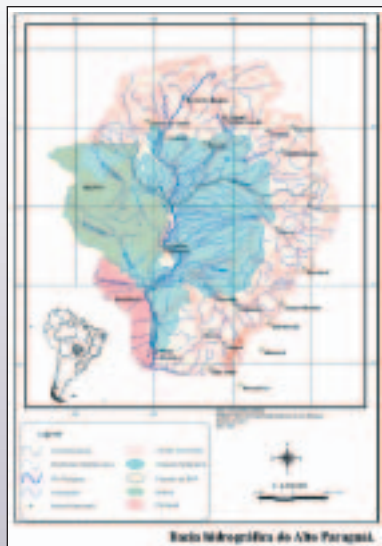


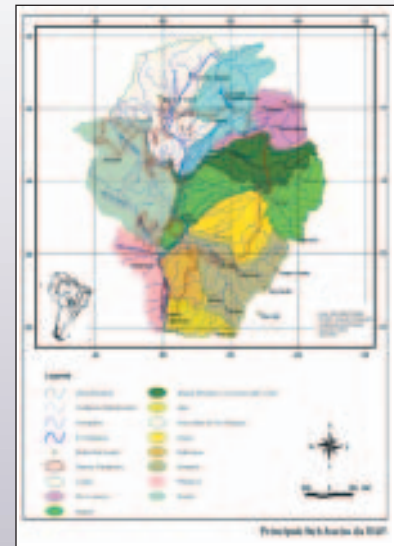
# PANTANAL AND THE UPPER PARAGUAY RIVER BASIN

*Implementation of Integrated Watershed Management Practices for the Pantanal and the Upper Paraguay River Basin*

## IMPLEMENTATION OF INTEGRATED WATERSHED MANAGEMENT PRACTICES FOR THE PANTANAL AND UPPER PARAGUAY RIVER BASIN PROJECT



COUNTRY: Brazil  
 IMPLEMENTING AGENCY: United Nations Environment Programme (UNEP)  
 REGIONAL EXECUTING AGENCY: Organization of American States/Office for Sustainable Development and Environment (OAS/OSDE)  
 LOCAL EXECUTING AGENCY: National Water Agency of Brazil (ANA)  
 PROJECT DURATION: 2000-2005  
 WEBSITE: <http://www.ana.gov.br/gefap>  
 GEF GRANT: 6.615 US\$ millions  
 CO-FINANCING: 9.788 US\$ millions  
 PROJECT COST: 16.403 US\$ millions



### INTRODUCTION

The Paraguay River Basin, part of the La Plata River Basin, encompasses an area of 1,095,000 km<sup>2</sup>, straddling the borders of Brazil, Argentina, Bolivia, and Paraguay. The Upper Paraguay River Basin covers an area of approximately 600,000 km<sup>2</sup>, of which, 362,376 km<sup>2</sup> are in Brazil, encompassing large portions of the States of Mato Grosso and Mato Grosso do Sul. The Basin is of essential strategic importance within the context of water resources management in the countries that share its waters (Brazil, Bolivia, and Paraguay). The Basin comprises two distinct areas in which conditions vary significantly, both in terms of natural and water resources: the Plateau (Planalto) and the Floodplain (Pantanal), which is one of the largest wetland areas on the planet, covering 147,574 km<sup>2</sup> and providing an essential link between the biomes of the Brazilian Cerrados and the Chaco plains of Bolivia and Paraguay. Highly seasonal rainfall patterns, nutrient-rich flooded areas,

and extensive vegetation (with more than 3,400 plant species) support rich and diverse wildlife habitats, as well as many endangered species such as the jaguar (*Panthera onca*). Waterfowl are abundant during the dry season.

Since the 1970s, the Upper Paraguay River Basin has undergone significant socioeconomic development. The consequent intensive settlement patterns and land use, especially on the Plateau, have had significant environmental impacts, including deforestation, land degradation, soil erosion, and siltation, water and environmental contamination, over-fishing, and incidence of invasive species, among others. Various planned large-scale infrastructure projects, with significant implications for the trans-border regions, also pose significant environmental threats to this Natural Heritage Area, Wetland of International Importance, and Biosphere Reserve.

## THE PROJECT

The main objective of the Project is to promote the formulation and implementation of a Strategic Action Program (SAP) for the Integrated Management of the Pantanal and Upper Paraguay River Basin. Project activities are designed to enhance and provide protection to the environmental functioning of the predominant ecological system, protect the wetland biodiversity, and implement strategic activities that address the root causes of environmental degradation. The strengthening of basin institutions responsible for water resources management in the Basin, the generation and dissemination of information, and the integration of environmental concerns into economic development activities on a sustainable basis are key elements of this project.

The project is composed of six components: (i) water quality and environmental protection; (ii) conservation of the Pantanal; (iii) soil degradation; (iv) stakeholder involvement and sustainable development; (v) organizational structure development; and (vi) watershed management program implementation.

During the project design phase, three regional workshops were held in the Basin with the participation of more than 200 persons, representing 60 civil, corporate, nongovernmental and governmental entities (municipal, state, federal, and international). All relevant basin actors and communities presented proposals for project activities, many of which became integral part of the project by constituting its 44 activities. All demonstration projects and feasibility studies remained coordinated by the institutions that formulated and presented them. Thus, the project design and execution process established an active feedback and commitment from the main basin stakeholders in the project.

The project has developed a rich and useful information base and has promoted a basin-wide dialogue and information sharing, helping manage conflicts and instructing public participation. At the same time, the project has been able to achieve strong stakeholder ownership and has developed management and monitoring instruments insuring good communication among five levels of players (the agencies executing project activities, the technical coordinator, the National Water Agency-ANA, OAS and UNEP). Critical to the current

project accomplishments have been competent management at the various levels of the project, government commitment, effective information sharing, and systematic stakeholder participation. Project implementation benefited substantially from the local expertise including the scientific community from Federal or State universities, as well as technological units such as EMBRAPA and ANA. The project's emphasis on using existing institutions to implement activities has led to significant improvement of institutional capacities in the region.

## IMPLEMENTATION STATUS

All demonstration and pilot projects, feasibility and technical studies, and implementation activities have been finalized, and the DAB/SAP process has been concluded, consolidating the results of four years of scientific and technical research, policy development and implementation, institutional coordination, and broad public discussion process.



*Panoramic view of the Pantanal*

The project conducted planning and feasibility studies, implemented actions recommended in the *Upper Paraguay Basin Conservation Plan (PCBAP)*, developed a *Diagnostic Analysis of the Basin (DAB)*, and formulated a *Strategic Action Program for the Integrated Management of the Pantanal and the Upper Paraguay River Basin (SAP)*, which was completed in August 2004. In addition, the project triggered an unprecedented public and stakeholder mobilization in the basin. A total of 116 public events involved more than 4,530 participants representing a total of 258 federal, state, and municipal institutions, NGOs, and private enterprises.

The project also actively supported the development and formalization of inter-institutional partnerships, which are currently being replicated in other river basins, and promoted transboundary coordination with Bolivia and Paraguay on the management of the basin water resources. The complete collection of the Final Reports of all activities was published and

donated to federal universities in the riparian states and federal and state reference libraries. The consolidated SAP report was published in its full version in Portuguese and English and is also available as an Executive Synthesis document published in the three basin languages, for regional and international dissemination. The executive summaries of the Final Reports of the DAB, the SAP, and the demonstration projects and studies are also available at: <http://www.ana.gov.br/gefap>.

## **PROJECT RESULTS: TOWARDS THE INTEGRATED AND SUSTAINABLE MANAGEMENT OF THE PANTANAL AND THE UPRB**

The main project results and success indicators include: (i) Enhanced public and scientific awareness and knowledge of the Pantanal and the UPRB; (ii) Improved protection of the Pantanal and the river system and its biodiversity; (iii) Improved public and stakeholder participation through direct involvement of communities in the identification and implementation of remedial measures; (iv) Strengthened institutional framework and staffing capabilities of the state and local environmental bodies for sustainable environmental and water resources management; (v) Improved implementation of policy instruments, including water charges, for rational and sustainable water resources management and environmental protection in the Pantanal and the UPRB; (vi) Improved integrated water resources management and environmentally sustainable development in the UPRB. These results are based on the integrated impact of the output and products of the activities carried out under the six project components, as described below.

### **I. WATER QUALITY AND ENVIRONMENT PROTECTION: SOUND SCIENTIFIC AND TECHNICAL BASIS FOR BASIN MANAGEMENT**

Project activities quantified a number of priority issues defined in the PCBAP, producing new scientific and technical knowledge and providing the basis for the development and implementation of public policies and remedial measures. Among the main project contributions in this respect are the publishing of the *Water Quality Reports for the Pantanal/MS (1999-2003)* and the implementation of the *Water Resources Information System for the UPRB* at the State Secretariat of Environment in MS. The main outputs of the project in this realm also include:

- Identification and detailed quantitative knowledge of the sedimentation, silting, and solid discharge processes in the basin, proving that more than 16.9 million tons of sediments are retained in the Pantanal each year, resulting in the expansion of the flooded areas.

- Documented inventory of the endemic fish, fishing activities, and fish reproduction biology in the basin. The study results demonstrated that the volume of fish production in the Taquari River has been reduced by 1/5 during the last 15 years.
- Quantitative evaluation and detailed knowledge of the levels of chemical and heavy metal contamination of water, fish, aquatic fauna, sediments, and air and definition of mercury transportation routes, demonstrating that the mercury contamination in the UPRB is confined to a few specific regions (including Barão de Melgaço area, the mining region of Poconé, and the area of Morrinhos), without serious threat of transboundary transport and contamination.
- Mapping and characterization of the meander cuts (arrombados) in the Taquari River Basin, showing that the *Zé da Costa e Caronal Arrombado* (11,000 km<sup>2</sup>) has been affected by the overflow of the almost whole Taquari water, causing permanent floods in the Paiaguas Pantanal region.

### **II. CONSERVATION OF THE PANTANAL: PRESERVING THE NATURAL HABITAT THROUGH CONSERVATION UNITS AND SUSTAINABLE TOURISM**

The project activities were essential for the creation, strengthening, and improvement of the system of Conservation Units at the state level. The activities resulted in the development and implementation of a Conservation Units System in the State of Mato Grosso do Sul (MS), as means of preserving the best natural habitats in the region. The project also supported the improvement of the Conservation Units System in the State of Mato Grosso (MT), by, *inter alia*, creating the State Park of the Taquari River Source (30,600 ha). The main project achievements and success indicators in this respect also include:

- Definition of area and strategies for the implementation of the Pantanal-Cerrado Ecological Corridor.
- Development of Management Plans for the buffer zones of the Acurizal, Penha, and Doroche Natural Reserves, protecting the Pantanal National Park.
- Elaboration of the Management Plan for the newly established State Park of the Taquari River Source
- Development and implementation of public-private partnerships for sustainable tourism. The project developed a detailed methodology and implemented training courses for the sustainable management of the buffer zones and nesting grounds areas in the Pantanal region of Barão de Melgaço. These activities stimulated the incorporation of the private sector initiatives for the sustainability of the contemplating tourism in the region.



- Establishment of a Geo-referenced Information System supporting the management and monitoring of the illegal live-animal trade in the Pantanal.
- Definition of Strategies for the Participative Action for the Biodiversity Conservation in the UPRB and Prioritization of Conservation Targets.

### III. LAND DEGRADATION: REHABILITATING CRITICAL AREAS

Addressing land and water management cross-cutting issues, the project identified and implemented best management and environmentally-sound practices within the agriculture, mining, and urban sectors. The project also promoted community-based land rehabilitation effort. The main contributions of the project in this area include:

- Rehabilitation of an abandoned gold mine (3 ha, approximate volume of 280,000 m<sup>3</sup>) in the city of Poconé (MT) and creation of a Mining Thematic Park.
- Implementation of sustainable soil use practices: Non-tillage planting in the Upper Taquari.
- Consolidated proposal for the Integrated Environmental Management of Solid Waste for the 19 municipalities of the Miranda and Apa river basins
- Development of a Protection and Recovery Plan for the area of the Paraguari River headwaters (10.000 ha).

### IV. STAKEHOLDER INVOLVEMENT: INCLUDING PEOPLE, MUNICIPALITIES, AND THE PRIVATE SECTOR IN THE DEVELOPMENT OF SOLUTIONS

The public participation process represents a hallmark of this project. A comprehensive approach and a wide range of modalities were used to achieve the high level of public involvement and commitment from basin stakeholders, including direct participation in the project design phase, execution of demonstration projects and studies, recruitment of local expertise for the project activities, organization of thematic events and technical meetings, education and training activities,

as well as dissemination of information and project results through video documentaries, printed material, and publications. At the same time, the project recognized the specific characteristics of the social, economic, and cultural groups in the basin, adopting different approaches to involve and promote their participation in the project and in the management of the basin. Thus, for example, the project organized and empowered the local fisherman communities, promoting the recognition of the professional category of the live bait collectors and their participation in the re-formulation of the State Law regulating capture and transport of live baits in the State of MS, as well as ensured their representation as members of the State Fishing Council. The project was also catalytic in promoting the involvement of NGOs in the execution of some of the key project activities related to eco-regional planning, biodiversity conservation, and sustainable tourism. The main achievements and success

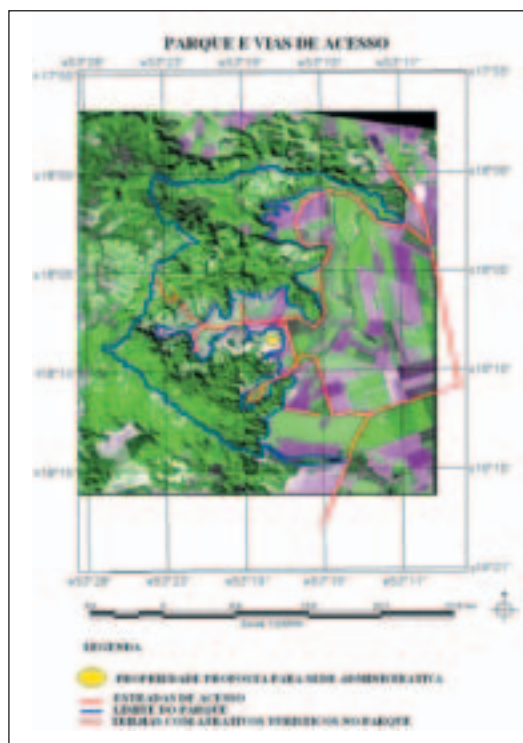
indicators in this respect also include:

- Development of an Environmental Education Program for the Tourism Sector in the Miranda River sub-basin.
- Implementation of sustainable economic activities for live bait collectors and community economic and social empowerment.
- Development of aquaculture activities in the Taquari River basin as alternative means of economic production and a source of income for local fish producers.



*Porta da Fazenda Nesting Ground*

- Implementation of an Environmental Education Program in local school and communities through education and training courses for local environmental agents.



*Limits of the State Taquari River Sources State Park*

- Preparation and broad dissemination of the video documentaries: *Introducing the Pantanal/Upper Paraguay Project*; *Ecological Corridor Pantanal-Cerrado*; and *Taquari River: Problems and Solutions*.
- Organization and holding of 116 public events, involving a total of 258 organizations and institutions (47 federal, 30 state, 55 municipal, 66 NGOs, 45 private enterprises, 3 international organizations, 12 foreign-country institutions).

## V. ORGANIZATIONAL STRUCTURE DEVELOPMENT: IMPROVING INSTITUTIONAL AND STAFFING CAPABILITIES FOR INTEGRATED WATER RESOURCE MANAGEMENT

The project strengthened and improved the institutional framework and its capacity to implement new legislation, regulation, and procedures and evaluated the effectiveness of several policy instruments, thus actively supporting the implementation of the National Policy on Water Resources and its corresponding state legislation in the UPRB. The project also promoted the exchange of technical information throughout the harmonization of environmental and water resources legislation at all levels of government, the implementation of education programs, and the development of decision-support systems. Furthermore, the project promoted the establishment of an institutional framework involving all the organizations and institutions participating in the execution of the project activities. During 2002, the newly created National Water Agency-ANA, in charge of the implementation of the National Water Resources Policy in Brazil and the execution of the project, signed Terms of Technical Cooperation with the federal, state, municipal, and non-governmental institutions coordinating activities in the context of the project. The successful initiative opened the way for new institutional partnerships in water resources management at all levels and is being replicated in other river basins. The main outputs of the project in this realm also include:

- Development of an Environmental Management System for the border Municipality of Corumbá, including formulation of environmental legislation, implementation of environmental licenses, and GIS municipal information system.
- Development of a Hydrological Model for the Pantanal and the UPRB, providing real-time flow forecast, assessment of basins conditions alterations, and hydrological series.
- Creation and implementation of *ICMS Ecológico*, an eco-tax stimulating the establishment of Conservation Units in the State of Mato Grosso do Sul.

- Strengthening of local governments' capacity to manage water resources in Upper Paraguay sub-basins, through training of the Inter-municipal Water Resources Consortia in the Miranda and Apa sub-basins (CIDEMA) and the Taquari river basin (COINTA).
- Training of more than 1,000 public managers, community voluntary agents, and NGO representatives in water management issues.

## VI. STRATEGIC ACTION PROGRAM FOR THE INTEGRATED MANAGEMENT OF THE PANTANAL AND UPPER PARAGUAY RIVER BASIN

The completion of the DAB/SAP process and its principal output – the *Strategic Actions Program for the Integrated Management of the Pantanal and the Upper Paraguay River Basin (SAP-P/UPRB)* established the framework for the implementation of an integrated management model especially designed to fulfill the specific requirements of the region. Furthermore, the process of SAP formulation and validation, based on the mobilization of all main basin stakeholders and the coordination of proposed strategic actions with the Federal and State Multi-year Action Plans (2004-2007) related to the basin, as well as with other basin initiatives, culminated in an agreed and consolidated common agenda with an unprecedented integrated approach for the Pantanal and Upper Paraguay River Basin management and a strong social and institutional commitment for its full implementation. Although national in scope, the DAB/SAP process also involved across-the-border coordination with Paraguay and Bolivia, consolidated at the International Seminar for the Integrated Management of the Transboundary Apa River (Brazil-Paraguay), the Seminar on Strategic Actions for the Transboundary Integrated Management of the UPRB (Brazil-Bolivia), and the International Seminar on the Pantanal Aquifer (Brazil-Bolivia-Paraguay), among other bi-lateral and tri-lateral initiatives. The main contributions of the project related to this component include:

- Establishing institutional partnerships and strengthening environmental bodies in the states of MT and MS, aimed at the development and implementation of strategic actions for the integrated management of the basin water resources.
- Advancing the implementation of financial water management instruments, as provided for in the National Policy of Water Resources, in the UPRB by assessing the impact and estimating the income (US\$20.5 million in 10 years) of introducing water charges in the Cuiabá river basin.

- Providing and disseminating new scientific and technical knowledge and data on the Pantanal and the UPRB and consolidating the consensus over the main critical issues of the basin and the related root causes, through the preparation of the *Diagnostic Analysis of the Basin (DAB)* and the discussion and validation of its findings at 5 public events with the participation of 363 basin stakeholders representing almost 60 institutions.
- Providing authorities, decision-makers, and basin stakeholders with a framework of strategic actions, related activities, expected products, and associated costs for the sustainable development and protection of the Pantanal and the UPRB, in the context of implementation of large-scale infrastructure projects and the expansion of agribusiness, through the *Strategic Action Program for the Integrated Management of the Pantanal and the Upper Paraguay River Basin*.
- The implementation of the *Integrated Water Resource Management System for the Pantanal/Upper Paraguay*, as defined in the *Strategic Action Program* – including

deployment of management instruments and institutional strengthening, partnerships with Paraguay and Bolivia, and monitoring and control of flows and water quality – along with the protection of biodiversity and soil conservation and rational land use, will allow for the full implementation of the National Policy on Water Resources in the Pantanal and the Upper Paraguay River Basin and provide global benefits by protecting the largest wetland in the world and globally important natural area, containing unique biodiversity and housing numerous migratory species. Furthermore, the juxtaposition of developing economic opportunities supporting a growing human population and a globally important natural area is one that occurs throughout many areas of the South America – both in the la Plata River Basin, Amazon River Basin, and Andes Mountains – as well as elsewhere in the world, especially adjacent to major rivers and in the tropical rainforests. In this context, the lessons learned in the Pantanal/Upper Paraguay have potential application in many parts of the world where similar conditions exist.

This document has been prepared by the Office for Sustainable Development and Environment of the General Secretariat of the Organization of American States, as the regional executing agency for the Pantanal Project, in collaboration with the United Nations Environment Programme (implementing agency for the Global Environment Facility), and the National Water Agency of Brazil (ANA). The document is intended to provide general information on the status, preliminary results and follow-up activities regarding project implementation, and do not necessarily reflect the opinion of ANA, the United Nations Environment Programme, the Organization of American States, or the GEF.



[www.oas.org/osde](http://www.oas.org/osde)