and 2007 showed a high number of them especially in 2005, the driest year (Morelli et al, 2009).

On a regional scale, the activities of land use and soil in the PNMT region as extensive cattle ranching, agriculture, mining activities, commercial and sport fishing, tourism, pesticide contamination, invasion of exotic species, Paraná-Paraguay waterway, Manso hydroelectric, and anthropogenic fire (IBAMA, 2003) represent pressures which, if added to the impacts of climate, may have cumulative effects of changes in habitats along the migratory routes and in the system of navigation of waterbirds.

The climate impacts may be direct - the prediction warming in the Pantanal of 1 to 1.5°C in 2020, 1.5 to 3°C in 2050 and 2.5 to 4.7°C in 2080. By 2100 it is expected an increase of 3-6°C in the model A2 and 2-4.5°C in the B2 model (Marengo, 2007), or indirect – its expected the reduction Pantanal river of 25-50% (Marengo, 2006).

Other is that in Brazil there are few data about the life cycle of migratory waterbirds. In the Cayuga Lake Basin (New York, USA) *Pandion haliaetus* populations arrived 27.1 days early and in the Worcester County (MA, USA) populations *Actitis macularius* and *Tringa solitaria* arrived at 7.9 and 10.2 days early in 1951-1993 because of global warming (Butlen, 2003). *Tringa flavipes* arrived two days later in the Delta Marsh, (Manitoba, Canada) during springs of 1939 to 2001 due to warming of 0.6 to 3.8°C (Murphy-Klassen et al, 2005).

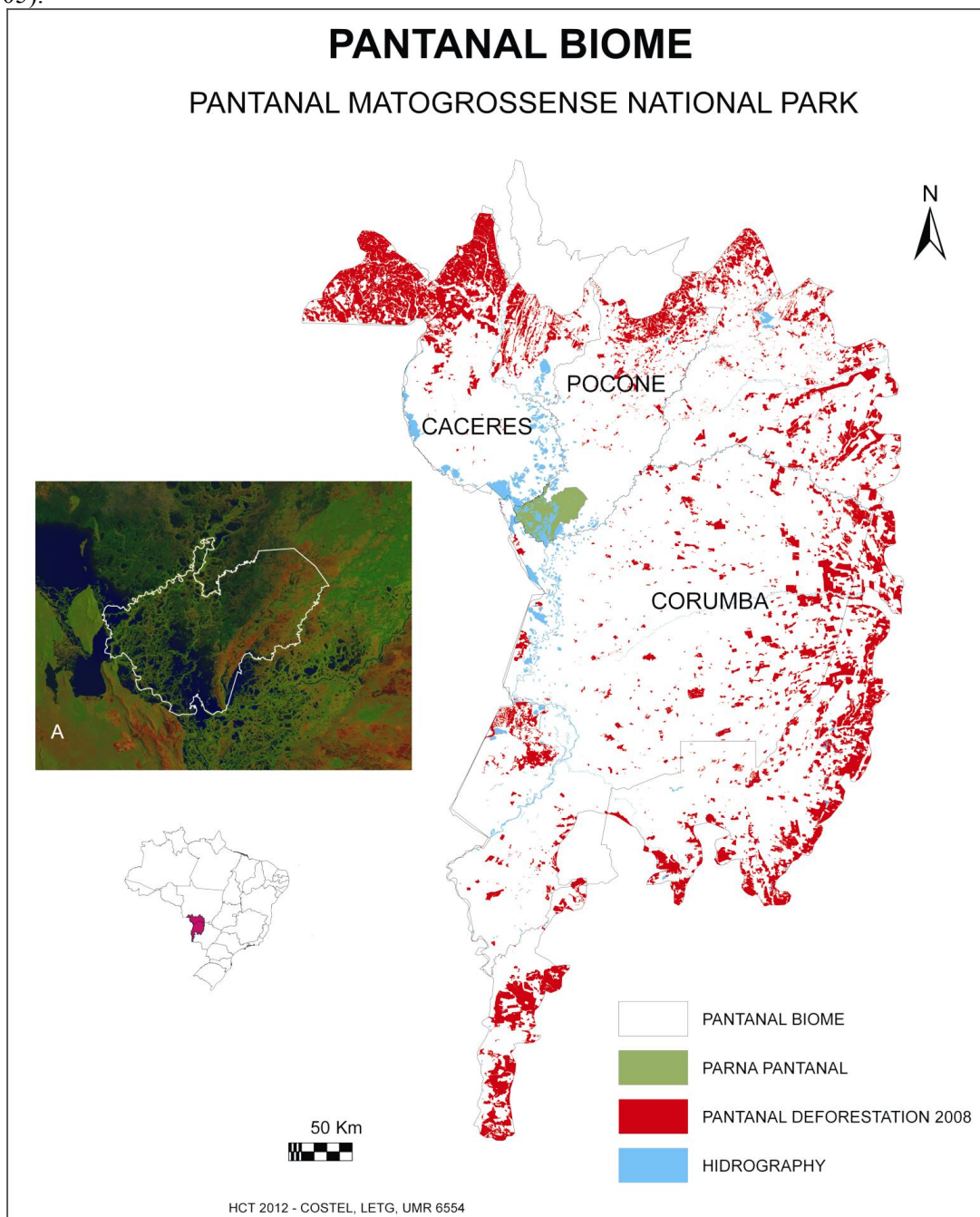


Figure1. Pantanal Matogrossense National Park in Pantanal Biome, Brazil. A=Colored composition 3, 4, and 5 of Landsat 5 in PARNA Pantanal, period of drought 06/10/2011 (Blue=water, pink=nude soil, green=vegetation)

In PARNA Pantanal, the local management tools that could help the adaptation of these animals are the Park Management Plan and the Master Plans of cities Poconé, Cáceres and Corumbá. The PNPM Management Plan a) provides that the intangible area of the park is only open for research (visitation is prohibited in order to preserve feeding areas of migratory bird species, b) provides studies of birds in relation to the impacts of forest fires, erosion in the rivers, studies of reproduction and places of breeding and rest, but there is no sufficient data, c) provides the controlled burn in the buffer zone with monitoring, d) prohibits the flights in the airspace except under special conditions. This document should have been updated in 2009, but there is no provision for this.

Other policy tools are the Master Plan of cities, a document that should provide the planning in cities with over than 20.000 people. The Corumbá Plan established guidelines for the Municipal Environmental Policy, but did not define specific goals (Law 98 of 2006). In Poconé it is in preparation (Project of Law 19 of 2009), and there is no prospect in Cáceres.

In the state and national level, the State Policy for Management and Protection of the Upper Paraguay Basin in Mato Grosso (Law 8.830 of 2008) and a Project of Law of Policy Management and Protection of the Pantanal Biome (Law 750 of 2011) allows deforesting the native wetland forest for extensive cattle (the main impacting factor in the Pantanal) and allows hydroelectric, which is altering the flow of flood marshland.

4. CONCLUSION

Although Brazil does not present a specific policy for the conservation of migratory waterfowl, there is a political effort to nominate protected areas where they occur. The problem is that even in these management areas is complicated by a series of administrative and financial needs, bureaucracies and conflicts. In the Pantanal, even with extensive information and scientific positions of national and international community, governmental actions still being established according to the comfort and convenience of the political game. The scenario of land use pressures with the impacts of climate change can lead to irreversible loss of waterfowl diversity.

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