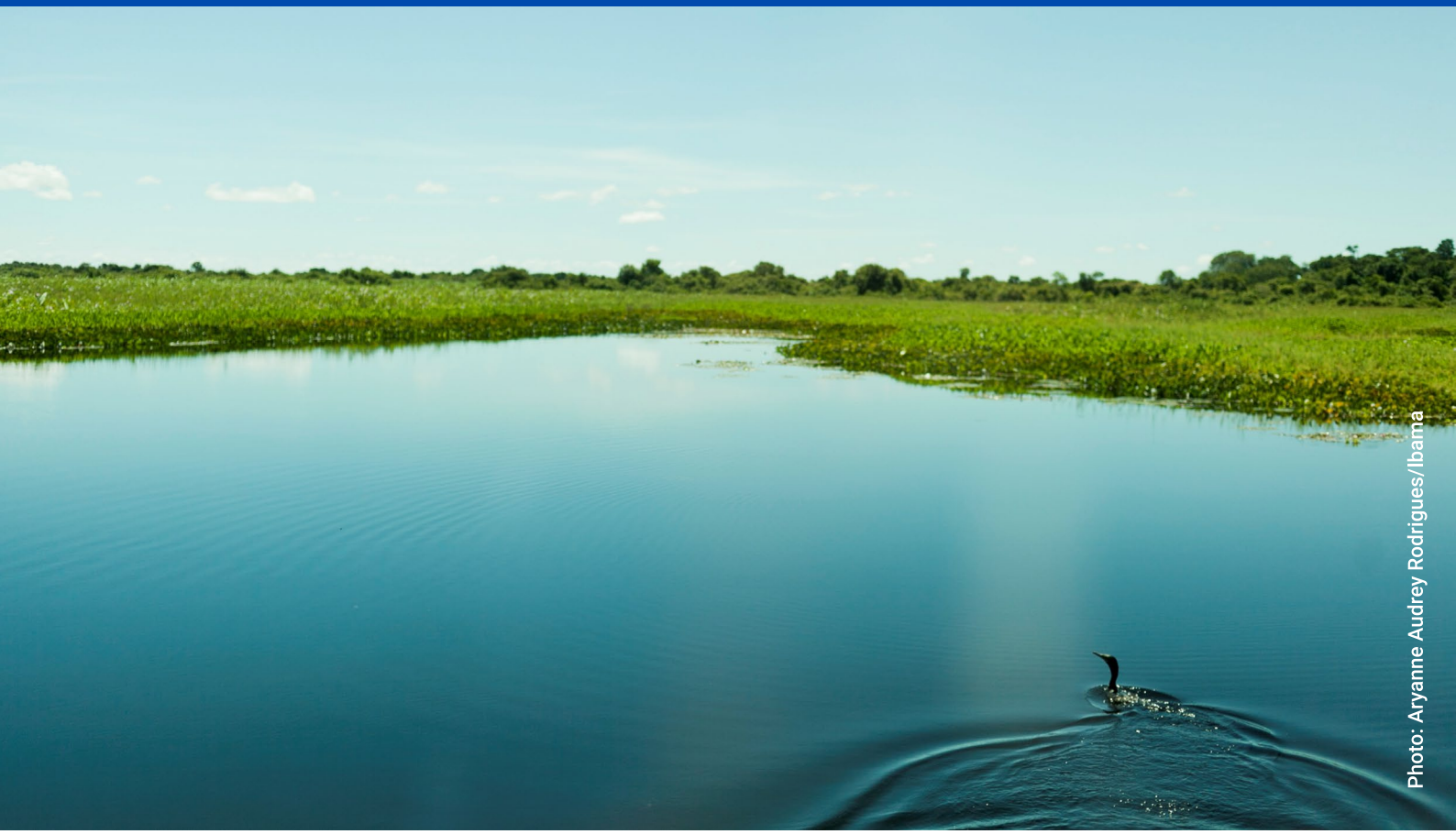
ACTION PLAN FOR DEFORESTATION AND FIRE PREVENTION AND CONTROL IN THE PANTANAL BIOME (PPPANTANAL)

(2024 to 2027)



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ACTION PLAN FOR DEFORESTATION AND FIRE PREVENTION AND CONTROL IN THE PANTANAL BIOME (PPPantanal)

Brasília - DF

2024

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International Cataloging-in-Publication Details - CIP

B823p Brazil. Ministry of Environment and Climate Change.
Action Plan for Deforestation and Fire Prevention and Control in the Pantanal Biome (PPPantanal) (2024 to 2027) [electronic edition]: Brasilia: MMA, 2024.
102 p.: il.; color.

Access: World Wide Web
ISBN 978-65-88265-94-9 (on-line)

1. Deforestation. 2. Pantanal. 3. Fires. 4. Control. I. Title.

CDU (2. ed.) 630.4

National Environmental Library
Ana Lúcia C. Alves – CRB1/2017

This publication was produced with the support of the “Partnerships for Innovations for Rainforest Protection in the Brazilian Amazon” project. The project is implemented in cooperation with the Brazilian Ministry of Environment and Climate Change and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, with support from the Federal Ministry for Economic Cooperation and Development (BMZ), as part of the German-Brazilian Cooperation for Sustainable Development.

List of Acronyms	
AAE	Strategic Environmental Assessment
Abin	Brazilian Intelligence Agency
Agesul	State Agency for Enterprise Management
AGRAER	Agricultural Development and Rural Extension Agency
ANA	National Water and Basic Sanitation Agency
Anater	National Agency of Technical Assistance and Rural Extension
ANM	National Mining Agency
APP	Permanent Preservation Area
ASV	Vegetation Suppression Authorization
AUR	Restricted Use Area
BAP	Upper Paraguay River Basin
BDQueimadas	Fires Database
Biosul	Bioenergy Producers Association of Mato Grosso do Sul
BNDES	Brazilian Development Bank
CAR	Rural Environmental Registry
CBERS	Sino-Brazilian Earth Resources Satellite
CBM	Military Fire Brigade
CBMMS	Military Fire Brigade of the State of Mato Grosso do Sul
CCPR	Office of the Chief of Staff of the Presidency of the Republic
CDB	Convention on Biological Diversity
CDSR	Forest Fire Control Difficulty Climate Index
CEDEC - MS	State Coordination for Civil Defense of Mato Grosso do Sul
Cedif - MT	Strategic Committee to Combat Illegal Deforestation, Illegal Forest Exploitation, and Forest Fires

List of Acronyms	
Ciman	Integrated Multi-Agency Operational Coordination Center
CIPPCD	Permanent Interministerial Commission for the Prevention and Control of Deforestation
CMN	National Monetary Council
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CNUC	National Register of Conservation Units
CO	Carbon dioxide
CO_2	Carbon Dioxide
Fire Committee - MS	Interinstitutional Committee for the Prevention and Combat of Forest Fires in the State of Mato Grosso do Sul
Conab	National Supply Company
Conaveg	National Commission for the Recovery of Native Vegetation
COP	Conference of the Parties
Green CPR	Green Rural Product Certificate
CPRM	Brazilian Geological Survey
CRA	Environmental Reserve Quota
Deter	Real-Time Deforestation Detection System
DNIT	National Department of Transportation Infrastructure
Embrapa	Brazilian Agricultural Research Corporation
Embratur	Brazilian Agency for Promoting International Tourism
EMPAER	State Company for Research, Assistance, and Rural Extension of Mato Grosso
ENREDD+	National Strategy for Reducing Emissions from Deforestation and Forest Degradation, Conservation of Forest Carbon Stocks, Sustainable Forest Management, and Enhancement of Forest Carbon Stocks
EVTEA	Technical, Economic, and Environmental Feasibility Study
Famasul	Federation of Agriculture and Livestock of Mato Grosso do Sul
FNB	Neotropic Foundation of Brazil
FNSP	National Public Security Force
Funai	National Indigenous Foundation
GEE	Greenhouse Gases
GEF	Global Environment Facility
GSI	Institutional Security Office

List of Acronyms	
Ibama	Brazilian Institute of Environment and Renewable Natural Resources
IBGE	Brazilian Institute of Geography and Statistics
ICMBio	Chico Mendes Institute of Biodiversity Conservation
Incra	National Institute of Colonization and Agrarian Reform
Incra/MT	National Institute of Colonization and Agrarian Reform of the State of Mato Grosso
Indea/MT	Agricultural Defense Institute of the State of Mato Grosso
Inmet	National Meteorological Institute
INPE	National Institute of Space Research
kW	Kilowatt
LASA	Environmental Satellite Applications Laboratory of the Department of Meteorology
MAB	Man and the Biosphere
MAPA	Ministry of Agriculture, Livestock, and Food Supply
MCTI	Ministry of Science, Technology, and Innovation
MD	Ministry of Defense
MDA	Ministry of Agrarian Development and Family Farming
MDIC	Ministry of Development, Industry, Trade and Services
MEC	Ministry of Education
MF	Ministry of Finance
MGI	Ministry of Management and Innovation in Public Services
MIDR	Ministry of Integration and Regional Development
MIF	Integrated Fire Management
MJSP	Ministry of Justice and Public Security
MMA	Ministry of Environment and Climate Change
MME	Ministry of Mines and Energy
MP	Particulate matter
MPA	Ministry of Fishing and Aquaculture
MPE	State Prosecution Service
MPE - MS	Prosecution Service of the State of Mato Grosso do Sul
MPF/PGR	Federal Prosecution Service / Office of the Attorney General
MPI	Ministry of Indigenous Peoples

List of Acronyms	
MPO	Ministry of Planning and Budget
MRE	Ministry of Foreign Affairs
MS	State of Mato Grosso do Sul
MT	State of Mato Grosso
MTE	Ministry of Labor and Employment
MTR	Ministry of Transportation
MTUR	Ministry of Tourism
NAF	Federative Coordination Unit
NDC	Nationally Determined Contribution
NMA	Monitoring and Evaluation Center
O_3	Ozone
PA	Settlement Project
PAA	Family Farming Food Acquisition Program
PAC	Growth Acceleration Program
PAE	Agroextractivist Settlement Project
PCH	Small Hydroelectric Power Plant
PCT	Traditional Peoples and Communities
PEMIF	State Plan for Integrated Fire Management
PF	Federal Police
PJC	Civil Judicial Police
Planaveg	National Plan for the Recovery of Native Vegetation
PM	Military Police
PMA	Environmental Military Police
PMDBBS	Project for Satellite-Based Monitoring of Deforestation in Brazilian Biomes
PNATER	National Policy for Technical Assistance and Rural Extension for Family Farming and Agrarian Reform
PNMC	National Policy on Climate Change
UNDP	United Nations Development Programme
PPA	Multi-Year Plan
PPCD	Action Plan for Deforestation Prevention and Control
PPCDAm	Action Plan for Deforestation Prevention and Control in the Legal Amazon
PPCDQ	State/Municipal Plan for the Prevention and Control of Deforestation and Fires

List of Acronyms	
PPCerrado	Action Plan for Deforestation and Fire Prevention and Control in the Cerrado Biome
PPPantanal	Action Plan for Deforestation and Fire Prevention and Control in the Pantanal Biome
PRA	Environmental Regularization Programs
PRF	Federal Highway Police
Probio	Project for the Conservation and Sustainable Use of the Brazilian Biological Diversity
Prodes	Satellite-Based Deforestation Monitoring Project
BiomasBR Program	Satellite Monitoring Program of Brazilian Biomes
Pronaf	National Program for Strengthening Family Agriculture
Pronater	National Program for Technical Assistance and Rural Extension in Family Farming and Agrarian Reform
Proveg	National Policy for the Recovery of Native Vegetation
PES	Payments for Environmental Services
BR	Biosphere Reserve
RBRB	Brazilian Network of Biosphere Reserves
REDD+	Reducing Emissions from Deforestation and Forest Degradation, Conservation, Sustainable Forest Management, and Enhancement of Forest Carbon Stocks
Reflore MS	Association of Planted Forest Producers and Consumers of Mato Grosso do Sul
RFB	Brazilian Revenue Service
RL	Legal Reserve
RPPN	Private Natural Heritage Reserves
SECD	Special Department for Deforestation Control and Environmental Land Management
Semadesc-MS	State Department for Environment, Development, Science, Technology and Innovation of Mato Grosso do Sul
Serpro	Federal Data Processing Service
Sesc	Social Service of Commerce
Sesp	State Department of Public Security
Sicar	National Rural Environmental Registry System
Sigef	Land Management System
SIGMINE	Mining Geographic Information System

List of Acronyms	
Sinaflor	National System for Controlling the Source of Forest Products
SNCI	National Real Estate Certification System
TerraClass	Land Use and Land Cover Mapping Project
UA	Animal Unit
UAS	Authorization for Alternative Land Use
CU	Conservation Units
UF	State
UFRJ	Federal University of Rio de Janeiro
HPP	Hydroelectric Power Plant
Unesco	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WWF	World Wide Fund for Nature
ZARC	Agricultural Climate Risk Zoning
ZEE	Ecological-Economic Zoning

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1. EXECUTIVE SUMMARY

The Pantanal is a biome with unique and extremely complex characteristics, based on an intricate set of sedimentary landforms formed through the continuous erosion of the steep edges of the surrounding plateaus. It lies at the fragmented convergence of two major open biomes, Cerrado to the east and Chaco to the west (the latter beyond Brazil's borders), and is influenced by the Amazon to the north and the Atlantic Forest to the south. Its original cycles of flooding and receding waters are its most prominent and defining features.

The tributaries of the Upper Paraguay River Basin (BAP) flow from various plateaus, continuously eroding them and transporting sediments of diverse origins and compositions, forming the foundation of internal diversity in the Pantanal macrolandscape. The surface waters of the Upper Paraguay Basin are naturally dammed due to the main flow of the Paraguay River being constricted in a geomorphological phenomenon known as the "Southern Hill Closure." This geological bottleneck is formed by downstream elevations (Bodoquena Plateau on the Brazilian side, and Cerro Corá with the Amambay and Ybytyruzú ranges on the Paraguayan side).

The Pantanal macrolandscape, also known as the "Pantanal floodplain," is actually a geomorphological set of sedimentary landforms comprising three large interconnected relative depressions (Cuiabana Depression, Paraguay Depression, and Miranda Depression). These depressions are associated with false and small sedimentary plains marked by smaller landforms, which are continuously formed by megafans at the mouths of the main tributaries of the Paraguay River (primarily the Cuiabá, Taquari, and Miranda rivers). The biome's landscape also includes large perennial lagoons, remnants of the ancient inland sea of the Xaraés (such as Jacadigo, Negra, Cáceres, Castelo, Vermelha, Mandioré, Gaíva, Beraba, Piranhas, and Orion). The escarpments of the surrounding plateaus are a significant and defining part of the Pantanal macrolandscape. Interestingly, some isolated and topographically imposing landforms interrupt the flat terrain, such as the Serra do Amolar, the Urucum Massif, and the Nabileque Hills. This complex assembly of diverse formations constitutes a larger unit that functions organically and is biologically interconnected, which may be referred to as the Relative Depression of the Pantanal.

The geological origin of the Pantanal is the result of a progressive tectonic subsidence process, caused by the faulting of entire blocks of what was once a large bulge, culminating in a massive tectonic movement during the Andean orogeny, in other words, the geology of the Pantanal is directly related to the abrupt and violent emergence of the Andes mountain range millions of years ago, likely during the Tertiary period. Later, the terrain underwent intense dissection under much wetter climatic conditions than those of today, becoming individualized as a macrolandscape in the Pleistocene period, resulting in the depression into which various sediments have been and continue to be deposited (Ab'Saber, 1988; 2010).

Covering an area of 150,355 km² in its Brazilian portion, the biome spans two states: Mato Grosso (MT), which accounts for 35% of the total area, and Mato Grosso do Sul (MS), accounting for 65%. It occupies 1.76% of the total national territory, making it the smallest of Brazil's six biomes (IBGE, 2024b). In these states, the biome predominates in nine municipalities, with only one municipality fully contained within the biome: Ladário (MS) (IBGE, 2024c). According to data from the National Institute for Space Research (Inpe, 2023), between 2001 and 2023, the cumulative deforestation increase for both states was 15,775.92 km², representing just over 10% of the biome's total area, with 11,351.20 km² (71.95%) in MS and 4,424.72 km² (28.05%) in MT. By 2023, the Pantanal had already lost 30,000 km², equivalent to 20% of the biome's total area (Inpe, 2024). Therefore, along with the Amazon, the Pantanal is among the biomes with the highest proportion of remaining native vegetation in the country. However, between 2012 and 2023, the biome lost a total of 7,206.6 km² of its native forest cover, which represents approximately 4.8% of the biome in just one decade (Inpe, 2023).

The landscape unit that characterizes the biome is marked by seasonal flooding, resulting from the nearly permanent saturation of soils in various areas, with a mosaic of herbaceous and arboreal vegetation. However, open formations predominate in the biome, and native grasslands have often been used as forage pastures for cattle management for over two hundred years (Rosa et al., 2007). Fire is also part of the evolutionary history of many native grassland ecosystems in the Pantanal, having been present in the region for over 12,000 years (Power et al., 2016), and is historically used for pasture clearing during the dry season, between May and September, which is when the major fires in the Pantanal occur (IBGE, 2019; Santos et al. 2020).

In the floodplain, native pastures are being replaced by cultivated pastures, and new areas are being deforested to support brachiaria fields, composed of Urochloa decumbens and U. humidicola (Comatri-Filho, 1984; Pott, 1988; Aquino et al., 2017; Santos, 2020). In the plateau, native areas are being replaced by agricultural crops, especially soybeans and corn. The removal of vegetation, without considering soil suitability and without proper management and conservation practices, accelerates erosion along the edges of the plateau, as observed in the Taquari River, one of the largest tributaries of the BAP (Galdino, 2006).

In addition to agriculture and livestock, the energy sector has intensified in the BAP, with serious socio-environmental implications and comparatively low productivity. As of 2021, 52 hydroelectric ventures were in operation in the BAP, producing a total of 1,192.87 kW, which at the time represented only 0.70% of Brazil's total hydroelectric energy generation (Zanatta, S.C.S.; Maciel, J.C., 2021). The construction of dams on rivers draining the Pantanal floodplain, as well as the filling of reservoirs, requires the removal of native riparian vegetation across vast areas of the biome.

Moreover, these structures cause hydrological changes both upstream and downstream of the dam, interfere with fish migration, alter riverine fauna, affect sediment transport,

lead to the loss of terrestrial and aquatic biodiversity, and impact riverside communities (Zanatta, 2018; Zanatta & Maciel, 2021).

The Pantanal has been experiencing a drought period since 2019, the longest continuous period observed since 1985. The year 2020 was the driest in the past five decades in the biome, with precipitation indices similar to those recorded in the 1960s (Santos et al., 2020). In 2020, the largest fire in the history of the Pantanal occurred, burning an area of 44,998 km², corresponding to just over 30% of the biome's territory in the Brazilian portion (Shimabukuro et al., 2023). Furthermore, projections from the Geological Survey of Brazil indicate that 2024 may be the driest year in the Pantanal's history, and forecasts from the Environmental Satellite Applications Laboratory of the Department of Meteorology (LASA), at the Federal University of Rio de Janeiro (UFRJ), point to the highest Climate Difficulty Index for Forest Fire Control (CDSR) since 2003 across the entire BAP. Among the main causes of these extreme and prolonged drought episodes are the intensification of El Niño, with warming of Pacific Ocean waters, and climate change. These extreme weather conditions have been aggravated by deforestation for land-use change, the drainage of extensive areas for agriculture and livestock use, and the damming of watercourses for hydroelectric projects. However, regarding the causes of fires in the Pantanal, the vast majority of ignition events are caused by human activity, with only a small portion resulting from natural causes, such as cloud-to-ground lightning.

The use of fire in the Pantanal by the livestock sector aims to eliminate or contain the spread of undesirable species and promote the regrowth of forage grass of low palatability to cattle (Rodrigues, 2002). Meanwhile, the suppression of native vegetation occurs to allow for the introduction of exotic grass and agricultural use. Nevertheless, deforestation and fires in the Pantanal lead to soil degradation, alterations in the hydrological regime, so crucial for the biome's functioning, and the loss of biodiversity and ecosystem services essential to society and the regional economy.

To mitigate the effects of deforestation and fires in Brazil's biomes, Decree No. 11.367, dated 1 January 2023, established the Permanent Interministerial Commission for the Prevention and Control of Deforestation (CIPPCD), a collegiate body linked to the Office of the Chief of Staff of the Presidency of the Republic and coordinated by the Ministry of Environment and Climate Change (MMA). Additionally, it reinstated the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) and provided for the development of Action Plans for the Prevention and Control of Deforestation (PPCD) for the Cerrado, Atlantic Forest, Caatinga, Pampa, and Pantanal biomes. Thus, the Action Plan for Deforestation and Fire Prevention and Control in the Pantanal Biome (PPPantanal) emerges from the consolidation of guidelines defined by the Environmental Technical Group of the 2022 Government Transition Commission, contributions from the 19 ministries that make up the CIPPCD, the success and accumulated experience of the federal government in developing the PPCDAm (now in its 5th phase) and the PPCerrado (now in its 4th phase), both planned for the 2023-2027 period. The instrument also benefited from bilateral meetings between the Special Department for Deforestation Control and Environmental Land Management (SECD) of the MMA and

several ministries, autonomous agencies, and affiliated entities in Brasília, consultations with the state environmental agencies of MS and MT, and dialogue with civil society and academia during the Technical-Scientific Seminar on the Causes and Consequences of Deforestation and Fires in the Pantanal, held on 18 April 2024 in Campo Grande/MS.

The plan is organized into the following sections:

I. Political and institutional context of PPPantanal;

II. Policies for deforestation and fire control in the Pantanal;

III. Deforestation and fires in the Pantanal;

IV. Axes and strategic objectives of PPPantanal.

The plan's actions are structured, in accordance with the guidelines set forth in Decree No. 11367, 10 January 2023, into four major thematic axes:

I. Sustainable productive activities;

II. Environmental monitoring and control;

III. Land and territorial planning;

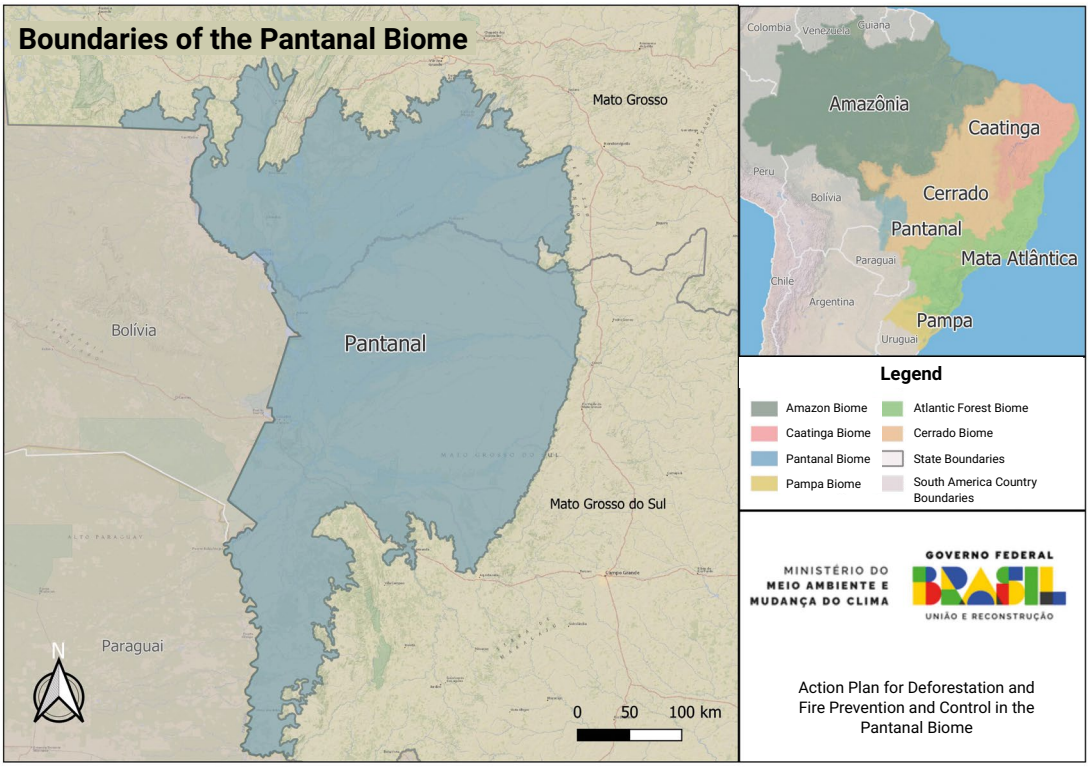
IV. Regulatory and economic instruments aimed at reducing deforestation and implementing actions encompassed by the other axes.

2. POLITICAL-INSTITUTIONAL CONTEXT OF THE PPPANTANAL

2.1. Biome characterization

The Pantanal is the smallest biome in Brazil, covering 150,355 km², with two-thirds located in the state of Mato Grosso do Sul (MS) and one-third in Mato Grosso (MT) (IBGE, 2024) - Figure 1.

Figure 1. Map of Brazilian biomes.



The high incidence of solar radiation and the region's topography are predominant factors shaping the Pantanal's climatic system, which is classified as being divided between the Semi-Arid Tropical (BsH) type in the core zones of the relative depression and the Subhumid-Dry Tropical (Aw) type along the bordering plateaus. The Paraguay River is the main river in the biome and is chiefly responsible for the flooding pulse of the Pantanal plain, which gives the region the distinctive feature of a flood system that manifests in four distinct phases: rising, peak flood, receding, and drought (Guimarães, 2014). Within this flooding context, the emergence of ephemeral watercourses, called "corixos," is common.

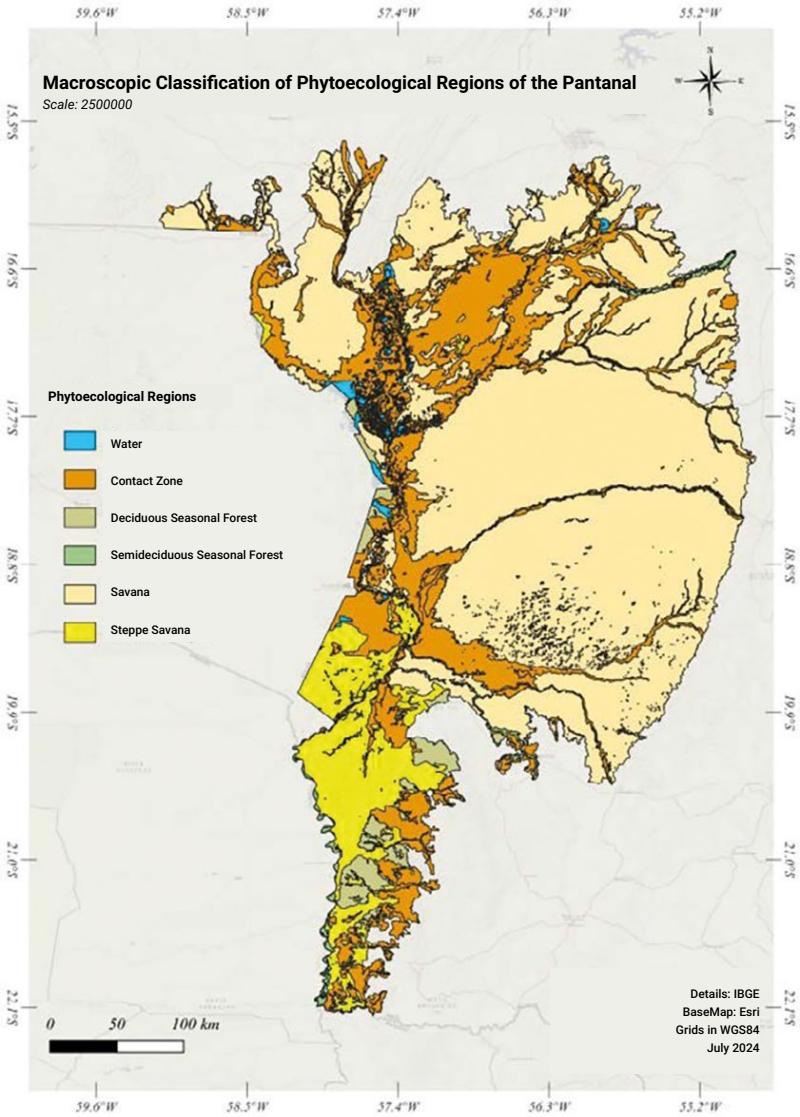
This flooding dynamic conditioned the formation of sandy soils, developed from unconsolidated sediments, with limited areas composed of clay and organic materials

deposited throughout the Quaternary period (Santos et al., 1997). It also contributed to the biome's high faunal richness, estimated at 652 bird species (many migratory), 264 fish species, 177 reptile species, 102 mammal species, and 40 amphibian species (ICMBio, 2024). Of these, at least 36 species are listed in some category of extinction risk (ICMBio, 2018). Additionally, the Pantanal hosts four Ramsar sites, designated under the Convention on Wetlands of International Importance, especially as Waterfowl Habitat: the Pantanal Mato-Grossense National Park; the Sesc Pantanal Private Natural Heritage Reserve; the Fazenda Rio Negro Private Natural Heritage Reserve; and the Taiamã Ecological Station, designated in 1993, 2002, 2009, and 2018, respectively (MMA, 2024b). The Ramsar Convention, as it became known, was enacted in Brazil by Decree No. 1905, 16 May 1996.

Regarding flora, an estimated 1,871 plant species are found in the biome, of which 218 are grass and 192 are legumes (Brazil, 2024). Concerning anthropogenic pressures, at least 21 species are threatened with extinction, particularly due to agricultural expansion into natural areas (Martinelli; Moraes, 2013). The biome is composed of a mosaic of forest formations interspersed with grasslands and open savanna-like areas, distributed according to topographic variations, soil type, and flood dynamics (Nunes da Cunha et al., 2022; Pott, 1994).

According to IBGE (2012), the biome is divided into the following phytoecological (physiognomic) regions: Deciduous Seasonal Forest, Semideciduous Seasonal Forest, Savanna (or Cerrado), and Steppe-Savanna (or Brazilian Chaco), as well as Ecological Transition Zones or Contact Zones (Figures 2 and 3). Pantanal's flora also has significant socioeconomic importance, serving as native pastureland for livestock and as a means of subsistence for rural communities through non-timber forest products such as fruits, seeds, resins, and medicinal plants. It likewise generates economic benefits through ecotourism, a source of income for many localities, especially those located in the Amolar region (MS) and around the Taiamã Ecological Station and the Sesc Pantanal Ecological Ranch Private Natural Heritage Reserve (MT).

Figure 2. Phytoecological regions of the Pantanal.



Source: Based on data from IBGE (2012).

Figure 3. Phytophysiognomies of the Pantanal.

Steppe Savanna (Brazilian Chaco).
Photo: Paulo Robson.

Wooded Savannah (Cerrado).
Photo: Geraldo ADJ.

Deciduous Seasonal Forest (Cordilheira).
Photo: Rosa HS.

Semideciduous Seasonal Forest (Riparian Forest).
Photo: Geraldo ADJ.

Due to anthropogenic influence on climate change and land use and occupation in the Pantanal, the flood regime has shown a decreasing trend in flooding events since 1990. Measurements from the Ladário gauge, managed by the Brazilian Geological Service and used to monitor the level of the Paraguay River, show that the maximum and minimum levels in 2021 were the lowest since the 1970s. In 2021 and 2022, water levels remained below the 30-year average, with minimum levels reaching 0.6 meters below zero, even during the rainy season (WWF, 2020). Compared to other biomes, the Pantanal was the one that lost the most flooded area throughout the MapBiomas Water historical series, covering the period from 1985 to 2023. In 2023, the surface area with water present for at least six months was 382,000 hectares, a 61% reduction compared to the historical average. A decrease was also observed in both the extent of flooded areas and the duration of water presence in those areas.

According to Roque et al. (2016), the interruption of water flows between the plateau and the Pantanal plain is the main factor altering the flood dynamics in the Pantanal. This process can be caused by various anthropogenic vectors, such as dam construction, roads, drainage systems, increased deforestation, and fires that alter the local hydrological cycle, in addition to the effects of climate change (Roque et al., 2016).

Furthermore, changes in the intensity and duration of the hydrological regime impact species distribution, the seasonal extent and persistence of wetlands, biodiversity patterns, species distributions (Junk et al., 2011), and soil formation and structure.

Therefore, the preservation and conservation of native vegetation, as well as the sustainable use of the Pantanal's environmental assets, are essential not only for maintaining the ecosystem and biodiversity but also for human well-being and the sustainable economic development of the region.

2.2. Environmental commitments

The Pantanal is mentioned in the Federal Constitution as National Heritage, along with the Brazilian Amazon Rainforest, the Atlantic Forest, the Serra do Mar, and the Coastal Zone. Its use must, as determined by law, be conducted in ways that ensure environmental preservation, including the sustainable use of natural resources. However, to date, there is no specific federal law addressing this matter. In this regard, the current federal regulatory framework for the use and conservation of native vegetation in the Pantanal is Law No. 12651, 25 May 2012, the Native Vegetation Protection Law (also known as the Forest Code). Its proper implementation is linked to environmental balance, soil fertility, clean air, quality water, and a stable climate. The Forest Code covers a range of aspects related to the use, protection, and restoration of vegetation, sets forth obligations regarding Permanent Preservation Areas (APPs) and Legal Reserves (RLs), regulates forest exploitation, and promotes economic instruments to achieve its goals, serving as the foundation for protecting Brazil's native vegetation.

Article 10 of Federal Law No. 12651/2012 establishes that wetlands and Pantanal plains are areas of restricted use, whose ecologically sustainable exploitation must consider technical recommendations from official research institutions. Any new suppression of native vegetation for alternative land use is subject to prior authorization from the respective state environmental agency, based on those recommendations. Currently, both Mato Grosso and Mato Grosso do Sul have their own state laws addressing this issue (this topic will be explored in more depth in the next section).

Due to the presence of traditional and intensive activities that contribute to native vegetation suppression, such as cattle ranching, agriculture, mining, and others, the effective implementation of Law No. 12651/2012, along with complementary local legislation and the strengthening of environmental licensing and procedures for issuing vegetation suppression authorizations, is key to ensuring the conservation and sustainable use of the biome.

The Convention on Wetlands of International Importance Especially as Waterfowl Habitat, also known as the Ramsar Convention, signed in 1971, which deals with the protection of wetlands, establishes obligations for signatory countries to designate at least one wetland

of international importance, called a Ramsar site, promote the sustainable use of such areas through rational planning, establish nature reserves, train qualified personnel, and foster international cooperation. Within this framework, the Pantanal hosts four Ramsar sites: Pantanal Matogrossense National Park, Sesc Pantanal Private Natural Heritage Reserve, Fazenda Rio Negro Private Natural Heritage Reserve, and Taiamã Ecological Station, designated in 1993, 2002, 2009, and 2018, respectively (MMA, 2024b).

During the 12th Ramsar Conference of the Parties (COP-12) in 2015, Bolivia, Brazil, and Paraguay initiated a dialogue to advance the construction of a coordinated vision for the Pantanal aimed at integrated and sustainable development of the region. This resulted in the "Declaration for the Conservation, Integral, and Sustainable Development of the Pantanal." The document consists of a set of guidelines for integrated trinational management of the Pantanal biome, signed by the environmental ministers of the three countries. Additionally, Resolution XII.8 was approved, reaffirming the important role of conservation and sustainable development in the Pantanal region for maintaining ecosystem functions in the countries of the La Plata River Basin.

Lastly, it is important to note that the Pantanal was recognized as a World Natural Heritage Site and Biosphere Reserve (BR) by UNESCO in 2000 (Brazil, 2022; UNESCO, 2024). The area of the Pantanal designated as a Biosphere Reserve is part of the Man and the Biosphere (MAB) program, which aims to promote a sustainable balance between human activity and biodiversity conservation (RBRB, 2021).

Source: MMA.

3. POLICIES FOR DEFORESTATION AND FIRE CONTROL IN THE PANTANAL

3.1. Federal public policies for deforestation control

With the publication of Decree No. 11367, 1 January 2023, the Action Plans for the Prevention and Control of Deforestation (PPCD) were resumed for the Amazon and Cerrado biomes, and plans were proposed for the other biomes, including the Pantanal. The PPCDs are considered tools for implementing the National Policy on Climate Change (PNMC), established by Law No. 12187, 29 December 2009. In addition, they contribute to the implementation of the National Strategy for Reducing Greenhouse Gas Emissions from Deforestation and Forest Degradation, Conservation of Forest Carbon Stocks, Sustainable Forest Management, and Enhancement of Forest Carbon Stocks in Brazil (ENREDD+), established by Decree No. 11548, 5 June 2023. The PPCDs also work in synergy with the National Biodiversity Policy (Decree No. 4339, 22 August 2002); the National Plan for the Recovery of Native Vegetation (Planaveg) (Decree No. 8972, 23 January 2017); the National Policy for Integrated Fire Management (Law No. 14944, 31 July 2024), thereby contributing to the implementation of national and international commitments; and the National Policy to Combat Desertification and Mitigate the Effects of Drought (Law No. 13153, 30 July 2015).

Among the projects implemented by the federal government, a key initiative is the Project for Strategies of Conservation, Restoration and Management for Biodiversity in the Caatinga, Pampa, and Pantanal Biomes (GEF Terrestrial Project), coordinated by the Ministry of the Environment and Climate Change (MMA). The project aligns with the principles of the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Its objectives include promoting biodiversity conservation through the consolidation and operationalization of protected areas, the management of adjacent areas, the recovery of degraded lands, the monitoring of endangered species of flora and fauna, and the engagement of local communities. The project aims to increase the population viability of endangered species, prevent carbon emissions, and expand areas of native vegetation under sustainable management practices in the three least-represented biomes in Brazil.

Another notable initiative was the implementation of the Project for the Conservation and Sustainable Use of the Brazilian Biological Diversity (Probio) by the MMA, which made it possible to identify priority areas for biodiversity conservation, assess the socioeconomic conditions and current trends of land occupation in Brazil, and formulate actions to conserve the country's natural resources (MMA, 2002). Among the outcomes of Probio was the satellite-based mapping of biome remnants, which enabled the quantification of fragmentation levels and the consolidation of biodiversity corridors, as well as the conduction of studies on the effects of fragmentation on the biota of

Brazilian biomes, including the Pantanal and Cerrado. This initiative allowed Brazil to begin monitoring biome vegetation cover using satellite imagery.

In 2008, the Probio mapping was supplemented by the Project for Satellite-Based Monitoring of Deforestation in Brazilian Biomes (PMDBBS), coordinated by the MMA and executed by IBAMA with financial support from the United Nations Development Programme (UNDP). The project aimed to systematically monitor vegetation cover in the Cerrado, Caatinga, Atlantic Forest, Pampa, and Pantanal biomes to quantify the loss of native vegetation and support actions and policies for the prevention and control of illegal deforestation in those biomes, as well as biodiversity conservation and climate change mitigation efforts. The project used the Vegetation Cover Maps of the Brazilian Biomes produced by Probio for the period up to 2002 as the baseline ("time zero") for monitoring. It also updated deforestation data for the Pantanal biome for the periods 2002-2008, 2008-2009, 2009-2010, and 2010-2011 using imagery from the Landsat and CBERS satellites, made available by INPE.

Since 2012, deforestation monitoring in the Pantanal biome has been conducted by the National Institute for Space Research (INPE) through the Satellite-Based Deforestation Monitoring Project (Prodes). On 1 August 2023, the biome was incorporated into the Real-Time Deforestation Detection System (Deter), which is designed to detect and issue alerts for deforestation, forest degradation, and logging activities to assist federal and state environmental law enforcement agencies. The system uses imagery from the Amazônia-1, CBERS-4, and CBERS-4A satellites to detect changes in forest cover and fire scars, with an average revisit frequency of every three days.

At COP-21, held in Paris in 2015, the Brazilian government submitted its Nationally Determined Contribution (NDC) to the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) (MMA, 2019). In this commitment, Brazil pledged to increase the share of sustainable bioenergy in the country's energy matrix to 18% by 2030, to scale up the sustainable management of native forests, and to reach a 45% share of renewable energy in the national energy matrix by 2030. Additionally, the NDC includes a commitment to restore 12 million hectares of native vegetation across Brazil, including in the Pantanal, by 2030 for multiple uses.

Finally, in 2023, a new commitment was proposed to reduce the loss of native vegetation and achieve zero deforestation by 2030 in all biomes. In the context of PPPantanal, zero deforestation refers to the elimination of illegal deforestation and the offsetting of legally authorized vegetation suppression and the resulting greenhouse gas emissions. This will be achieved through stronger implementation of forest legislation and the restoration and enhancement of native vegetation stocks, supported by economic incentives for conservation and sustainable forest management.

3.2. Federal public policies for fire control and reduction of fires

The MMA, together with IBAMA and ICMBio, has long worked to prevent and combat fires across the national territory through the Federal Brigade Program for the Prevention and Combat of Forest Fires, with brigades specifically contracted for this purpose. These efforts are focused primarily on federal areas (Indigenous lands, quilombola territories, and federal conservation units), selected based on their history of fires and the socio-environmental relevance of each area.

Also under the MMA's initiative, through IBAMA, a situation room is established annually during the critical dry season to operate in an integrated and coordinated manner. This room brings together, on a daily basis, representatives from federal and state institutions involved in monitoring and fighting fires. This unit, known as the Integrated Multiagency Operational Coordination Center (CIMAN), has operated for several years and was recently reestablished by Law No. 14944, 31 July 2024. Its primary role is to monitor the status of fires in Brazil, share information, define priorities, and coordinate large-scale firefighting operations. In 2024, due to the emergency in the Pantanal, CIMAN's operations began earlier than usual.

It is also important to mention that federal environmental institutions responsible for responding to fires work with annual planning that includes, in addition to the Federal Brigade Program and the institutionalization of Ciman, the implementation of initiatives related to Integrated Fire Management. This approach incorporates ecological, cultural, socioeconomic, and technical aspects of fire, with the objective of reducing emissions of particulate matter and greenhouse gases, conserving biodiversity, and decreasing the severity of fires. It also encompasses several activities such as training, awareness campaigns, environmental education, construction of firebreaks, development of burning calendars, implementation of controlled and prescribed burns, fires monitoring and suppression, as well as recovery and restoration of affected areas, which continue to be implemented in different regions of the country, including the Pantanal's conservation units and indigenous lands.

Regarding Integrated Fire Management, it is worth noting that although the National Policy on Integrated Fire Management was only recently approved (Law No. 14944, 31 July 2024), the approach has already been applied in the Pantanal for several years under ICMBio Ordinance No. 1150, 6 December 2022. This ordinance sets out the principles, guidelines, objectives, instruments, and procedures for implementing Integrated Fire Management in federal conservation units, yielding significant results in reducing fires, which have become increasingly frequent in the biome.

Another policy being developed by federal institutions in response to fires, also provided for in the National Integrated Fire Management Policy, is the recognition, appreciation,

and strengthening of community and volunteer brigades and brigade members operating throughout the national territory. This is being carried out through the development of the Federal Volunteering Strategy for Integrated Fire Management actions by the MMA and its affiliated agencies, Ibama and ICMBio, in partnership with other organizations and representatives of civil society. These collectives, increasingly present in environmental protection and conservation, are a valuable resource for preserving Brazil's natural heritage, as they are located in the territory and can assist the federal government with primary and immediate actions to prevent fires, such as community awareness, execution of prescribed and controlled burns, construction of firebreaks, fire monitoring and detection, and the recovery and restoration of areas affected by fires. In some cases, these collectives are also trained for initial suppression, allowing them to provide a first response to fire outbreaks and prevent them from becoming major fires. However, to ensure that this involvement is safe and effective for both parties (government and society), these groups must be properly trained and equipped, and their activation procedures must be clear, well established, and regulated, this being the main goal of the Federal Strategy.

Moreover, under Complementary Law No. 140, 8 December 2011, federal government actions in areas outside its jurisdiction must be of a subsidiary nature and formally requested by the federative entity originally holding administrative competence. It follows, therefore, that the responsibility for responding to burnings and fires in a given region should not be attributed solely to the federal government but also to state and municipal governments, which hold primary jurisdiction. Accordingly, in 2023, the MMA initiated a process of intergovernmental dialogue and coordination with the governments of Mato Grosso and Mato Grosso do Sul to promote interinstitutional cooperation in fire prevention and response efforts.

Also in 2023, Decree No. 11367, 1 January 2023, reestablished the National Commission for the Restoration of Native Vegetation (Conaveg), which coordinates the implementation, monitoring, and evaluation of the National Policy for the Restoration of Native Vegetation (Proveg) and the execution of the National Plan for the Restoration of Native Vegetation (Planaveg). Among its provisions are measures to recover degraded areas, including those affected by fires.

Source: MMA.

3.3. State public policies for deforestation control

Article 10 of Law No. 12651, 25 May 2012, establishes that, in the wetlands and Pantanal plains, ecologically sustainable exploitation is permitted, taking into account technical recommendations from official research agencies, and that any new clearance of native vegetation for alternative land use is subject to authorization from the respective state environmental agency.

Consequently, both the state of Mato Grosso and the state of Mato Grosso do Sul have their own regulations regarding land use and occupation, as well as specific criteria for issuing authorizations for clearing native vegetation in the Pantanal. These are in addition to other regulations designed to ensure that activities occur in an environmentally appropriate manner, such as environmental licensing.

Law No. 11861 of the state of Mato Grosso, enacted on 3 August 2022, amends the so-called "Pantanal Law" (Law No. 8830/2008), which regulates the preservation and sustainable use of the Upper Paraguay River Basin. The new law allows extensive cattle ranching in Permanent Preservation Areas (APPs) and Legal Reserves (RLs) in the region, provided that native pasture is used and the replacement with exotic grass is prohibited. It also limits the implementation of cultivated pastures to a maximum of 40% of the rural property area in the floodplain of the Pantanal, in order to preserve environmental heterogeneity and landscape functionality.

Additionally, the law permits the development of ecotourism and rural tourism, provided environmental conservation guidelines are followed. Furthermore, since 2013, the state of Mato Grosso has had Law No. 9878/2013, which created the State System for Reducing Emissions from Deforestation and Forest Degradation, Conservation, Sustainable Forest Management, and Enhancement of Forest Carbon Stocks (REDD+) in the state.

In Mato Grosso do Sul, Law No. 6160, 18 December 2023, was recently enacted to regulate the conservation, protection, restoration, and ecologically sustainable exploitation of the Restricted Use Area of the Pantanal Plain (AUR-Pantanal). This law was developed by the State Department for Environment, Development, Science, Technology and Innovation (Semadesc) in consultation with civil society, the productive sector, and the Ministry of the Environment and Climate Change. Under the law, specific and environmentally sensitive formations in the Pantanal, such as landis, salt flats, forested islets (in Portuguese *capões*), mountain ranges, bay borders, earth mound fields (in Portuguese *campos de murundus*), and ecological corridors, are granted special protection. Clearing of native vegetation in these areas is only allowed in cases of public utility, social interest, and low environmental impact. Nevertheless, extensive cattle ranching is permitted in these areas as long as it does not cause environmental degradation. The legislation also restricts, with some exceptions, the expansion of agricultural crops such as soy and sugarcane, cattle feedlots, new charcoal production facilities, construction of dikes, drains, and dams that alter the hydrological regime, the installation of small hydroelectric plants, and the introduction of exotic animal species.

State Law No. 6160/2023 also requires the maintenance of representative samples of biodiversity on rural properties. To that end, the clearing of native vegetation on rural lands is subject to maintaining at least 50% of the area with forest and cerrado formations, and 40% with grassland formations as representative samples of diversity. However, when such areas, or others subject to restrictions, account for 60% or more of the property, alternative land use may be authorized on up to 40% of the property, provided that the technical recommendations of Embrapa Pantanal are followed.

Furthermore, since the enactment of Law No. 6160/2023, authorization to clear native vegetation in the Pantanal floodplain of Mato Grosso do Sul is conditional upon: (i) registration and approval of the Rural Environmental Registry (CAR) of the property; (ii) absence of final environmental violations in the past three years; (iii) proper cattle management to minimize degradation of native and cultivated pastures; (iv) implementation of pasture cleaning and use of fire for vegetation management in accordance with the environmental licensing criteria; (v) protection and use of APP and Legal Reserve areas in accordance with current legislation.

The law also established the State Sustainable Development Fund for the Pantanal Biome, aimed at financing Payments for Environmental Services (PES) and promoting projects focused on the carbon market.

Another initiative by the states to preserve the Pantanal is the creation and expansion of Conservation Units (CUs) to protect ecologically important areas. As of now, there are three state conservation units in the Pantanal, in addition to state-level RPPNs: Encontro das Águas State Park (MT); Guirá State Park (MT); and the Rio Negro Pantanal State Park (MS). These units play a key role in preserving local biodiversity and enabling scientific research and ecotourism in the region. They are of great environmental importance and complement federal CUs.

In April 2024, the governments of MS and MT signed a Technical Cooperation Agreement for the Protection of the Pantanal. The objective is to unite efforts in defense, protection, and sustainable development of the Pantanal, which spans both states. The agreement was signed during the 1st Seminar on the Causes and Consequences of Deforestation and Fires in the Pantanal, organized by the federal government through the Ministry of the Environment and Climate Change.

Given the shared nature of forest management among government levels and the legal competence of states for licensing and enforcement, it is essential to emphasize the need for ongoing integration between the Federal Administration and states, and for strengthening state agencies. Only through such cooperation will it be possible to effectively and sustainably implement policies for deforestation and fire prevention and control. This is especially critical in biomes with greater human presence, where a larger portion of the territory consists of private lands, which are predominantly under state jurisdiction for environmental licensing and enforcement.

3.4. State public policies for fire control and reduction of fires

The state of Mato Grosso do Sul has the Interinstitutional Committee for the Prevention and Combat of Forest Fires in the State of Mato Grosso do Sul (Fire Committee), reactivated in 2017. Its purpose is to promote discussion, management, coordination, monitoring, evaluation, prevention, and suppression of fires in the state, as well as to propose regulatory measures. The Committee includes representatives from the following public institutions: Semadesc, Imasul, Military Fire Department of MS (CBMMS), the State Prosecution Service (MPE/MS), Ibama, the National Department of Transport Infrastructure (DNIT), the State Agency for Enterprise Management (Agesul), the State Civil Defense Coordination of Mato Grosso do Sul (Cedec/MS), the Environmental Military Police (PMA/PMMS), and the Brazilian Agricultural Research Corporation for the Pantanal (Embrapa Pantanal). It also includes representatives from civil society organizations, such as WWF Brazil, SOS Pantanal, and the Neotrópica Foundation of Brazil (FNB), as well as from the productive sector, including the Federation of Agriculture and Livestock of Mato Grosso do Sul (Famasul), the Association of Planted Forest Producers and Consumers of Mato Grosso do Sul (Reflore MS), and the Bioenergy Producers Association of Mato Grosso do Sul (Biosul). Furthermore, Decree No. 15654,

15 April 2021, established the State Plan for Integrated Fire Management (PEMIF), which aims to regulate the authorized use of fire in Mato Grosso do Sul.

In Mato Grosso, responsibility for coordinating actions to prevent and combat illegal deforestation, illegal logging, and fires lies with the Strategic Committee to Combat Illegal Deforestation, Illegal Logging, and Forest Fires (Cedif-MT), composed of the following agencies and institutions: the Office of the Chief of Staff, Sema/MT, the State Department of Public Security (SESP), Military Police (PM), Civil Police (PJC), Military Fire Department (CBM), and the Agricultural Defense Institute of the State of Mato Grosso (Indea/MT). The following may also be invited to join Cedif: representatives of the Ibama Superintendency in Mato Grosso (Ibama/MT), ICMBio, the National Indigenous Foundation (Funai), the Superintendency of the National Institute for Colonization and Agrarian Reform in Mato Grosso (Incra/MT), the State Prosecution Service (MPE), the Federal Prosecution Service and the Office of the Attorney General of the Republic in Mato Grosso (MPF/PGR), the Federal Police (PF), the Federal Highway Police (PRF), and the Brazilian Armed Forces.

Cedif-MT's duties include promoting actions that lead to the identification and administrative, civil, and criminal accountability of those responsible for environmental degradation; analyzing data and information directly or indirectly related to deforestation, fires, and other forms of illegal forest degradation; coordinating and developing integrated operational actions among the agencies and institutions, prioritizing the protection of forests and other vegetation; defining priority intervention areas; proposing improvements to environmental legislation and administrative and managerial mechanisms; providing technical services and formulating specific tools, mechanisms, and strategies for executing actions to combat illegal deforestation, fires, and forest degradation; and establishing Regional Environmental Emergency Cabinets, to be composed of local authorities from the institutions that make up Cedif-MT.

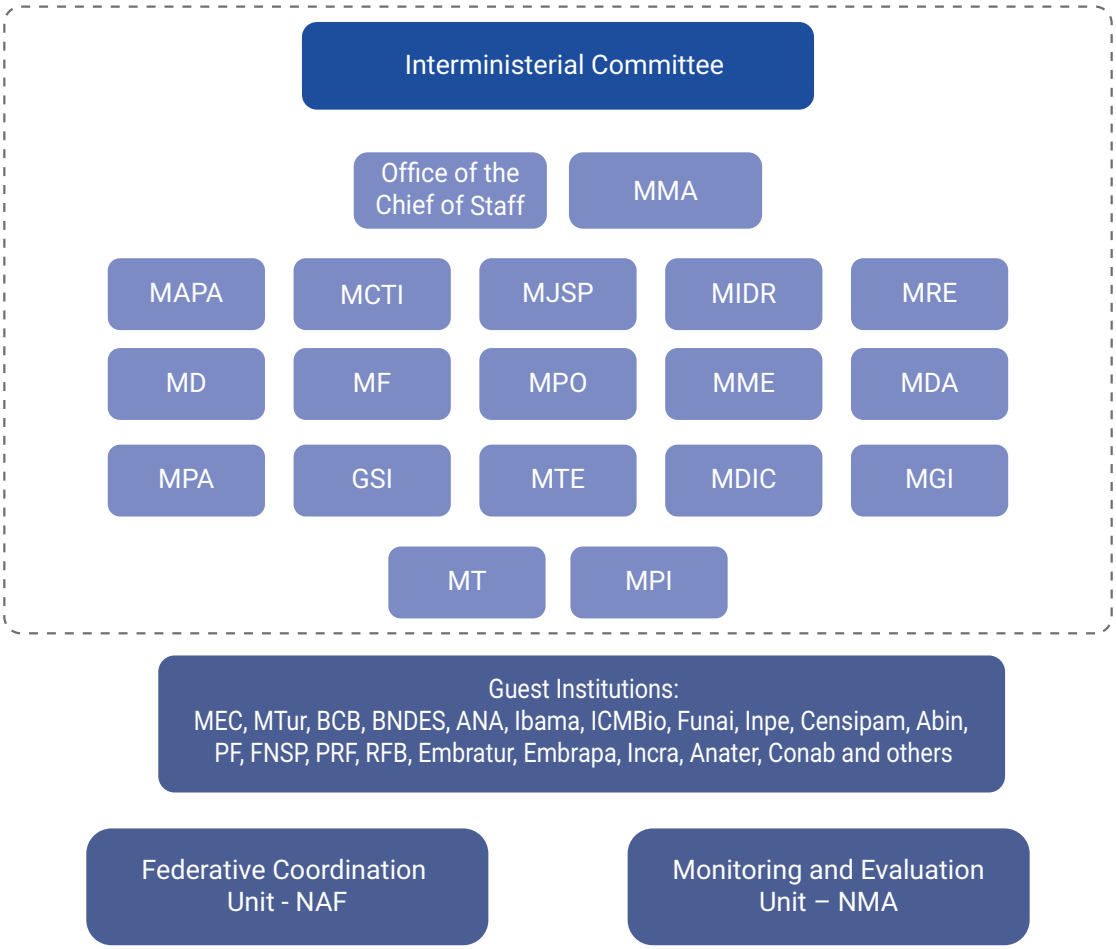
In both states, it is important to note that these state-level interinstitutional bodies should coordinate with the National Committee on Integrated Fire Management, also established under the National Policy on Integrated Fire Management. This reinforces the principle that the responsibility for fire control and the reduction of fires, as well as the broader implementation of Integrated Fire Management, is not the sole responsibility of the federal government. Instead, it must occur in an integrated and coordinated manner among public and private institutions, organized civil society, Indigenous peoples, traditional communities, and the private sector.

Source: MMA.

3.5. Governance of the 1st phase of PPPantanal

To demonstrate its commitment to biodiversity conservation and the responsible use of natural resources, and in response to the significant increase in deforestation rates in recent years in the country, the federal government established, through Decree No. 11367, 1 January 2023, the Permanent Interministerial Commission for the Prevention and Control of Deforestation, mandating the preparation of Action Plans for the Prevention and Control of Deforestation and Fires for all biomes in Brazil. The 1st phase of the PPPantanal will be implemented over four years (from 2024 to 2027), aligning its actions with the execution of the Multi-Year Plan (PPA). In coordination with other plans and public policies, the PPPantanal is designed to enable all ministries and other executing bodies to contribute toward the goal of achieving zero deforestation by 2030. The governance model for the 1st Phase of the PPPantanal adheres to the directives of Decree No. 11367/2023 and is managed by the Interministerial Commission, which includes mechanisms and tools for transparency and social participation (Figure 4)).

Figure 4. Governance structure of Phase 1 of the PPPantanal.



In the realm of ministerial coordination, the Permanent Interministerial Commission for the Prevention and Control of Deforestation (CIPPCD) serves as the forum for deliberation, decision-making, and the development of strategic proposals for new action plans. Chaired by the Office of the Chief of Staff of the Presidency of the Republic (CC/PR) and coordinated by the Ministry of Environment and Climate Change (MMA), the Interministerial Commission includes the participation of 17 other ministries.

The responsibilities assigned to the Interministerial Commission include the definition and coordination of actions to reduce deforestation rates throughout the national territory, evaluation, approval and monitoring of the implementation of the Action Plans for Deforestation Prevention and Control (for all Brazilian biomes) and the establishment of measures to overcome any difficulties in their implementation. The Interministerial Commission is also responsible for ensuring that the actions provided for in the Plans promote the development and integration of environmental protection systems and contribute to the conservation of biodiversity and the reduction of greenhouse gas

emissions from deforestation, forest degradation and fires. For this reason, it is also the role of the Interministerial Commission to monitor the elaboration and implementation of public policies that affect the Action Plans, through coordinated actions with the states, the Federal District, and municipalities, and other federal institutions.

Following the 1st Technical-Scientific Seminar on the Causes and Consequences of Deforestation and Fires in the Pantanal, held on 18 April 2024 in Campo Grande (MS) and coordinated by the MMA, dozens of meetings were held with the member ministries and invited institutions of the CIPPCD to promote in-depth discussions on the tools and mechanisms needed to address the identified challenges. These discussions allowed for a detailed analysis of the characteristics, challenges, and opportunities of each thematic axis, in order to define the plan's objectives, expected outcomes, actions, targets, and indicators.

To enable integrated implementation with states and municipalities, the Federative Coordination Unit (NAF) will be established, with periodic meetings between the MMA, other federal actors, and the state and municipal environmental departments. The NAF will serve as a forum for information sharing and for identifying challenges and opportunities for joint action between the Federal Administration, the states and municipalities, with support from, and within the scope of, the Tripartite National Commission, established by Complementary Law No. 140/2011. In accordance with Article 11 of Decree No. 11367/2023, an annual monitoring report on the Plan's implementation will be published, including the execution of each line of action led by members and guests of the Interministerial Commission. To this end, the Monitoring and Evaluation Unit (NMA) will be established, coordinated by the MMA, with participation from ministries, oversight agencies, and representatives of civil society and academia. The NMA may also propose adjustments to targets and indicators to improve the measurement of the effectiveness of the Plan's actions. Both the NMA and the Federative Articulation Center (NAF) will serve as platforms for supporting future revisions, as outlined in art. 2, Decree No. 11367/2023, establishing a routine for generating information to continuously improve the plan.

Instruments related to transparency and social participation were also designed to ensure proper disclosure and transparency of the plan's actions, while expanding and strengthening channels for participation by states, the private sector, and organized civil society. Decree No. 11367/2023 provides for the following instruments for social participation: public consultations, technical-scientific seminars, and the preparation of follow-up and monitoring reports on the implementation of actions.

The elaboration of 1st Phase of the PPPantanal was coordinated by the Extraordinary Department for Deforestation Control and Environmental Land Management (SECD/MMA), which drafted the document based on: (a) reports from the transition working groups on environment, agriculture, justice, and Indigenous peoples; (b) inputs gathered

during the Technical-Scientific Seminar; (c) inputs from meetings with federal actors; and (d) technical meetings with states and civil society.

The 1st Technical-Scientific Seminar on the Causes and Consequences of Deforestation and Fires in the Pantanal, held in Campo Grande (MS) and broadcast live via MMA social media, brought together representatives from the federal and state governments, civil society, the private sector, and academia. During the seminar, several presentations were made on the causes and consequences of deforestation and fires in the biome. The seminar also enabled the analysis of intra-regional social and economic dynamics, in order to anticipate the planning of preventive actions against the emergence of new deforestation frontiers in the biome. After the seminar, a Problem Tree (Annex A) was developed compiling the various causes and consequences of deforestation and degradation in the biome, which was used as a basis for the preparation of this Plan.

Source: MMA.

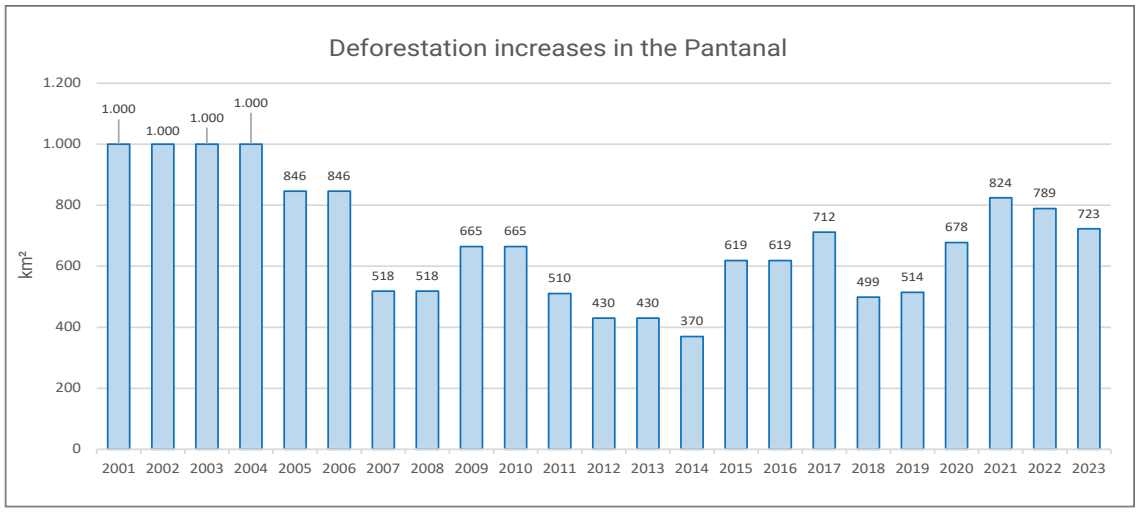
4. DEFORESTATION AND FIRES IN THE PANTANAL

4.1. Deforestation dynamics in the biome

Official deforestation data for the country are made available through the Satellite Monitoring Program of Brazilian Biomes (BiomasBR Program), coordinated by the National Institute for Space Research (Inpe). The BiomasBR Program encompasses three projects by Inpe: the Satellite Deforestation Monitoring Project (Prodes), the Real-Time Deforestation Detection System (Deter), and the Land Use and Land Cover Mapping Project (TerraClass), conducted in partnership with the Brazilian Agricultural Research Corporation (Embrapa). In addition to quantifying the annual deforestation increments, Inpe also provides data on hotspots detected by satellites and on burned areas in each Brazilian biome (TerraBrasilis Platform and Fires Program).

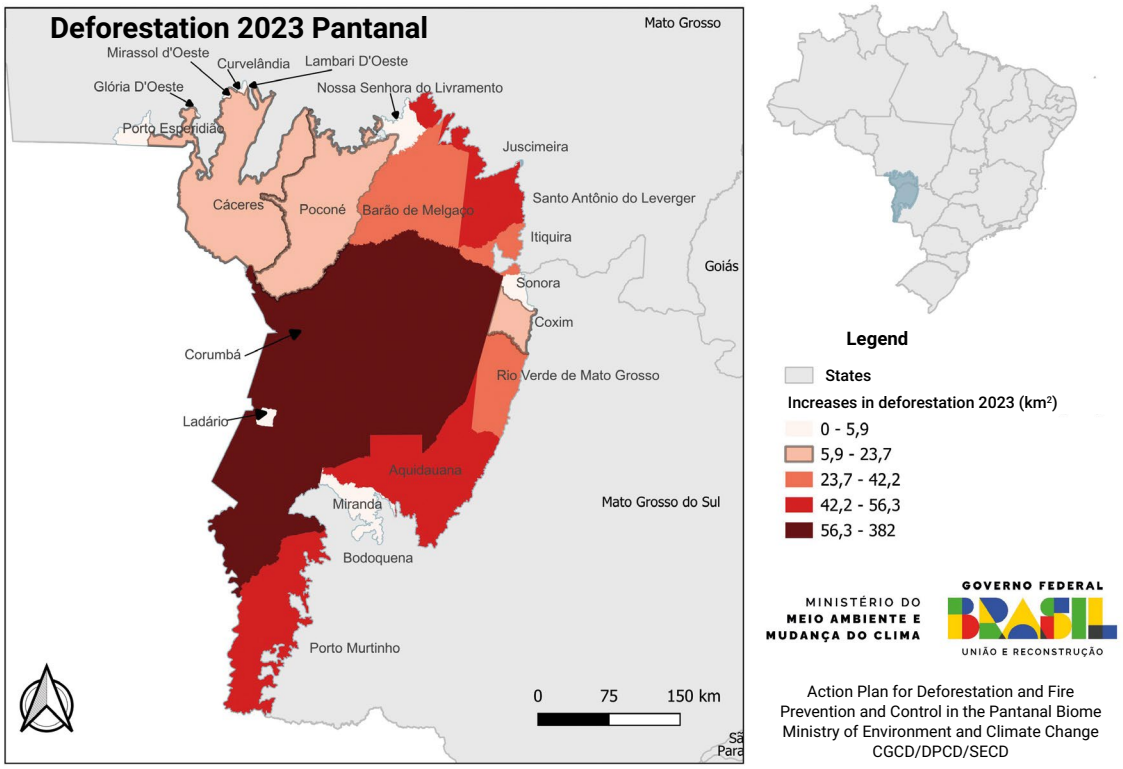
According to the data presented by Inpe (Figure 5), between the years 2001 and 2022 (Prodes/Inpe), there was no consistent trend of either reduction or increase in deforestation throughout the entire period. In this context, the highest annual deforestation value occurred between the years 2001 and 2004 (1,000.06 km²) and the lowest in 2014 (369.7 km²). Regarding the most recent years in the historical series, the data show a decrease from 2021 to 2023, from 824.5 km² to 723.1 km², respectively. Based on the 2023 data, the municipality of Corumbá concentrates the largest deforested areas (Figure 6). Although deforestation in 2023 is approximately 25% below peak levels, it still represents a high level of deforestation and demonstrates that, despite efforts to enhance conservation of the biome and improve relevant legal controls, such as environmental licensing and regulations related to authorizing vegetation suppression. The Pantanal remains under pressure, making it necessary to implement more effective measures to ensure the sustainable use of the biome.

Figure 5. Deforestation increases in the Pantanal biome from 2001 to 2023 (km²).



Source: adapted from Inpe (2024).

Figure 6. Distribution of deforestation by municipalities in the Pantanal in 2023 (km²).



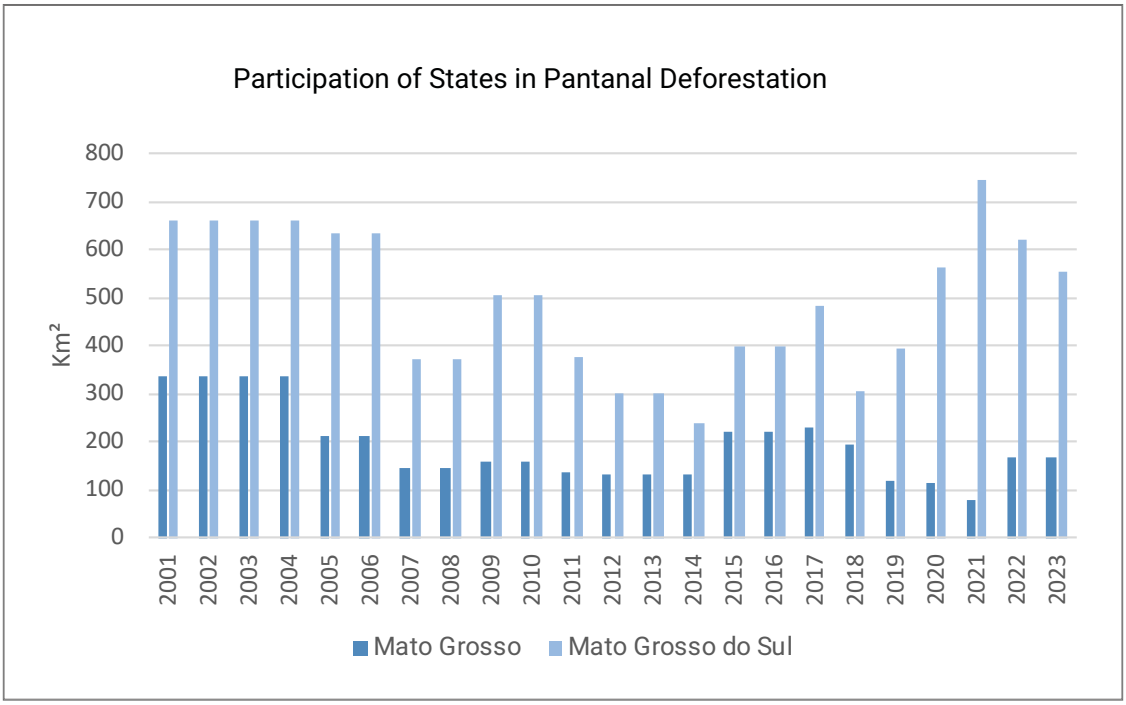
A detailed assessment of deforestation between the two states within the biome shows that Mato Grosso do Sul has consistently recorded higher annual deforestation figures than the state of Mato Grosso throughout the analyzed period (Figures 7 and 8). It is worth noting that the state of Mato Grosso do Sul accounts for 65% of the biome's total area, which directly influences the amount of deforested land within its territory.

In the years 2000, 2002, 2014, 2016, and 2018, the state of Mato Grosso contributed a larger share to the total deforested area. However, even in those years, Mato Grosso's share accounted for less than 40% of the total deforested area. It is also important to highlight the significant reduction in deforestation in the state of Mato Grosso do Sul in 2014, the lowest in the historical series for both the state and the biome.

From 2019 onward, a sharp increase in deforestation was observed in the state of Mato Grosso do Sul, reaching its peak in the historical series in 2021. On the other hand, deforestation in the state of Mato Grosso decreased in the Pantanal between 2017 and 2021, with the curve reversing in 2022 and 2023.

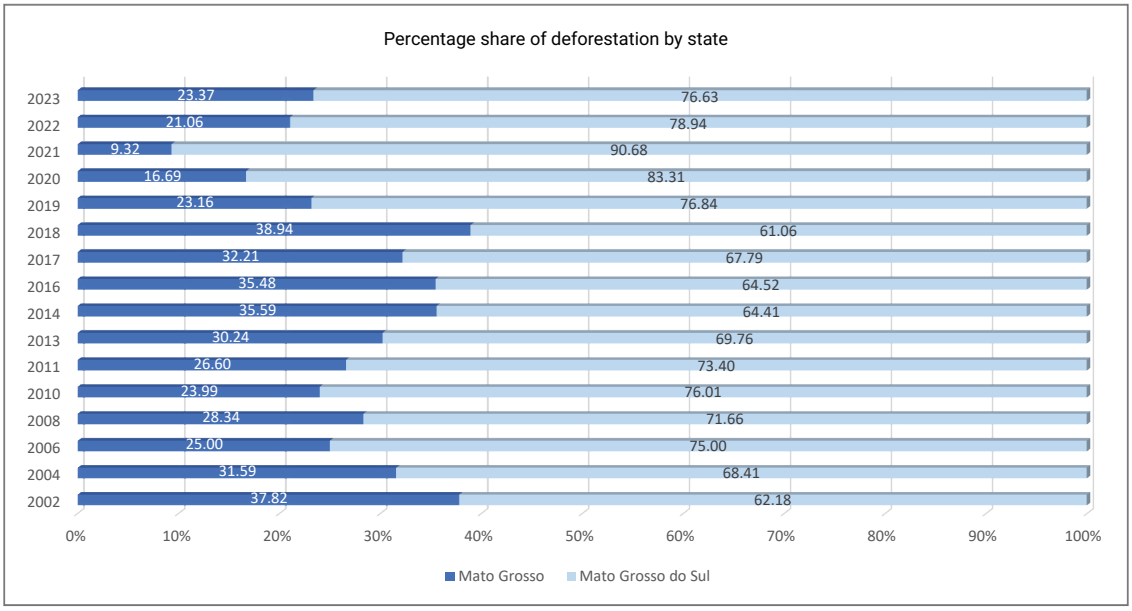
The most recent data from 2023 indicate that the deforested area in Mato Grosso do Sul was 554 km², corresponding to approximately 76.63% of the total deforested area in the biome. Meanwhile, the state of Mato Grosso recorded approximately 169 km² of deforested area, corresponding to 23.37%.

Figure 7. P States' share in cumulative deforestation increases in thePantanal biome (km²).



Source: adapted from Prodes/Inpe (2023).

Figure 8. Percentage share of deforestation by state.



Source: adapted from Prodes/Inpe (2023).

Understanding the land title profile of the biome is important to better comprehend the dynamics of deforestation and fires. To that end, analyses were conducted, including overlap removal, based on data from private areas (Land Management System/Sigef and the National Property Certification System/SNCI, both from Incra), federal settlements, undesignated federal land parcels, and quilombola territories (Incra), Indigenous Lands (Funai), and the National Registry of Conservation Units (MMA).

It is observed that most of the biome is occupied by private areas, corresponding to 78.42% of the biome's area (Figure 9). It should be noted that the areas with no information, the second largest category in terms of representativeness within the biome (9.36%), are composed of state, municipal, military, undefined, and similar areas. Figure 10 presents the federal areas within the biome.

Figure 9. Percentage distribution of land title categories in the Pantanal biome in 2023.

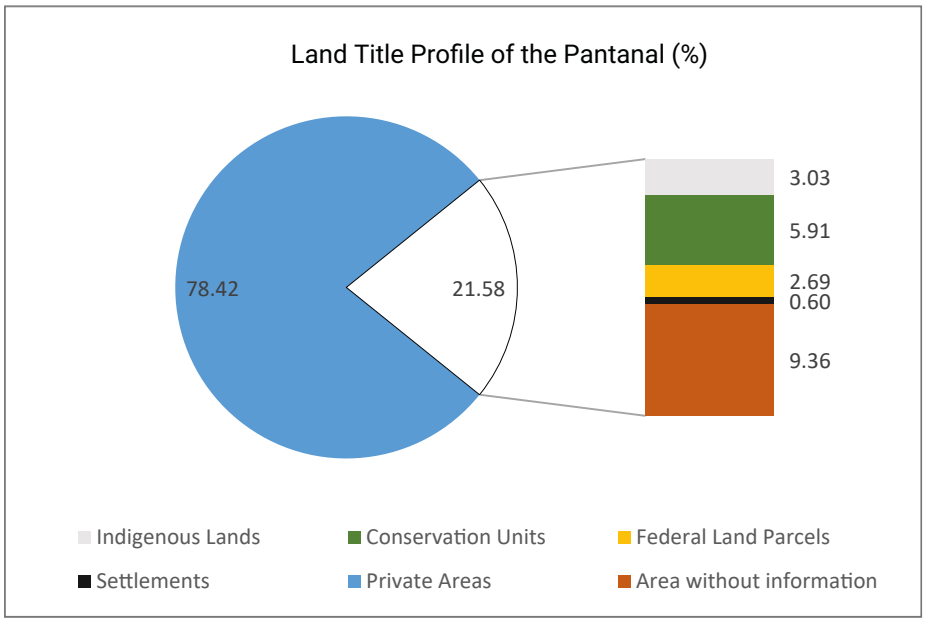
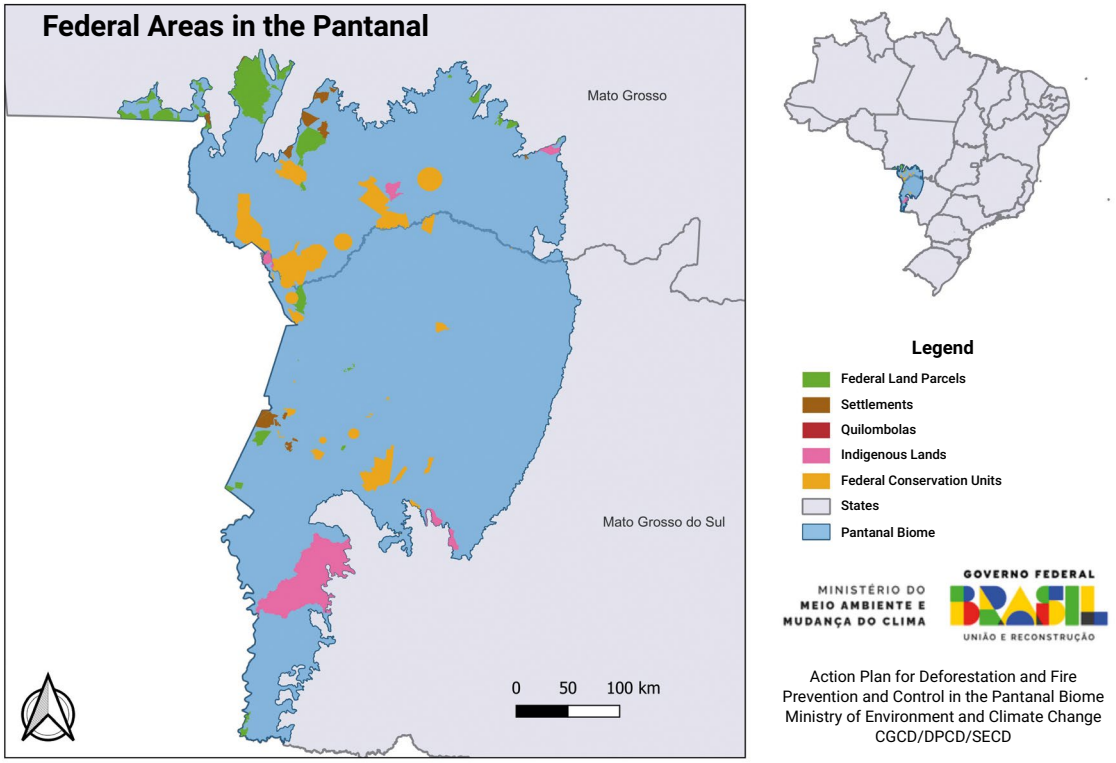
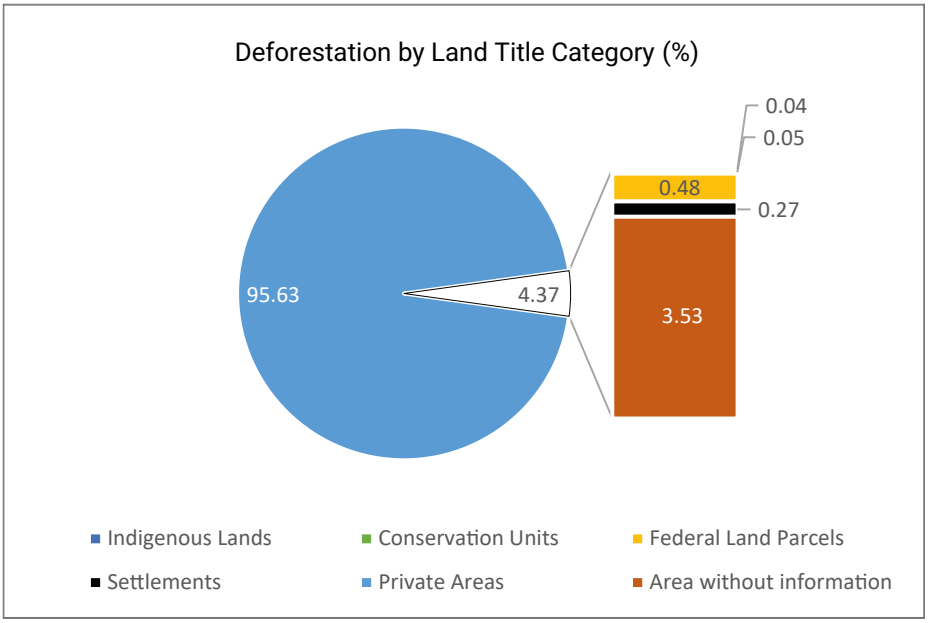


Figure 10. Federal Areas in the Pantanal biome.



An assessment of deforestation in 2023 across these land title categories shows that private areas concentrated the majority of deforestation, with 691 km², over 95% of the total deforested area in the biome (Figure 11). Controlling deforestation in a biome where 95% of it occurs in private areas presents challenges that require a targeted approach, for example, stricter control and compensation for legally deforested areas, an approach consistent with the zero-deforestation concept pursued in this Plan. In contrast, conservation units and Indigenous lands showed lower shares of total deforestation during the period: 0.05% and 0.04%, respectively. Therefore, the status of protected area indeed appears to contribute to the conservation of the biome's vegetation.

Figure 11. Percentage distribution of deforestation in the Pantanal biome by land title categories in 2023.



It is also important to assess deforestation within rural properties registered in the National Rural Environmental Registry System (Sicar), even without confirmation as to whether these areas are public or private and whether their occupation is legitimate or irregular. According to data processing carried out by MMA for the preparation of this Plan, it was observed that 98.82% of deforestation occurred within properties registered in Sicar. A small portion of such properties, however, overlaps with other land title categories: approximately 0.25% overlap with settlements, 0.37% with undesignated federal land parcels, and 0.04% with conservation units, extremely low overlap values, demonstrating the quality of CAR management by the states of Mato Grosso do Sul and Mato Grosso.

According to the National Registry of Conservation Units (CNUC), the Pantanal area comprises 4.68% Sustainable Use Conservation Units and 2.87% Strict Protection Units, still far from the global target of conserving at least 30% of terrestrial, inland water, coastal, and marine areas by 2030, as defined by the Kunming-Montreal Global Biodiversity Framework (GBF) during the 15th United Nations Biodiversity Conference (COP 15) in Montreal, Canada (UNEP, 2024). Additionally, deforestation within conservation units was also low, with most of it occurring in Private Natural Heritage Reserves (RPPNs), particularly in the Sesc Pantanal Ecological Estancia RPPN, which alone accounted for more than 84% of deforestation in conservation units (Table 1). Currently, most existing conservation units in the biome are Strict Protection Units, which provide better conditions for promoting the conservation of environmental assets within them, despite their limited territorial coverage in relation to the biome's area (Chaves; Silva, 2018).

Table 1. List of the ten most deforested Conservation Units between 2020 and 2023.

		Annual Deforestation (km²)					
Name of Conservation Unit	**UF**	**2020**	**2021**	**2022**	**2023**	**Contribution**	**Trend**
PRIVATE NATURAL HERITAGE RESERVE SESC PANTANAL ECOLOGICAL ESTANCIA	MT	0.11	0.00	4.67	0.32	84%	
PRIVATE NATURAL HERITAGE RESERVE PIONEIRA DO RIO PIQUIRI	MS	0.00	0.00	0.00	0.06	16%	
BAÍA NEGRA ENVIRONMENTAL PROTECTION AREA	MS	0.00	0.00	0.00	0.00	0%	
TAIAMÃ ECOLOGICAL STATION	MT	0.00	0.00	0.00	0.00	0%	
GUIRÁ STATE PARK	MT	0.05	0.07	0.00	0.00	0%	
PANTANAL DO RIO NEGRO STATE PARK	MS	0.00	0.00	0.00	0.00	0%	
ENCONTRO DAS ÁGUAS STATE PARK	MT	0.10	0.00	0.00	0.00	0%	
PANTANAL MATOGROSSENSE NATIONAL PARK	MT/MS	0.00	0.00	0.00	0.00	0%	
PIRAPUTANGAS MUNICIPAL NATURE PARK	MS	0.00	0.00	0.00	0.00	0%	
PRIVATE NATURAL HERITAGE RESERVE CACHOEIRAS DO SÃO BENTO	MS	0.00	0.00	0.00	0.00	0%	
Total of the 10 most deforested		0.26	0.07	4.67	0.38	100%	
Grand Total		**0.30**	**0.11**	**4.67**	**0.38**		

The Pantanal contains seven Indigenous territories, which represent approximately 3% of the biome's area, and only four recorded deforestation events between 2020 and 2023. As observed in the conservation units, deforestation in Indigenous territories is also low and concentrated; specifically in 2023, only the Kadiwéu territory (Table 2) registered deforestation, this territory encompasses 560 thousand hectares and includes six villages of the Kadiwéu and Terena ethnic groups, located in the region of Corumbá and Porto Murtinho, in Mato Grosso do Sul.

Table 2. List of the ten most deforested Indigenous Lands between 2020 and 2023.

		Annual Deforestation (km²)					
Name of Indigenous Land	**UF**	**2020**	**2021**	**2022**	**2023**	**Contribution**	**Trend**
Kadiwéu	MS	0.77	0.12	0.09	0.29	100%	
Baía dos Guató	MT	0.09	0.00	0.00	0.00	0%	
Cachoeirinha	MS	0.00	0.00	0.00	0.00	0%	
Guató	MS	0.00	0.00	0.00	0.00	0%	
Perigara	MT	0.00	0.00	0.00	0.00	0%	
Taunay/Ipegue	MS	2.27	0.66	0.00	0.00	0%	
Tereza Cristina	MT	0.41	0.00	0.01	0.00	0%	
Total of the most deforested areas		3.54	0.78	0.10	0.29	100%	
Overall Total		**3.54**	**0.78**	**0.10**	**0.29**		

In the Settlement Projects (PA), which account for about 1% of the biome's area, it was noted that in 2023, the PA Limoeiro registered the largest deforested area among the settlements, with 0.60 km², still a low figure (Table 3). It is worth highlighting that PA Laranjeira I and PA Paiol share second place on the list, each with a deforested area of 0.29 km², followed by PA Tamarineiro II - South, with 0.27 km².

Table 3. List of the ten most deforested Settlement Projects between 2020 and 2023.

		Annual Deforestation (km²)					
Name of Settlement Project	**UF**	**2020**	**2021**	**2022**	**2023**	**Contribution**	**Trend**
PA LIMOEIRO	MT	1.23	1.94	1.13	0.60	31%	
PA LARANJEIRA I	MT	0.31	0.25	0.12	0.29	15%	
PA PAIOL	MT	2.01	1.18	1.66	0.29	15%	
PA TAMARINEIRO II - SUL	MS	0.35	0.29	0.23	0.27	14%	
PA TAQUARAL	MS	0.19	0.22	0.05	0.18	9%	
PA SADIA VALE VERDE	MT	1.31	1.35	0.39	0.10	5%	
PA AGROANA/GIRAU	MT	0.27	0.31	0.15	0.06	3%	
PA CORIXO	MT	0.33	0.32	0.29	0.06	3%	
PA IPÊ ROXO	MT	0.10	0.00	0.33	0.06	3%	
PA MARGARIDA ALVES	MT	0.00	0.00	0.00	0.01	1%	
Total of the 10 most deforested		6.10	5.86	4.35	1.92	99%	
Overall Total		**6.37**	**6.24**	**4.55**	**1.93**		

Regarding undesignated federal land parcels in the Pantanal biome, which total 3% of the biome's area, seven of them recorded deforestation in 2023, with Caiçara National Farm standing out, accounting for approximately 47% of the total deforested area in federal land parcels, or 1.64 km² (Table 4).

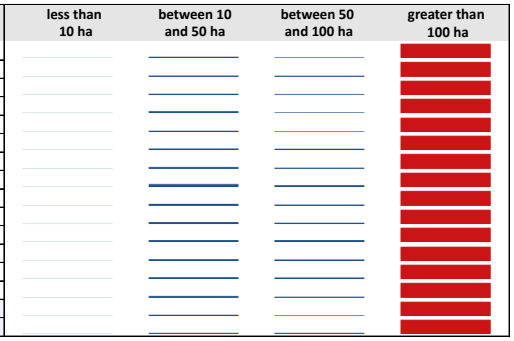
Table 4. List of the ten most deforested undesignated federal land parcels between 2020 and 2023.

		Annual Deforestation (km²)					
Name of Federal Public Land	**UF**	**2020**	**2021**	**2022**	**2023**	**Contribution**	**Trend**
CAIÇARA NATIONAL FARM	MT	4.14	6.86	6.05	1.64	47%	
AGUASSU	MT	0.79	1.09	0.88	0.72	21%	
PATRIMÔNIO DO JACADIGO - PART 1	MS	0.59	3.50	0.29	0.38	11%	
CAMPINAS	MT	0.00	0.00	0.00	0.33	9%	
BARRANQUEIRA XIII	MT	1.15	0.03	0.00	0.21	6%	
BREJINHO	MT	0.00	0.26	0.06	0.19	5%	
BARRANQUEIRA - 15A	MT	0.00	0.06	0.00	0.02	1%	
ÁGUAPEI - 03	MT	0.00	0.00	0.00	0.00	0%	
AGUAPEÍ - 09	MT	0.08	0.33	0.41	0.00	0%	
AGUAPEI -01	MT	0.85	0.07	0.00	0.00	0%	
Total of the 10 most deforested		7.60	12.20	7.69	3.49	100%	
Overall Total		**9.16**	**13.98**	**8.55**	**3.49**		

An analysis of deforestation polygon sizes reveals that deforestation in the Pantanal predominantly occurs in polygons larger than 100 hectares, which account for 65 to 83% of the total deforested area in the biome (Figure 12). Areas between 10 and 100 hectares accounted for up to 27% in 2018, but currently represent 14% of polygons. Meanwhile, polygons smaller than 10 hectares have made up less than 6% in all years of the historical series, dropping to 3% in 2023. This distribution highlights a trend of deforestation in areas larger than 100 hectares. Finally, it is estimated that the biome contains, in private areas, about 6.1 million hectares of surplus legal reserve eligible for deforestation authorization, after accounting for overlaps (UFMG, 2024).

Figure 12. Evolution of the size of deforestation polygons in the Pantanal between 2002 and 2023.

Year	less than 10 ha	between 10 and 50 ha	between 50 and 100 ha	greater than 100 ha
2002	4%	9%	6%	81%
2004	4%	9%	8%	79%
2006	4%	10%	7%	78%
2008	5%	12%	8%	74%
2010	4%	10%	6%	80%
2011	4%	10%	10%	76%
2013	5%	12%	9%	73%
2014	6%	17%	12%	65%
2016	5%	12%	9%	74%
2017	4%	12%	8%	76%
2018	6%	13%	13%	67%
2019	4%	11%	11%	73%
2020	5%	12%	11%	72%
2021	4%	11%	8%	78%
2022	3%	8%	6%	83%
2023	3%	7%	7%	83%



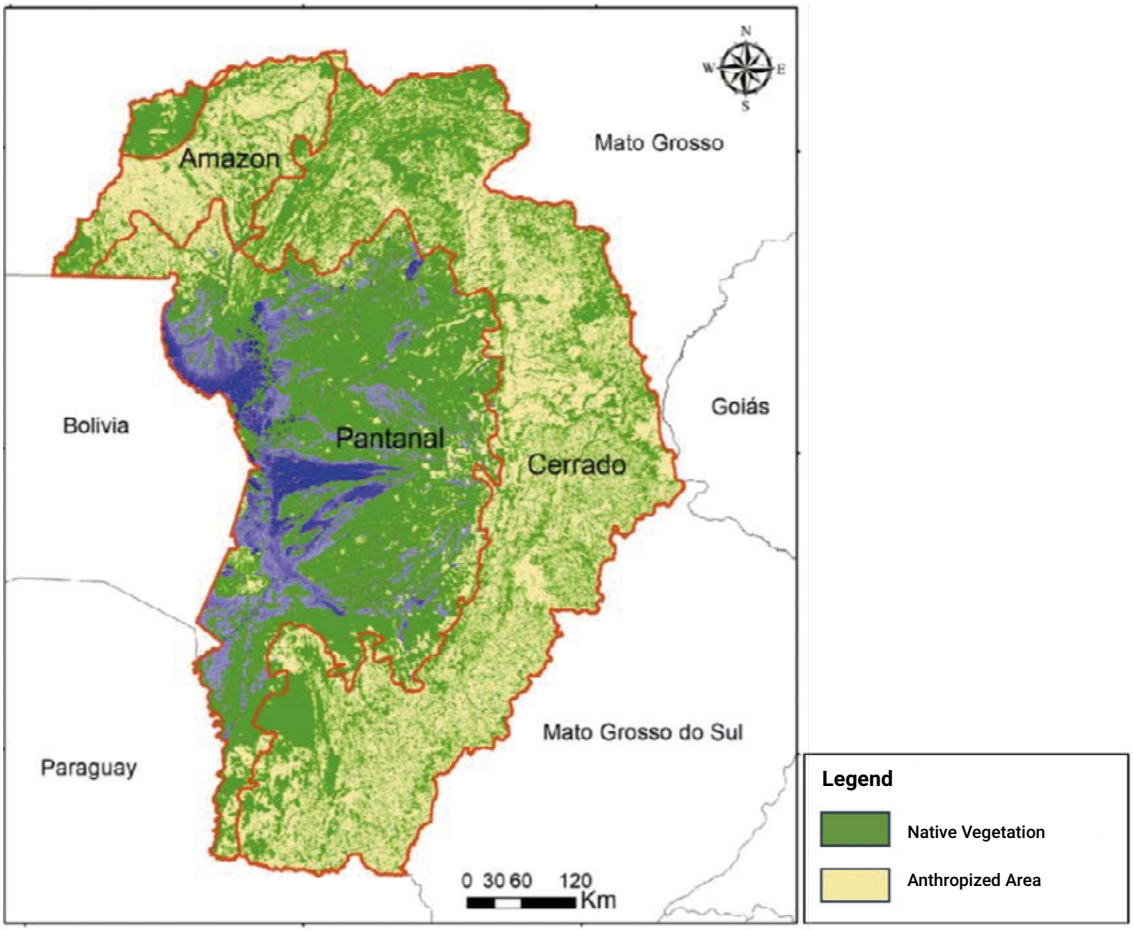
Considering that deforestation in the Pantanal occurs predominantly in private areas and in polygons larger than 100 hectares, it is essential that environmental licensing of projects and authorizing acts for vegetation suppression be strengthened and properly implemented to ensure that the use of the biome's environmental assets occurs in an economically and socially appropriate manner, as well as in alignment with the resilience capacity of local ecosystems.

It is worth noting that forest management in Brazil involves collaboration among the federal, state, and municipal governments, each with specific responsibilities for the licensing and oversight of forest-related activities, as defined by Complementary Law No. 140, 8 December 2011. Under this legal framework, the states are responsible for issuing authorizations for forest suppression on rural properties within their territories and, consequently, are obligated to monitor this activity. The Federal Administration and the municipalities, in turn, take care of the areas under their competence. Despite this shared set of responsibilities, it is important to emphasize the need to strengthen and integrate actions across all levels of government to improve deforestation control.

4.1.1. Expansion of livestock and agriculture

The main cause of deforestation in the Pantanal is related to land use for livestock and agriculture (Alho et al., 2019). The replacement of native vegetation with exotic species has caused significant impacts on the region's landscape and biodiversity, as these species compete with native ones and alter the floristic composition and structure of local ecosystems (Marques; Amorim; Milani, 2024). In the case of livestock, different species of Brachiaria were introduced, with humidicola (*Urochloa humidicola*) being the most abundant, as it adapts well to the Pantanal's flood and drought cycles (Crispim; Domingos Branco, 2002). With new implementation technologies and the effectiveness of cultivars, there has been a substantial increase in native vegetation removal, which has advanced in an arc-like pattern, from the edge of the Pantanal toward the center of the floodplain - Figure 13 (Guerra et al., 2020).

Figure 13. Land use and flood pulse in the Upper Paraguay River Basin.



Source: Adapted from Guerra et al. (2020).

Regarding agriculture, areas of native vegetation have been replaced by sugarcane, soybean, corn, and other grain plantations, also along the edges of the biome. In addition to the impacts caused by the replacement of native species with monocultures, the indiscriminate use of pesticides leads to water and soil pollution. Fertilizers and pesticides used to maintain these crops can contaminate water bodies, negatively impacting water quality and the health of aquatic ecosystems, affecting not only aquatic fauna but also human communities that depend on these resources (Da Fonseca et al., 2019).

In addition to deforestation, the conversion of native vegetation areas into agricultural development areas often involves the use of fire for land clearing or pasture renewal. The indiscriminate and uncontrolled use of this practice, beyond increasing the likelihood of fires, also leads to soil degradation.

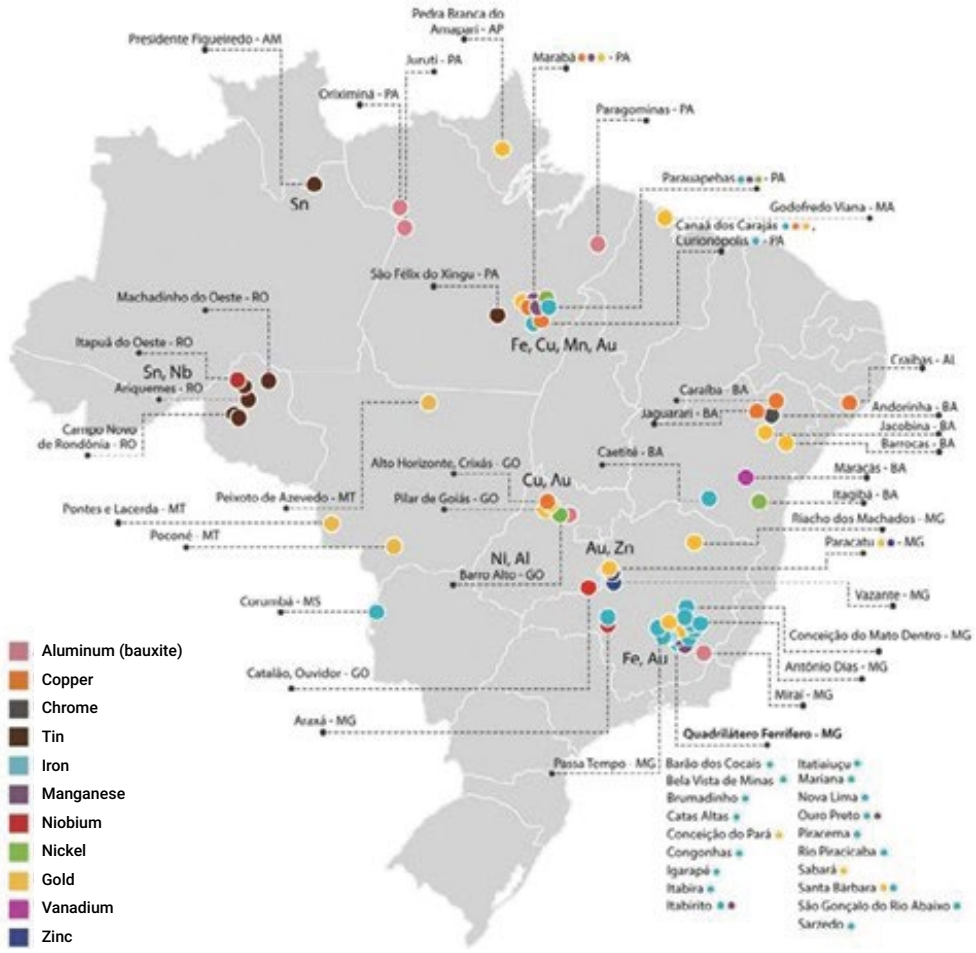
Therefore, it is important that livestock and agriculture coexist with the Pantanal while respecting the legal limits imposed by legislation, observing the resilience capacity of ecosystems and the impacts on regional traditional peoples and communities. The suppression of native vegetation for livestock and agricultural purposes must be conducted responsibly and should be minimized whenever possible, for example, through the recovery or renovation of abandoned agricultural or pasture areas. Furthermore, governmental programs or compensatory actions should be planned and implemented, when applicable, to promote the recovery of deforested areas within the biome. Similarly, it is vital to develop preventive actions aimed at qualifying the use of fire as a management tool and structuring response measures for fire events.

4.1.2. Exploitation of mineral resources

According to the Brazilian Mineral Yearbook (Brazil, 2023), the city of Poconé (MT), in the Pantanal, stands out as one of Brazil's main gold reserves, while Corumbá (MS) is notable for its iron ore reserves. Additionally, the yearbook indicates that the mines in these cities recorded gross mineral production exceeding 1,000,000 tonnes in 2021 (Figure 14).

The implementation of infrastructure associated with mining ultimately encourages the suppression of native vegetation in the Pantanal, as well as other forms of environmental degradation, such as changes in soil and water quality and potential mercury contamination if mismanaged. Such pressures can be mitigated and compensated through measures established during the environmental licensing process. However, gold mining, in particular, exhibits high levels of illegality, making it necessary to strengthen monitoring routines for legal activities and repression of illegal operations (Brasil, 2020).

Figure 14. Mines with gross ore production above 1,000,000 t/year.



Source: Brazilian Mineral Yearbook, National Mining Agency (2023).

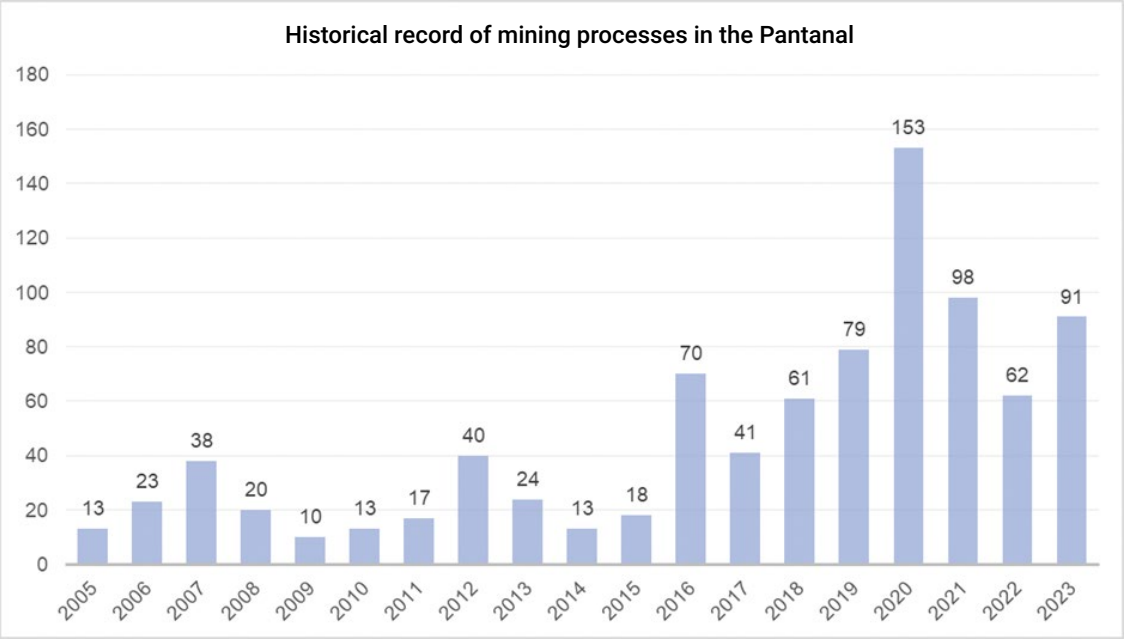
Currently, mineral exploitation regimes include Research Authorization, License Registration, Artisanal Mining Permit, and Extraction Registration. The Artisanal Mining Permit (PLG) is a regime established by Law No. 7805/1989, through which the government authorizes the artisanal exploitation of minerals, such as gold, diamonds, and cassiterite, regardless of prior research work. ANM Ordinance No. 155/2016 establishes that, under the PLG regime, the maximum area for permits is limited to 50 hectares for individuals and 1,000 hectares for cooperatives located outside the Legal Amazon.

It is important to note that as artisanal activity has evolved, it has ceased to be characterized as low-impact and reliant on rudimentary tools and equipment, becoming instead an activity that makes extensive use of heavy machinery and hazardous materials. Through the Geographic Information System for Mining, it is possible to identify contiguous areas under artisanal exploitation in the Pantanal, particularly in the cities of Corumbá and

Poconé. Thus, improving environmental regulation of mineral exploitation under the Artisanal Mining Permit regime is essential to preserve the ecological balance of the Pantanal.

Mining processes registered with ANM follow distinct administrative phases depending on their characteristics. Figure 15 illustrates the annual distribution of active gold and iron mining processes, at various stages, located in the Pantanal biome.

Figure 15. Historical record of mining processes in the Pantanal.



Source: adapted from SIGMINE/National Mining Agency (ANM).

4.1.3. Legality of deforestation in the Pantanal

Article 10 of Law No. 12651, 25 May 2012, establishes that, in the wetlands and Pantanal plains, ecologically sustainable exploitation is permitted, taking into account technical recommendations from official research agencies, and that any new clearance of native vegetation for alternative land use is subject to authorization from the respective state environmental agency. As previously stated, the percentage of rural properties that must be maintained as legal reserve in the biome varies between 40% and 50%, depending on the legislation of each state.

However, an analysis of public data and deforestation authorizations in the biome, made available by Sinaflor/Ibama and the states, presents alarming results (Table 5). A comparison of Authorizations for Vegetation Suppression (ASV) with deforestation data from Prodes/Inpe between 2018 and 2023 indicates that 78% of vegetation loss occurred without a valid authorization (ICV, 2024).

Table 5. Authorized deforestation resulting from the cross-check between the Prodes/Inpe Pantanal database (2018 to 2023) and the unified database (by year).

Year	Authorized area (ha)	Total Deforested (PRODES)	% Without Authorization
2018	4,906.27	49,851.73	90
2019	3,252.28	51,447.69	94
2020	7,461.57	67,786.17	89
2021	24,950.88	82,442.14	70
2022	25,418.15	78,941.33	68
2023	23,789.76	72,317.96	67
Total	89,778.91	402,787.03	78

Source: Table prepared by MMA based on the document "Analysis of Vegetation Suppression - Pantanal" (ICV, 2024) and Prodes/Inpe data.

This clearly shows the difficulty of controlling deforestation in the Pantanal solely through current policies, making it critical to advance policies such as payments for environmental services, the establishment of production arrangements for non-timber products, and other forms of environmental resource valuation, with the aim of enabling sustainable alternatives to vegetation removal.

4.2. Dynamics of burnings and fires in the biome

Fires, understood as any uncontrolled and unplanned fire that affects forests and other types of vegetation, whether native or planted, have been a constant concern for the Brazilian government due to the problems they cause. Beyond the environmental impacts, including the emission of greenhouse gases, fires can also affect transportation and power distribution systems, causing damage to power grids and unwanted blackouts, and interfering with land and air transportation systems, potentially leading to the closure of roads and airports. Furthermore, fires severely compromise air quality and the health of populations exposed to air pollutants and gases resulting from biomass burning or fires, especially affecting children and adolescents, who are among the groups most impacted by respiratory illnesses and school disruptions. The main pollutants generated by burnings and fires include carbon dioxide (CO_2), carbon monoxide (CO), ozone (O_3), particulate matter (PM), hydrocarbons, and other toxic gases.

Although the use of fire is a traditional practice, the occurrence of burnings and fires in the Pantanal has become increasingly frequent and intense. These events are rarely of natural origin, such as those caused by lightning, which typically occur at the beginning of the rainy season. Such events are part of the biome's ecology and affect smaller areas. On the other hand, most fires stem from human activities, which historically occurred more frequently at the end of the rainy season or during the dry season, being most common between mid-August and the end of October.

Controlled burns for agricultural and livestock purposes are also common. The use of fire in the Pantanal by cattle ranchers aims to eliminate or contain the spread of undesirable or less palatable species. Commonly burned areas include those dominated by "caronal" (mainly *Elyonurus muticus*), "capim-rabo-de-burro," "capim-fura-bucho" (*Paspalum carinatum* and *Paspalum stellatum*), and "rabo-de-lobo" (*Andropogon bicornis* and *Andropogon*) (Rodrigues, 2002). These intentional burns should normally be carried out in pre-established areas under specific conditions and with authorization from the competent environmental authority. National fire monitoring systems are not capable of distinguishing between the different uses of fire by Pantanal residents or other traditional peoples and communities, or prescribed burns conducted for conservation purposes by the managing units of protected areas (federal, state, or municipal), or even the burns carried out by rural producers for agro-silvopastoral purposes. These "burns", which are usually carried out in the form of firebreaks, prescribed, or controlled burns, are intentional and have specific purposes, differing both in intensity and impact from uncontrolled, undesired fires. For the latter, which are becoming increasingly frequent and intense, a differentiated approach is needed, with planning of integrated actions for prevention, preparedness, response, and accountability.

It is also important to highlight that the Pantanal is a wetland area subject to flooding and drought pulses and is significantly affected by rainfall, river flows, and other climatic elements such as temperature, humidity, and wind speed. These elements also directly impact on the biome's economy, which is primarily based on agricultural and livestock activities, as well as in the adjacent plateau areas. Flood and ebb regimes, rainfall and drought cycles, precipitation, and humidity are also directly related to the occurrence of burnings and fires.

The information presented in this section was collected based on the data provided by the INPE Fire Data Platform (BDQueimadas/Inpe), specifically hotspots and burned area. As noted on INPE's website, the product referring to burned area is still undergoing validation and is currently at a provisional maturity level, meaning incremental improvements are still being made. For this reason, the product quality may not be ideal (https://terrabrasilis.dpi.inpe.br/queimadas/aq1km/).

Thus, according to the information provided by BDQueimadas/Inpe, approximately 190,000 hotspots were detected in Brazil in 2023, of which 6,580 occurred in the Pantanal, that is, about 3.5% of the total detected (Table 6). Considering the burned area data, also available on the same platform, the percentage detected in the Pantanal that year follows the same trend (3.5%): of the total 372,346 km² of burned area in Brazil in 2023, approximately 13,000 km² occurred in the Pantanal (Figure 14).

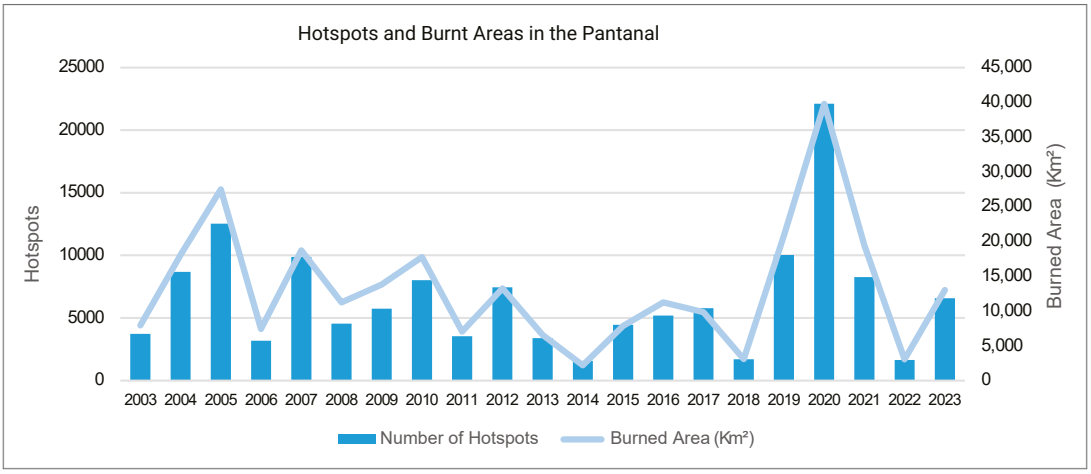
Table 6. Number of hotspots and burned area (km²) in Brazilian biomes in 2023.

Biome	Number of Hotspots in 2023	%	Burned Area (km²) in 2023	%
Amazon	98,639	51.94%	91,860.00	24.67%
Cerrado	50,713	26.70%	149,864.00	40.25%
Caatinga	21,550	11.35%	100.311.00	26.94%
Atlantic Forest	11702	6.16%	16,135.00	4.33%
Pantanal	6,580	3.46%	12,996.00	3.49%
Pampa	717	0.38%	1.180.00	0.32%
Total	189,901	100%	372,346.00	100%

Source: Adapted from BDQueimadas/National Institute of Space Research (Inpe), 2024.

When evaluating the trends in burned area and hotspots from 2002 to 2023, it becomes clear that the number of hotspots and the extent of burned areas in the biome vary across the years, with declines typically occurring in 2- to 3-year cycles. However, standing out from this pattern is the peak in both hotspots and burned area in 2020 (Figure 16). In 2023, 6,580 hotspots and 12,996 km² of burned area were recorded, figures below the historical average of 6,838 hotspots and approximately 13,646 km².

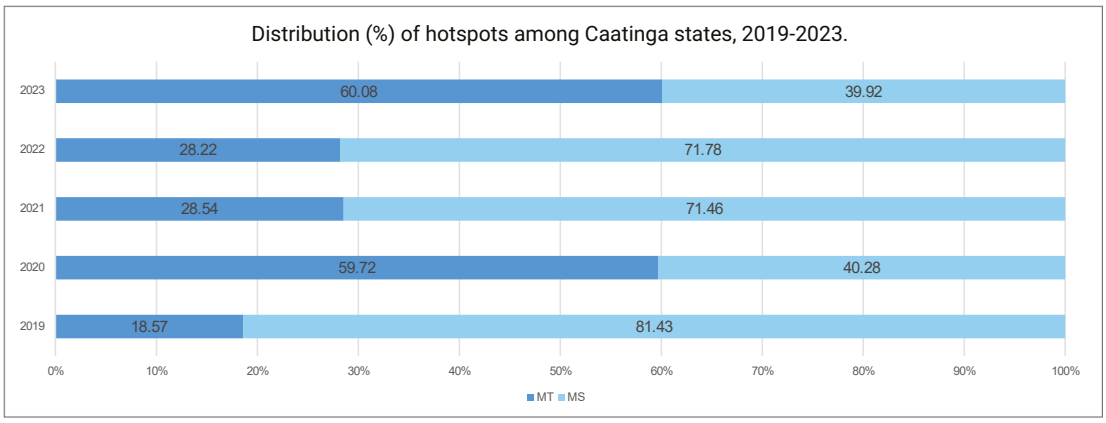
Figure 16. History of hotspots and burned area (km²) in the Pantanal.



Source: adapted from BDQueimadas/National Institute of Space Research (Inpe), 2024.

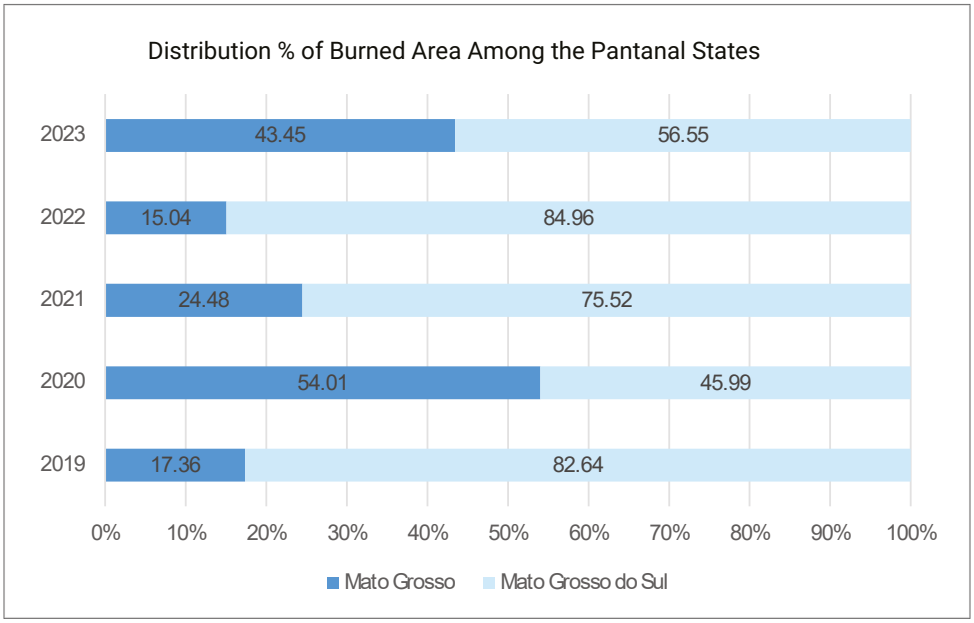
When analyzing the last five years of the historical series, it can be seen that Mato Grosso was responsible for most of the hotspots in 2023 and 2020, while the state of Mato Grosso do Sul had proportionally more hotspots in the years 2022, 2021 and 2019 (Figure 17). In relation to the burned area, the behavior is somewhat different, since only in 2020 did the state of Mato Grosso show a larger burned area (Figure 18).

Figure 17. Percentage distribution of hotspots by state from 2019 to 2023.



Source: MMA, 2024 (processing of Inpe data).

Figure 18. Percentage distribution of burned area by state from 2019 to 2023.



Source: MMA, 2024 (processing of Inpe data).

In 2023, of the 6,580 hotspots recorded, 2,627 (39.92%) were in Mato Grosso do Sul and 3,953 (60.08%) in Mato Grosso. Most of the hotspots in both states are located in private areas, around 4,464 (an average of 67.84%) (Table 7 and Figure 19). In the state of Mato Grosso, the hotspots located in the "Conservation Units" and "Other" categories ranked second and third, corresponding to 18.80% and 15.28%, respectively, of the hotspots in the state. In the state of Mato Grosso do Sul, the hotspots were concentrated in conservation units (7.99%) and others (7.88%).

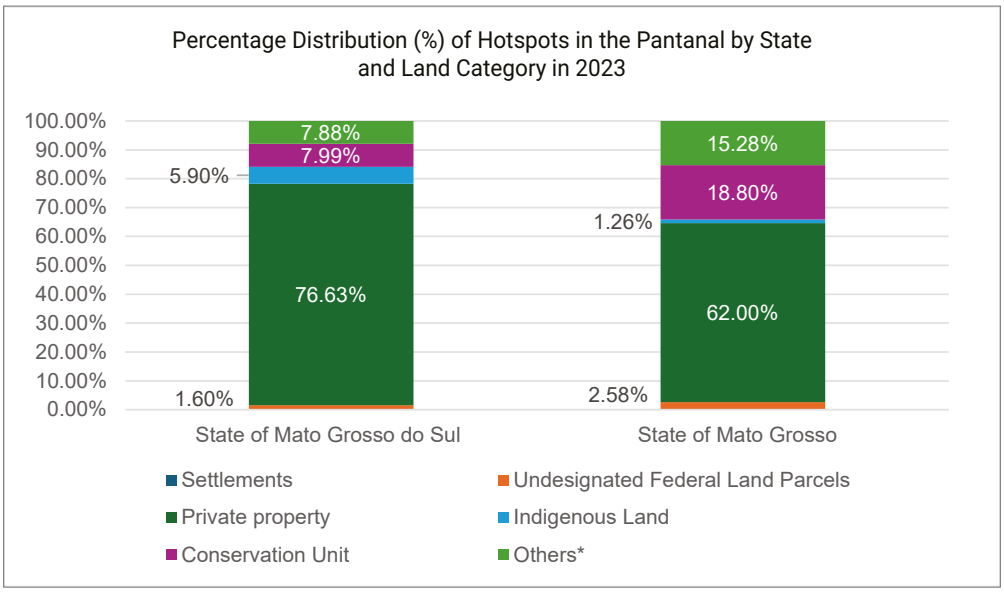
Table 7. Distribution of hotspots by land title categories in the Pantanal in 2023.

UF	Settlement	Federal Land Parcels	Private property	Indigenous Land	Conservation Unit	Others*
State of Mato Grosso do Sul	0	42	2,013	155	210	207
State of Mato Grosso	3	102	2,451	50	743	604

Source: MMA, 2024 (processing of Inpe data).

* “Other” includes all areas not otherwise categorized, such as state, municipal, military lands, areas without information, and others.

Figure 19. Percentage distribution of hotspots by land title categories in the Pantanal in 2023.

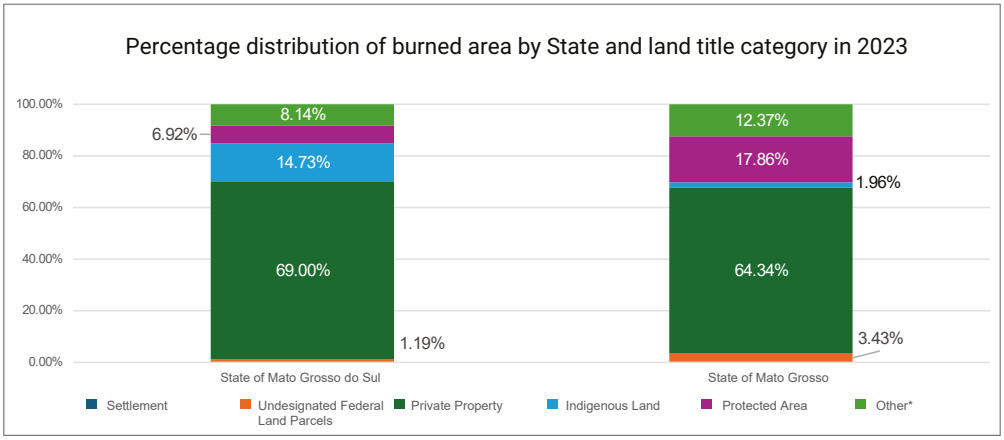


Source: MMA, 2024 (processing of Inpe data).

* "Other" includes all areas not otherwise categorized, such as state, municipal, military lands, areas without information, and others.

Private lands also accounted for the largest share of burned area in the Pantanal. In Mato Grosso do Sul, 69% of the state's burned area occurred on private land, and 14.73% on "Indigenous Lands." In Mato Grosso, private lands accounted for 64.34% of burned area, followed by "Protected Areas" with 17.86% (Figure 20).

Figure 20. Percentage distribution of burned area by state and land title category in 2023.



Source: MMA, 2024 (processing of Inpe data).

* "Other" includes all areas not otherwise categorized, such as state, municipal, military lands, areas without information, and others.

Regarding hotspots by federal land title categories, both in the state of Mato Grosso and Mato Grosso do Sul, the "Protected Area" category concentrated most of the occurrences, 82.74% and 51.60% respectively (Table 8). It is worth noting that this number is somewhat overestimated, as state and municipal conservation units were not excluded from the "Protected Area" category. However, this pattern changes when analyzing the burned area (Table 9): in Mato Grosso do Sul, "Indigenous Lands" (64.43%) rank second in burned area, while in Mato Grosso, "Conservation Unit" leads with 76.69%.

Table 8. Percentage distribution of hotspots by federal land title categories in the Pantanal in 2023.

Distribution of hotspots by land title categories in the Pantanal in 2023*					
State	**Settlement**	**Federal Land Parcels**	**Indigenous Lands**	**Conservation Unit****	**State contribution to hotspots in the Biome**
State of Mato Grosso do Sul	0.00%	10.32%	38.08%	51.60%	31.19%
State of Mato Grosso	0.33%	11.36%	5.57%	82.74%	68.81%
Category contribution to the biome (%)	**0.23%**	**11.03%**	**15.71%**	**73.03%**	

Source: MMA, 2024 (processing of Inpe data).

* Does not include military areas.

** Including state/municipal conservation units.

Table 9. Percentage distribution of burned area by federal land title categories in the Pantanal in 2023.

Distribution of Burned Area in Federal Land Parcels in the Pantanal in 2023 (km²)*					
UF	**Settlement**	**Federal Land Parcels**	**Indigenous Land**	**Conservation Unit****	**State contribution to burned area in Federal Land Parcels**
State of Mato Grosso do Sul	0.10%	5.19%	64.43%	30.29%	56.09%
State of Mato Grosso	0.15%	14.74%	8.42%	76.69%	43 91 %
Contribution of the category to the total area burned in federal areas (%)	**0.12%**	**9.38%**	**39.83%**	**50.66%**	

Source: MMA, 2024 (processing of Inpe data).

* Does not include military areas.

** Including state/municipal conservation units.

Therefore, most hotspots occur in areas that are not under the primary jurisdiction of the federal government. Only 19.83% of the heat spots and 23.04% of the burned area occurred in land title categories that can be considered federal land parcels (Table 10). It

is important to highlight that fires in the Pantanal primarily affect private lands, which are under the jurisdiction of state or municipal governments, or lands whose ownership and jurisdiction have not yet been determined. It is also worth noting that the "conservation unit" class includes units of the three spheres of government and that the "Other" class can include military areas, which are the responsibility of the Federal Administration.

Table 10. Representativeness of hotspots in federal areas in the Pantanal in 2023.

Number of Hotspots per Area	Percentage Distribution of Hotspots	Percentage Distribution of Burned Area
Federal Areas 2023	19.83%	23.04%
Private Areas 2023	67.84%	66.98%
Others	12.33%	9.98%
Number of Hotspots in the Pantanal	100.00%	100.00%

Source: MMA, 2024 (processing of Inpe data).

* Does not include military areas.

** State areas, municipal areas, areas without information and others.

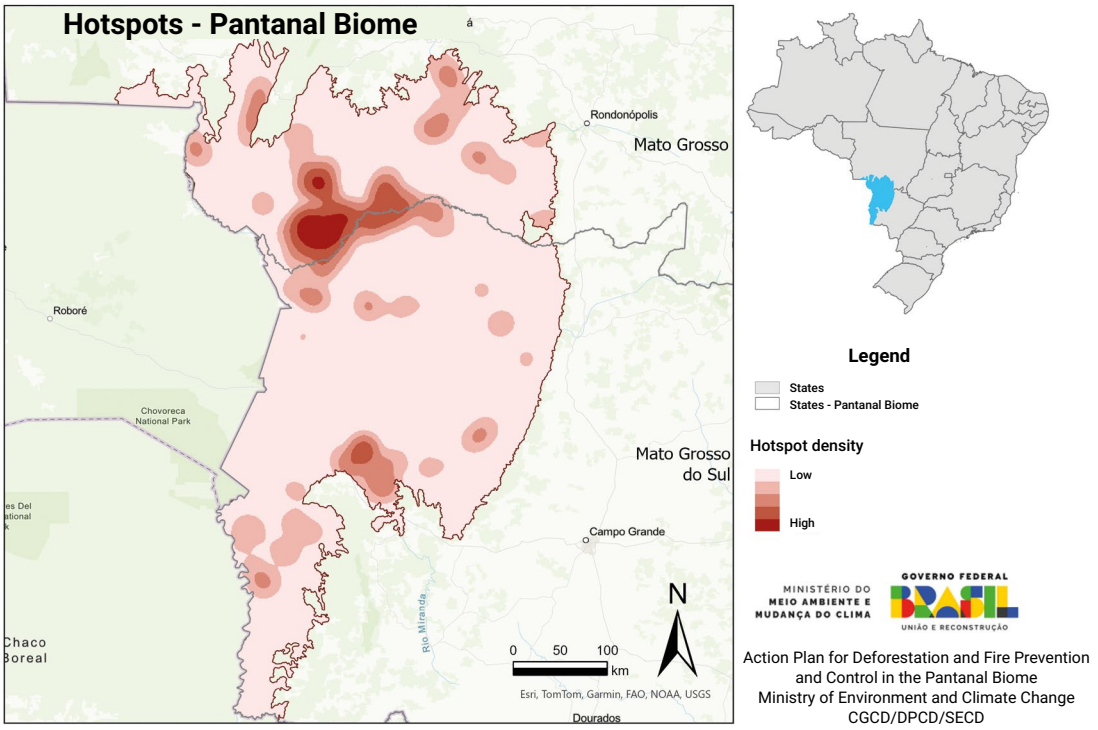
Regarding the municipalities with the highest number of hotspots in the biome in 2023, Poconé (MT) was the most affected, with a total of 2,274 detected spots (or 34.6% of the total). Next were the municipalities of Corumbá (MS), with 1,714 spots (26%), and Barão de Melgaço (MT), with 803 spots (12.2%). Together, these three municipalities accounted for approximately 73% of all hotspots observed in the biome in 2023 (Table 11 and Figure 21).

Table 11. List of the ten municipalities with the most hotspots in the Pantanal in 2023.

City	State	Number of Hotspots	Percentage
Poconé	MT	2,274	34.6%
Corumbá	MS	1.714	26.0%
Barão de Melgaço	MT	803	12.2%
Aquidauana	MS	493	7.5%
Cáceres	MT	488	7.4%
Santo Antônio do Leverger	MT	276	4.2%
Miranda	MS	241	3.7%
Porto Murtinho	MS	145	2.2%
Itiquira	MT	55	0.8%
Nossa Senhora do Livramento	MT	32	0.5%

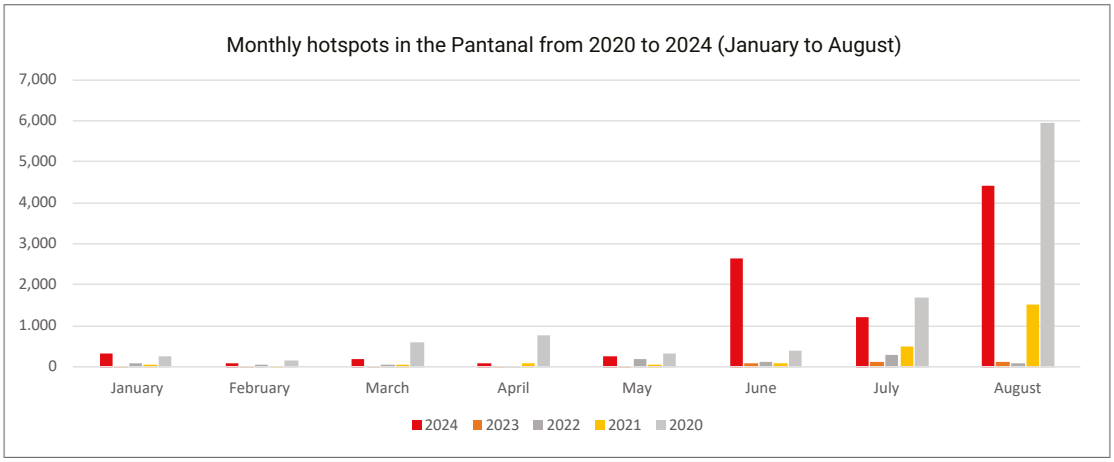
Source: BDQueimadas/National Institute of Space Research (Inpe), 2024.

Figure 21. Distribution of hotspots in the Pantanal in 2023.



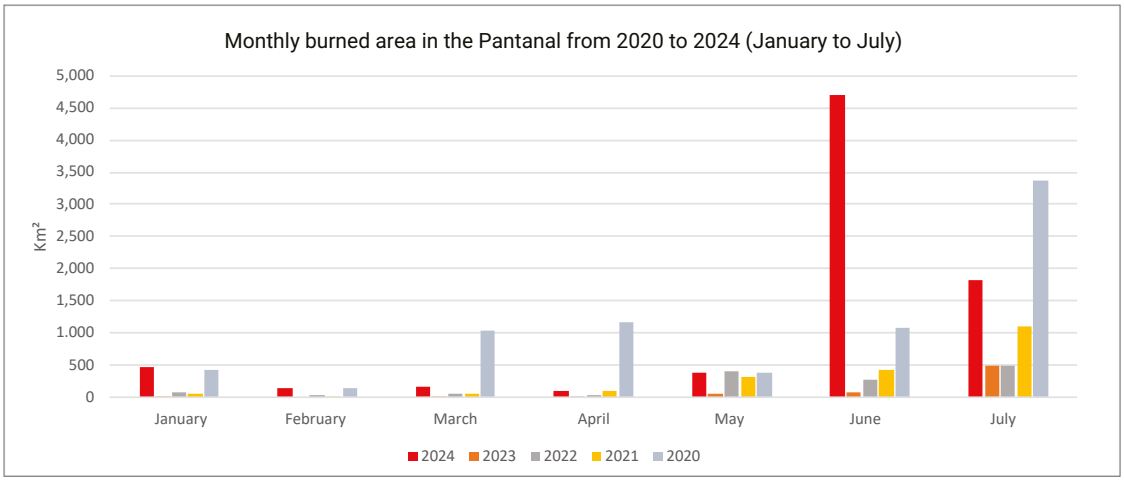
In recent years, there has been a substantial increase in fires affecting native vegetation, which have been exacerbated by extreme droughts, heatwaves, and changes in rainfall patterns, phenomena intensified by human activity. In this context, between January and September 2024 (when this Plan was drafted), nearly 12,000 hotspots were recorded throughout the biome (including anthropized areas and native vegetation), the highest figure in the historical series for the same period. However, in July and August 2024, the total number of hotspots was lower than the figures recorded in July and August 2020, the year with the highest incidence in the biome (Figure 22). A similar trend was observed in terms of burned area (Figure 23). In June 2024, the burned area was greater than in 2020 (4,704 km² compared to 1,076 km²); however, in July 2024, the burned area was already smaller compared to July 2020 (1,820 km² compared to 3,367 km²).

Figure 22. Monthly hotspots in the Pantanal from 2020 to 2024 (January to August).



Source: BDQueimadas/National Institute of Space Research (Inpe), 2024.

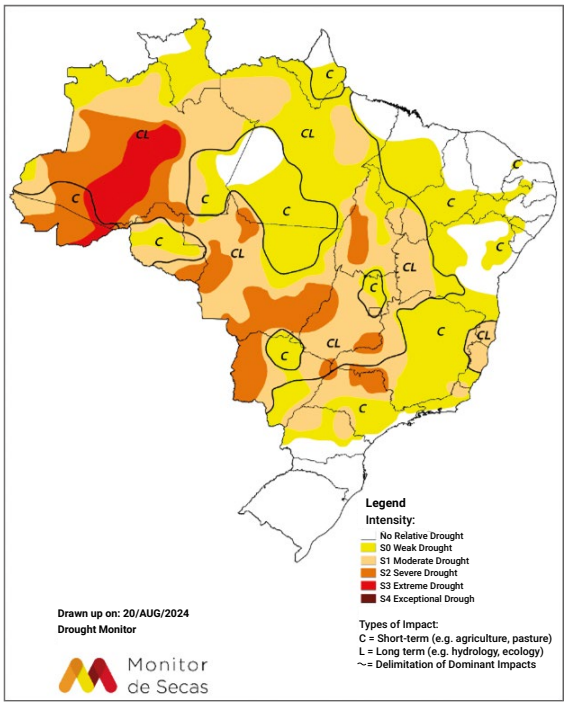
Figure 23. Monthly burned area in the Pantanal from 2020 to 2024 (January to July).



Source: BDQueimadas/National Institute of Space Research (Inpe), 2024.

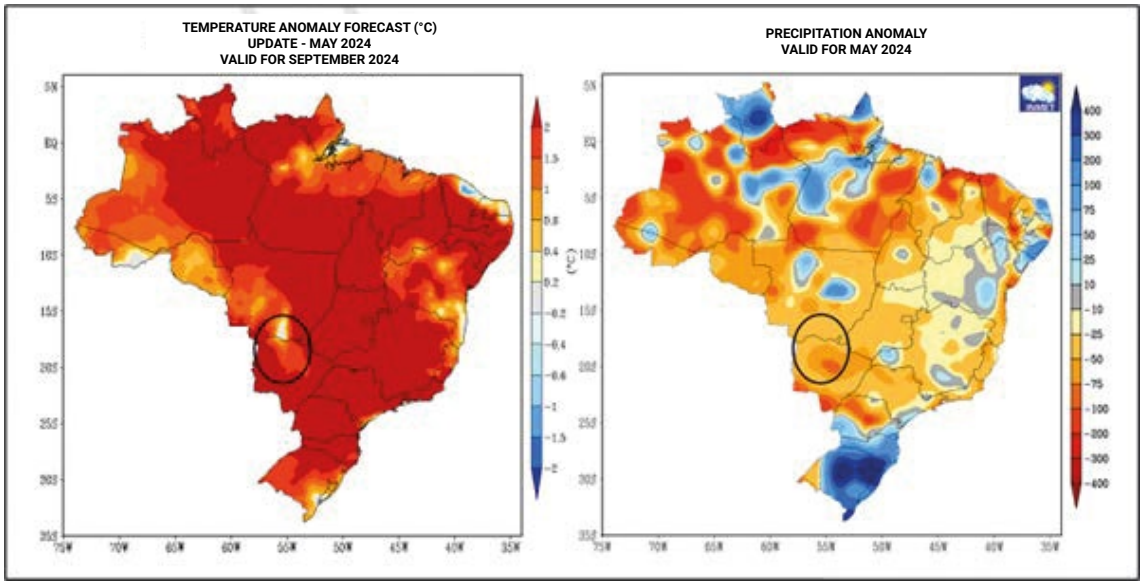
The year 2024 has been marked by climatic conditions favorable to the occurrence and spread of fires. Figures 24 and 25 present the drought forecast made available by the Drought Monitor of the National Water Agency (ANA), and the temperature and precipitation anomalies reported by the National Institute of Meteorology (Inmet). Additionally, the Ladário stream gauge, used as a reference station for assessing drought and flood periods in the Pantanal, shows water levels for the first half of 2024 (January to June) below the normal range, very close to those observed in 2020, a year that saw fires of great magnitude, intensity, and severity in the region. In 2024, the situation is likely to repeat itself, given the low water levels of the Paraguay River, as shown by the gauge readings below (Figure 26).

Figure 24. Drought Monitor map showing drought intensity for July 2024 across different regions and states of Brazil.



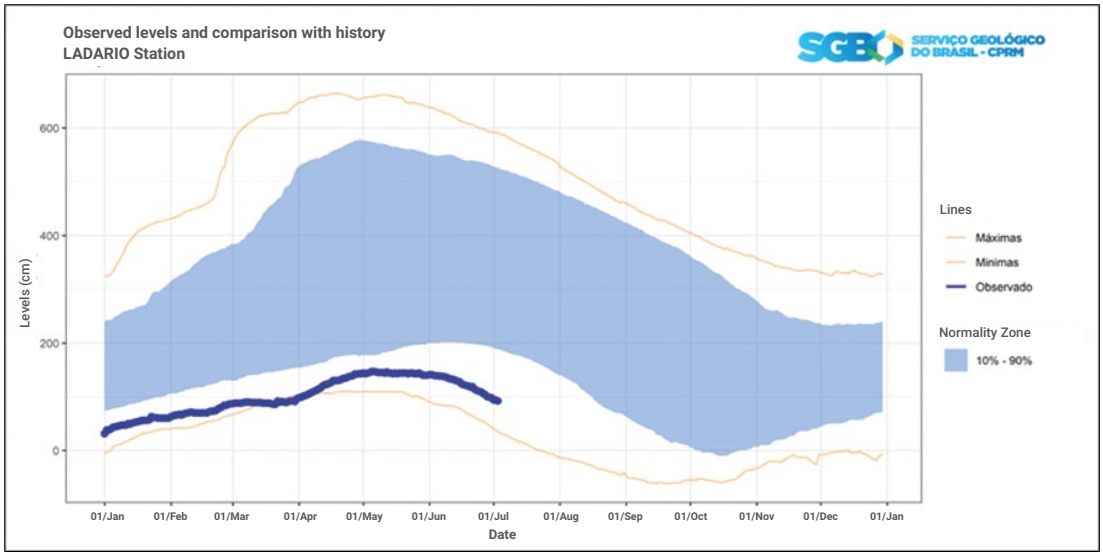
Source: Drought Monitor/National Water and Sanitation Agency (ANA), 2024.

Figure 25. Observed temperature and precipitation anomalies in Brazil, with emphasis on the Pantanal region.



Source: National Institute of Meteorology (Inmet), 2024.

Figure 26. Paraguay River levels at the Ladário gauging station, in the municipality of Ladário (MS), from 1 January to 10 July 3, compared to the highest, lowest, and normal recorded levels.

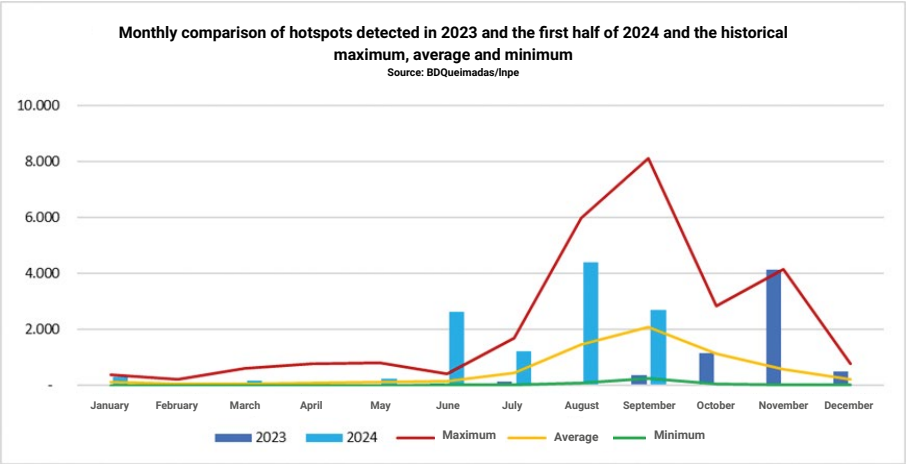


Source: Geological Survey of Brazil (CPRM, 2024).

The current context indicated a possible shift in the dynamics of fires in the Pantanal. In 2023, the hotspot peak occurred in November, rather than between August and September as observed in previous years. It is also worth noting that data showed a

strong trend toward an increase in hotspots in the biome, which is corroborated by climate and hydrological forecasts pointing to reduced average precipitation and rising temperatures. However, the situation observed in 2024, the year this plan was drafted, showed a trend consistent with previous years, with an increase in fire outbreaks in the Pantanal beginning in August or September (Figure 27).

Figure 27. Total hotspots in the Pantanal in 2023 and early 2024, compared to the historical average for the same period.



Source: BDQueimadas/National Institute of Space Research (Inpe), 2024.

Given this scenario, the following extraordinary measures were adopted:

- Budget replenishment for Ibama and ICMBio, through the approval of an extraordinary budget credit to hire firefighting brigades (2,400 brigade members for Ibama and 1,500 for ICMBio) and to expand the contracting of aircraft, fuel, personal protective equipment, other firefighting gear, and additional supplies (Provisional Measure No. 1241, 11 July 2024);
- Streamlining of administrative procedures for the acquisition of goods, equipment, vehicles, and specific services related to fire prevention, preparedness, and control, as well as for the hiring of brigade members by Ibama, allowing for faster and more frequent contracting cycles and minimizing gaps between contracts (Provisional Measure No. 1239, 8 July 2024);
- Amendment of National Civil Aviation Agency (ANAC) regulations regarding authorization for overflight by international aircraft with foreign crews during emergency services, including environmental emergencies and states of public calamity (Provisional Measure No. 1240, 9 July 2024);

- High-level pact between the federal government and state governments for the planning and implementation of collaborative and integrated actions for fire prevention, preparedness, and combat in the Pantanal and Amazon biomes, extending to other biomes;
- Ensuring the engagement of other ministries and agencies linked to the federal government to provide emergency measures, as detailed in the extraordinary meeting of the National Multiagency Integrated Operational Coordination Center (Ciman).

These measures are in addition to the routine actions carried out by the various federal institutions responding to fires in the Pantanal, as mentioned earlier. For more information on fire data and the federal government's firefighting efforts, visit: https://www.gov.br/mma/pt-br/composicao/secd/boletins-combate-aos-incendios.

5. STRATEGIC AXES AND OBJECTIVES OF THE PPPANTANAL

The analysis of the historical and current deforestation context in the Pantanal biome, along with projections of future trends, allowed for the definition of the strategic objectives of the PPPantanal (Table 12). Additionally, the details of objectives, expected outcomes, lines of action, targets, and indicators are presented in Annex B. The progress of the Plan's implementation can be monitored using the indicators presented, which may be updated based on monitoring and the annual evaluation, as provided in Decree No. 11367/2023, Articles 4 and 11.

Table 12. Strategic Axes and Objectives of Phase 1 of the PPPantanal.

Axes	Strategic Goals
Axis I - Sustainable Productive Activities	**Objective 1.** Promote sociobioeconomy, sustainable forest management, and the recovery and restoration of deforested or degraded areas.
	Objective 2. Encourage sustainable agricultural and livestock activities**.**
	Objective 3. Expand research, knowledge production, professional training, and technical assistance for sustainable production activities.
Axis II - Environmental Monitoring and Control	**Objective 4.** Strengthen the role of federal institutions and ensure accountability for environmental crimes and administrative violations related to deforestation, fires, and forest degradation.
	Objective 5. Improve the capacity for control, prevention, analysis, and monitoring of deforestation, degradation, and productive chains.
	Objective 6. Implement Integrated Fire Management to prevent and combat fires in native vegetation.
	Objective 7. Improve systems and integrate data on deforestation authorizations, embargoes, and infraction notices issued by state and municipal authorities into federal systems.
	Objective 8. Strengthen federative coordination to promote actions to control deforestation and fires and implement the Native Vegetation Protection Law.

Axis III - Land and Territorial Planning	**Objective 9.** Ensure protection, conservation, and sustainable use of natural resources, especially for Indigenous Peoples, quilombola communities, other traditional peoples and communities, and family farmers.
	Objective 10. Expand and strengthen the management of protected areas, including Integrated Fire Management.
	Objective 11. Coordinate and/or align the planning of large-scale developments and regional infrastructure and development projects with the goal of achieving zero deforestation by 2030.
	Objective 12. Conduct territorial planning and implement instruments already established by law to ensure the role of native vegetation, especially in headwaters and riparian zones, in maintaining and restoring the water regime and water quality.
Axis IV - Regulatory and Economic Instruments	**Objective 13.** Create, improve, and implement regulatory and economic instruments for deforestation control and the regulated use of fire.

5.1. Axis I - Sustainable productive activities

Sustainable productive activities in the Pantanal are carried out by a variety of actors operating across different economic sectors, including large, medium, and small enterprises, as well as initiatives led by Traditional Peoples and Communities (TPCs), encompassing agriculture, livestock farming, non-timber forest product harvesting, and related activities.

According to Law No. 8750/2016 (Brazil, 2016), there are 28 segments of traditional peoples and communities in the country, with eight communities mapped in the Pantanal, totaling approximately 1,110 individuals in the Pantanal regions of Mato Grosso and Mato Grosso do Sul. These include pantaneiros (cattle ranchers), terrestrial extractivists who collect plant and animal species, artisanal fishers, quilombola communities, and Indigenous Peoples (such as the Guató and Kadiwéu), who rely on hunting, extractivism, and even clay extraction for the production of handcrafted utensils (Ecoa, 2022).

In the state of Mato Grosso, the Palmares Cultural Foundation has records of 28 quilombola communities in the municipality of Poconé, making it the city with the highest number of self-identified quilombola individuals in the state, with a population of 3,445 people (IBGE, 2022). Officially recognized territories in Poconé include Campina da Pedra and Laranjal, where family farming is the main economic activity.

Deforestation and fires are two main drivers of landscape transformation and environmental degradation that directly affect the socioeconomic dynamics of Pantanal inhabitants, including large and medium landowners, but especially small rural producers and traditional peoples and communities. Many of these communities depend directly on the environment for food, medicinal use, cultural practices, and economic activities. They can therefore be severely affected by both the localized and cumulative impacts of deforestation and fire. These impacts also extend to the health of people living in the Pantanal due to smoke exposure.

In this context, under the axis of sustainable productive activities, the PPPantanal defines three strategic objectives aimed at promoting sustainable practices and the proper use of natural resources, as well as the restoration of deforested or degraded areas, as follows:

Objective 1. Promote socio-bioeconomy, sustainable forest management, and the recovery and restoration of deforested or degraded areas: value traditional knowledge to strengthen socio-biodiversity, promote sustainable businesses that, among other economic activities, support seed networks, expand tourism, generate employment and income, and encourage the conservation and restoration of native vegetation;

Objective 2. Foster sustainable agricultural and livestock activities: establish, regulate, and promote sustainable management practices and indicators of economic, social, and environmental sustainability for extensive livestock farming and agriculture, strengthen public policies to expand markets, and establish Integrated Fire Management for fire prevention;

Objective 3. Expand research, knowledge production, professional training, and technical assistance for sustainable productive activities: strengthen training, scientific innovation, and technical assistance to support sustainable practices by integrating scientific and traditional knowledge in support of Objectives 1 and 2.

Source: MMA.

Strategic Objective 1 aims to promote socio-bioeconomy, sustainable native vegetation management, and the recovery and restoration of deforested and degraded areas. The implementation of public policies for the conservation of the Pantanal must include the preservation of biocultural heritage, encompassing both biodiversity conservation and the maintenance of human populations and their ways of life, while also ensuring income generation. To this end, it is necessary to recognize and promote products from the Pantanal through, for example, Geographical Indication for Pantanal Honey and other products such as native rice (*Oryza latifolia* and *O. glumaepatula*). In this context, it is important to establish programs and actions that foster bioeconomy and its various branches (1.1.1).

Another important aspect is the strengthening of family farming in the biome. Since the mid-1990s, public policies aimed at rural development in Brazil have begun incorporating specific actions targeted at family farming. For example, the Family Farming Food Acquisition Program (PAA), created in 2003, has a dual purpose: to encourage family farming, by creating new institutional support channels for commercialization, and to provide food assistance to populations at risk by allocating food from family farming to social assistance entities, public food and nutrition security programs, and public and philanthropic school networks. This program supports family and agroecological farming in the biome, especially among TPCs and family farmers already living in the Pantanal, by opening institutional markets to small producers, avoiding intermediaries, structuring family farming production through guaranteed purchase agreements for social assistance entities, encouraging food diversity, and promoting cooperatives and associations as a means to scale up commercialization. All of this contributes to improved income and food security for families and fosters the organization of producers and the strengthening of regional production and consumption circuits (1.1.2).

In addition to strengthening and expanding public procurement programs, PPPantanal also aims to promote the adoption of sustainable businesses grounded in traditional knowledge, ecological transition, and ethnodevelopment (1.1.3), integrating environmental protection with the appreciation of culture, traditional ways of life, and the promotion of nature-based rural and community tourism (1.2.1). Moreover, socio-bioeconomic activities in the Pantanal are largely based on the extractivism of non-timber forest products, which constitute the economic base for many traditional riverside communities, such as Porto da Manga, Antônio Maria Coelho, São Francisco, the Association of Artisanal Bait Fishers of Miranda, Barra do São Lourenço, São Francisco, and Paraguai Mirim (Ecoa, 2022). Within this context, activities related to the extraction of bocaiuva, carandá, laranjinha de pacu, acuri, jenipapo, cumbaru, native rice, and artisanal fishing stand out. However, Pantanal communities face several challenges, such as a lack of infrastructure and technical assistance to carry out their activities, which results in precarious working conditions, low processing capacity and the need for greater integration of production chains. Therefore, the goal is to promote sustainable multiple-use forest management (including timber, non-timber, and livestock uses) and

good production practices for the economic exploitation of native timber and non-timber species and fauna, such as the production of honey and pollen from native bees (1.3.1).

One of the focus areas of the PPPantanal is to boost initiatives for mitigating the effects of deforestation and fires on the biome. In this regard, the aim is to promote restoration and recovery using native species to help reduce degradation, enhance biodiversity conservation and carbon stocks, and generate employment and income (1.4.1). Restoration and recovery efforts in the Pantanal have mainly occurred after the 2020 fires, such as the projects Pantanal Verde, Aquarela do Pantanal, Restauracción, GEF Terrestre, Restaura Pantanal (Taiamã Ecological Station and surroundings), and the Pact for the Restoration of the Pantanal, among others. The integration of restoration efforts in the Pantanal and the Cerrado is of utmost importance, as these biomes are interconnected from a hydrological standpoint, and this is the core premise of the Methodology of the Pact for the Restoration of the Pantanal. The headwaters of the rivers that supply the Pantanal floodplain are located in the Cerrado, and restoration initiatives in that biome are essential for maintaining and regulating the seasonal flood regime of the Pantanal. This regulation, in turn, is key to the prevention of fires, since flood pulses are closely related to the occurrence of such events in the Pantanal. Thus, there is also an objective to promote the integration of vegetation recovery and restoration actions with those under the River Basin Revitalization Program (1.4.2).

Source: MMA.

Strategic Objective 2 refers to the promotion of sustainable agricultural and livestock activities. In this context, the strategy is to encourage sustainable livestock and crop production, reducing pressure on critical deforestation areas while ensuring the social, environmental, and economic advancement of agriculture and livestock. For example, there is evidence of agricultural crops that have not historically occurred in the biome, such as soy, non-native rice, sugarcane, and forage grass. Therefore, the presence of such crops must be aligned with the biome's carrying capacity so that they can be developed sustainably. To this end, sustainable practices that reduce pressure on critical deforestation areas or the conversion of native pastures into exotic ones can be promoted and improved (2.1.1), as well as strengthening and expanding market access and public policies for family farming, which requires improvements in technical assistance and rural extension services (2.1.2).

It is worth noting that it is common in the Pantanal for fire to be used as a tool for maintaining and clearing native pastures, such as those dominated by capim caronal, rabo-de-burro, and fura-bucho. Due to the intensification of climate change, with rising temperatures and prolonged periods of extreme drought, it is important to disseminate the use of Integrated Fire Management (IFM) practices as tools for fire prevention, as well as to promote alternatives to the use of fire and its replacement in agricultural and livestock contexts (2.1.3). It is also critical to improve the capacity of agencies to distinguish authorized burning from criminal arson, which can be supported through the implementation of the National Fire Information System (Sisfogo/IBAMA), as provided for in the National Policy on Integrated Fire Management.

Strategic Objective 3 aims to expand research, knowledge production, professional training, and technical assistance for sustainable productive activities. This objective seeks to broaden and disseminate training and knowledge on the use and conservation of the biome. The production and dissemination of knowledge that raises awareness, educates, and empowers different social actors will significantly contribute to improving productivity, enhancing sustainability, and reducing deforestation and the incidence of fires in the biome (3.1.1).

5.2. Axis II - Environmental monitoring and control

The states of Mato Grosso and Mato Grosso do Sul have their own licensing and enforcement legislation related to deforestation and fires - State Law No. 6160/2023 of Mato Grosso do Sul, and State Law No. 11861/2022 of Mato Grosso. However, the integration of data between state and federal databases regarding land use and fire use is still inadequate, which undermines the classification of deforestation and fires as either legal or illegal.

A command-and-control system is one of the main tools the State possesses for effective and rapid intervention against the illegal suppression or conversion of native vegetation and for the control of burnings and fires. Thus, to optimize the planning and implementation of command-and-control actions, it is necessary to integrate databases and monitoring systems that provide information to support decision-making based on spatial intelligence, optimizing the use of available resources.

The responses under the environmental monitoring and control axis of PPPantanal are composed of five strategic objectives:

> **Objective 4.** Strengthen the role of federal institutions and ensure accountability for environmental crimes and administrative violations related to deforestation, fires, and forest degradation;
>
> **Objective 5.** Improve the capacity for control, prevention, analysis, and monitoring of deforestation, degradation, and production chains;
>
> **Objective 6.** Implement Integrated Fire Management to prevent and combat fires in native vegetation;
>
> **Objective 7.** Improve systems and integrate data on deforestation authorizations, embargoes, and infraction notices issued by state and municipal authorities into federal systems;
>
> **Objective 8.** Strengthen federative coordination to promote actions to control deforestation and fires and implement the Native Vegetation Protection Law.

Strategic Objective 4 aims to strengthen the role of federal agencies in the enforcement of environmental crimes and violations. To this end, it is essential to ensure accountability for individuals responsible for crimes and violations related to deforestation, fires, and degradation of native vegetation (4.1.1). It is also vital to expand the capacity to act in administrative, civil, and criminal proceedings against deforestation, fires, and degradation of native vegetation, strengthening institutional action with human, technological, and logistical resources to ensure the effectiveness of addressing fires and other environmental crimes and violations (4.2.1).

Strategic Objective 5 seeks to improve the capacity for control, prevention, analysis, and monitoring of deforestation, degradation, and productive chains. Thus, the aim is to enhance the monitoring systems for suppression and degradation of native vegetation, including the detection of vegetation physiognomies and their conservation status (5.1.1). Additionally, it seeks to implement monitoring mechanisms and establish parameters and procedures to measure the impact of suppression and degradation of native vegetation on air, soil, and water resources (5.1.2). To improve the monitoring of deforestation, degradation, and productive chains, it is also necessary to strengthen community-based monitoring initiatives for deforestation and fires, as well as provide safety mechanisms for the involved stakeholders (5.1.3). It is also relevant to strengthen governance and institutional cooperation for monitoring, including through a communication protocol regarding deforestation and fire dynamics that supports the adoption of quicker preventive and combat actions (5.1.4). Furthermore, government actions must implement/develop the monitoring of air pollution, inventories, and State Plans for Air Emissions Control in the states of the Biome (5.1.5); strengthen and integrate deforestation prevention and control actions set forth in the National Action Plans for the Conservation of Endangered Species (5.1.6); and implement and improve monitoring and control systems for the environmental origin and traceability of timber, minerals, and agricultural products (5.2.1).

Strategic Objective 6 aims to implement Integrated Fire Management (IFM) to prevent and combat fires. IFM considers the cultural, economic, social, and environmental needs related to the use of fire, integrating monitoring, evaluation, and adaptation of actions. The technique used in IFM allows for the selection of the timing, weather conditions, frequency, and location where fire may or may not be used safely in vegetation. The objective is to prevent large-scale fires by reducing dry biomass, minimizing greenhouse gas emissions, and protecting the most sensitive ecosystems, productive areas, and priority conservation areas. Although IFM is already being used in federal and state conservation units, RPPNs, and private lands, through the efforts of ICMBio, universities, and state agencies, actions are needed to strengthen the institutional capacity of ICMBio and Ibama, the main federal institutions responsible for the prevention, management, and combat of fires, for example, by strengthening the Federal Fire Brigades Program, including through the provision of equipment (6.1.1).

The Pantanal still requires actions related to the implementation of the National Policy on Integrated Fire Management (6.1.2). In addition to improving fire-related information systems, including monitoring, and its impacts (6.1.3), it is also necessary to support awareness campaigns and training related to the prevention and control of deforestation and fires (6.1.4). Also included under this objective is the scientific, technical, and operational enhancement of Integrated Fire Management actions. Within this scope, actions include fostering research and studies on fire behavior and effects to support decision-making (6.2.1).

Strategic Objective 7 addresses the improvement of systems and integration of data on deforestation authorizations, embargoes, and state and municipal infraction notices into federal systems. The integration and consolidation of vegetation suppression authorizations, embargoes, and infraction notices are directly linked to the Rural Environmental Registry (CAR) and the National System for the Control of the Origin of Forest Products (Sinaflor), which are key tools for controlling deforestation in Brazil. CAR is the primary instrument for implementing the Law on the Protection of Native Vegetation (Federal Law No. 12651/2012) and for promoting the environmental regularization of rural properties and possessions. In addition to enabling environmental and economic planning for land use and occupation of rural properties, registration with CAR, along with a commitment to environmental regularization, is a prerequisite for access to the issuance of Environmental Reserve Quotas in the states of the Pantanal, the benefits provided by environmental regularization programs, and access to various public and private lines of credit. Thus, the goal is to integrate data on Authorizations for Vegetation Suppression (ASV) and Authorizations for Alternative Land Use (UAS), as well as infraction notices and embargoes under the responsibility of federative entities, into federal systems (7.1.1 and 7.1.2).

Strategic Objective 8 seeks to strengthen federative coordination to promote actions for controlling deforestation and fires and implementing the Law on the Protection of Native Vegetation. In this regard, actions are planned to assist in the development and updating of State and Municipal Plans for the Prevention and Control of Deforestation and Fires (PPCDQs) (8.1.1). It is also a priority to coordinate with state and municipal agencies involved in the prevention of and response to fires to implement Integrated Fire Management (8.1.2); and to support the environmental regularization process through the analysis of properties registered in CAR conducted by the states, the implementation of PRAs, and other mechanisms provided for in the Law on the Protection of Native Vegetation (8.2.1), considering state-specific characteristics and their respective Rural Environmental Registry systems.

Source: MMA.

5.3. Axis III - Land and territorial planning

This axis focuses on the adjustment and allocation of land, aiming to optimize environmental protection and conservation efforts. In addition, it seeks to leverage existing legal instruments to promote sustainable use and reduce deforestation in line with strategic objectives. Land regularization ensures land rights and, consequently, responsibility for the conservation and sustainable use of natural resources. Thus, Axis III consists of four strategic objectives:

Objective 9. Ensure protection, conservation, and sustainable use of natural resources, especially for Indigenous Peoples, quilombola communities, other traditional peoples and communities, and family farmers;

Objective 10. Expand and strengthen the management of protected areas;

Objective 11. Coordinate and/or align the planning of major projects and infrastructure developments in the region with the goal of achieving zero deforestation by 2030;

Objective 12. Conduct territorial planning and implement existing legal instruments to ensure the role of native vegetation in maintaining and restoring water regimes and water quality.

Strategic Objective 9 of PPPantanal aims to ensure the designation of public land parcels for the protection, conservation, and sustainable use of natural resources, especially for indigenous peoples, quilombola communities, other traditional peoples and communities, and family farmers. In this regard, it is expected that designated federal and state public land parcels will have improved land tenure controls and reduced land tenure insecurity. To achieve this, the action plan establishes six strategic lines of action, divided into two main complementary fronts, aimed at fostering a more sustainable future for the region.

The first front aims to designate federal land parcels for the protection, conservation, and sustainable use of natural resources through the recognition of territorial rights, prevention, and control of deforestation (9.1.1); and to encourage and strengthen the creation of interinstitutional bodies and programs for managing land tenure conflicts (9.1.2). Examples of actions include the creation of new Conservation Units and the expansion of existing ones, such as the Pantanal Mato-Grossense National Park (MT). Another example is the São Francisco Agroextractivist Settlement Project (PAE) in Mato Grosso, which promotes social inclusion and sustainability in the Pantanal.

Strategic Objective 10 aims to expand and strengthen the management of protected areas to reinforce the protection of the biome. To this end, it is crucial to promote the creation of new Conservation Units (CUs) in the Pantanal. This objective is critical because the target set by the Convention on Biological Diversity to create conservation units representing 10% of the biome area by 2010 was not met in the Pantanal. Currently, just over 5% of the territory is protected by conservation units. It is important to highlight the role of conservation units in the Cerrado, as they directly influence the balance of the Pantanal, such as the Nascentes do Rio Taquari State Park, which is a watershed divide and protects three headwaters of the Taquari River in the Paraguay Basin: the Furnas, Mutum, and Engano streams.

Thus, PPPantanal proposes as a line of action the creation of Conservation Units focused on critical deforestation areas (10.1.1) and the consolidation of the management of existing CUs, which generally face implementation and basic infrastructure challenges, as well as the strengthening and implementation of territorial governance and management tools to improve the administration and connectivity of protected areas, such as mosaics, ecological corridors, biosphere reserves, Ramsar sites, and restoration plans (10.1.2), considering the interconnection between natural areas as a fundamental element for maintaining biodiversity and ecosystem services.

Source: MMA.

In addition to CUs, indigenous and quilombola territories play a crucial role in protecting the Pantanal, acting as guardians of the biome. These traditional communities possess deep ancestral knowledge of the ecosystem, passed down through generations, which enables them to develop sustainable resource management practices, ensuring biodiversity conservation and ecological balance. Their territories, often located in strategic areas, function as natural barriers against deforestation, the expansion of predatory activities, and the unchecked exploitation of natural resources.

Recognition and support of indigenous and quilombola territories are therefore essential for protecting the Pantanal. It is necessary to identify, delimit, demarcate, officially recognize, and regularize Indigenous Lands and Quilombola Territories (10.2.1). Beyond land recognition, it is also necessary to develop and implement participatory territorial and environmental management plans, with technological and economic support and technical assistance for carrying out sustainable activities (10.2.2). Protecting the Pantanal depends on a collective effort that includes the effective creation and management of CUs, the recognition and support of indigenous and quilombola territories, as well as the implementation of sustainable practices throughout the biome. Valuing and strengthening these traditional communities, while respecting their culture and way of life, is essential to ensuring the preservation of this unique ecosystem.

Strategic Objective 11 focuses on ensuring that infrastructure works and large-scale projects in the Pantanal are installed sustainably, avoiding, when possible, and mitigating the impacts of river damming from the plateau to the Pantanal floodplain for the installation of Small Hydroelectric Power Plants (PCHs), Hydroelectric Power Plants (UHEs), and other enterprises. Some of these structures are not located within the

Pantanal itself but in its surroundings, and their cumulative effect on the biome must be considered. There are over one hundred hydroelectric plants, including PCHs and UHEs, in the plateau area surrounding the Pantanal floodplain (Calheiro et al., 2018).

The Growth Acceleration Program (PAC) is an important instrument for Brazil's economic and social development. Launched in 2023, the New PAC aims to stimulate sustainable growth through massive infrastructure investments. The MGI and Serpro play an active role in implementing the program, supporting ministries and the Presidency. PAC Seleções, also launched in 2023, enables direct contact with states and municipalities to adapt PAC policies to local needs. Projects involving photovoltaic, wind, hydroelectric, and thermal power generation (Axis II of PAC) will be boosted by the program, with emphasis on Brazil's hydraulic potential. The construction of 20 small hydroelectric plants is planned across several states, including Mato Grosso, along with investments in thermal energy, particularly gas plants and renewable sources. The goal is to promote clean and renewable energy generation by offering financing opportunities for companies under the program. The program's structuring axes are: (i) efficient and sustainable transportation, covering logistics investments in highways, railways, and waterways; (ii) energy transition and security, including power generation projects; and (iii) water for all, including water infrastructure projects and river basin revitalization.

Therefore, this will be an opportunity to monitor and align the strategic objectives, outcomes, and lines of action of PPPantanal with PAC initiatives, avoiding negative impacts from such enterprises and strengthening cross-sectoral public policies in favor of the Pantanal biome. In this context, PPPantanal foresees the action of regulating, developing, and implementing instruments (such as Technical, Economic, and Environmental Feasibility Studies - EVTEA; and Strategic Environmental Assessment - AEE) to proactively contribute to environmental and territorial governance, aiming to avoid and control deforestation, recover or restore potentially deforested areas, and mitigate greenhouse gas (GHG) emissions resulting from land use change in areas affected by major enterprises and infrastructure and regional development projects (11.1.1).

Strategic Objective 12 is of paramount importance for the Pantanal, as it recognizes that territorial planning and the implementation of instruments already provided by law ensure the crucial role of native vegetation in maintaining and restoring the water regime and water quality. Maintaining the Pantanal's water regime requires consideration of the Cerrado biome located on the surrounding plateau, where the headwaters of the rivers that drain into the floodplain are found. To achieve this, three outcomes are expected: implementation of the instruments set forth in the Law on the Protection of Native Vegetation (Law No. 12651/2012); integration of agricultural management tools with native vegetation conservation and water management policies; and integration of water management tools with native vegetation conservation policy.

In pursuit of the outcomes of Strategic Objective 12, which aims to ensure the role of native vegetation in maintaining and restoring the water regime and water quality in

the Pantanal, key actions have been defined. First, the goal is to develop a proposal for priority areas for Legal Reserve compensation, focusing on the recovery of headwater areas, aquifer recharge zones, and wetlands, the creation of ecological corridors, and the conservation or restoration of vegetation, soil, ecosystems, and endangered species (12.1.1). Additionally, it is intended to include native vegetation conservation criteria at the property and micro-basin levels in the evaluation process for granting irrigation permits (12.2.1), to ensure that water use for agricultural purposes is carried out responsibly and does not compromise the health of the biome.

In summary, these actions represent a set of integrated solutions to protect the water regime and water quality in the Pantanal, promoting the sustainable use of natural resources and ensuring the conservation of this unique biome.

5.4. Axis IV - Regulatory and economic instruments

The development of public policies associated with regulatory and economic instruments aims to strengthen environmental legislation and introduce economic incentives that support sustainable practices in the Pantanal region. The actions should contribute to the conservation of the ecosystem and mitigate the damage caused by deforestation and fires, as well as promoting sustainable socio-economic development.

PPPantanal proposes the creation and adaptation of regulatory and economic instruments to guide and promote the sustainable use and restoration of natural resources, reduce deforestation and fires, support the development of sustainable economic activities and production chains, and strengthen the socioeconomic rights of local populations, thus supporting the implementation of the previous axes in a cross-cutting manner. To this end, the axis consists of one strategic objective:

> **Strategic Objective 13**. Create, improve, and implement regulatory and economic instruments for controlling deforestation and fires.

With the aim of avoiding the impacts of deforestation and fires and minimizing damage to Pantanal communities while simultaneously encouraging conservation practices, Strategic Objective 13 addresses the creation, improvement, and implementation of regulatory and economic instruments for controlling deforestation and fires in the Pantanal biome.

Source: MMA.

With regard to instruments designed to encourage the implementation of mitigation and adaptation measures, notable actions include those related to green and sustainable taxonomy (13.1.1). In addition, consolidating the bioeconomy as a strategy for sustainable socioeconomic development involves promoting various instruments. Accordingly, actions are planned to propose regulations and tax incentives for the bioeconomy and subsidies for sociobioeconomy products originating from sustainable and biodiverse production systems, including sustainable extractivism and agroforestry systems, especially those from Indigenous lands, territories of traditional peoples and communities, and family farming (13.2.1).

Another important factor to consider in the context of the Pantanal is the carrying capacity of pastures for livestock. In the Pantanal floodplain, the carrying capacity for cattle ranges from 0.2 to 0.3 Animal Units (AU)/ha, and in the plateau region, from 0.1 to 0.2 AU/ha. When these stocking rates are exceeded, accelerated degradation of natural environments occurs. In this context, it is important to expand financing for the productive recovery of pastures and other degraded areas (13.3.1).

Source: MMA.

Decree No. 9640/2016 regulates the issuance, registration, use, transfer, cancellation, and responsibilities associated with Environmental Reserve Quotas (CRAs), representing an important step and incentive toward the green economy and the promotion of tools for environmental regularization. Thus, with a revision of the decree regulating the CRAs, these quotas could be widely used in the forest economy market, backed by the guarantee and environmental integrity of the instrument (13.5.1). Along the same lines, advancing the implementation of forest compensation instruments for the Pantanal biome must include intensifying the issuance of quota certificates and negotiations over areas for legal reserve replacement.

The National REDD+ Strategy (ENREDD+) Brazil aims to reduce greenhouse gas emissions, deforestation, and forest degradation; promote the sustainable conservation of forests; and lower carbon dioxide levels. The initiative is part of Brazil's commitments under the United Nations Framework Convention on Climate Change (UNFCCC), which regulates the role of tropical forests in mitigating climate change. The strategy was developed through a participatory process involving the government, civil society, and the private sector. The Amazon Fund, administered by the National Bank for Economic and Social Development (BNDES), is one of ENREDD+'s main funding sources. Globally, Brazil is a key player in REDD+ implementation, particularly in the Amazon. Therefore, revising and implementing the National REDD+ Strategy (ENREDD+), including access to the Pantanal biome, represents an action that will contribute to climate change mitigation, conservation, and restoration of the Pantanal ecosystems affected by illegal deforestation and fires caused by improper Fire Management. It will also promote the

development of a low-carbon, sustainable forest economy, generating economic, social, and environmental benefits for the biome (13.4.1 and 13.6.1).

The conservation of the Pantanal faces challenges that threaten its sensitive ecosystem. The loss of wetlands, pollution, and the impacts of deforestation and fires are critical issues. In this regard, legal and regulatory frameworks must be improved and enforced, particularly those related to Integrated Fire Management (13.7.1).

The plan must also enable debate to advance the revision of provisions in the Environmental Crimes Law, the Native Vegetation Protection Law, and Decree No. 6514/2008, in order to increase penalties and accountability for environmental crimes against flora, including fires (13.7.2).

Created by Law No. 12,512/2011, the Bolsa Verde Program is an initiative aimed at promoting environmental conservation and sustainable development in rural areas. It provides financial assistance to low-income families living in environmental conservation areas, such as extractive reserves, national forests, and agrarian reform settlements with preservation characteristics. Payments are made quarterly, and the incentive is conditional upon the families' commitment to sustainable resource use practices in the areas where they live. The program's goals include promoting environmental conservation in priority areas, reducing poverty in communities dependent on natural resources, and integrating environmental and social policies, thereby providing both environmental protection and economic development for the most vulnerable populations. Therefore, expanding the Bolsa Verde Program in the Pantanal region will boost activities and projects focused on socioeconomic development, as well as encouraging collective land management and traditional systems, especially in protected areas (13.8.1).

In addition to penalties for predatory practices, it is necessary to implement incentives for sustainable activities aimed at conserving native vegetation and water resources, including sustainable irrigation initiatives, such as the Water Producer Program, supported by the MIDR and implemented by the National Water and Basic Sanitation Agency (ANA) (13.8.2).

Another important measure is the regulation of the carbon market in Brazil (13.9.1). Bill No. 2148/2015, which regulates the carbon market in Brazil, has been approved by the National Congress and is currently awaiting presidential sanction. Regulating the carbon market by defining rules and standards is a significant step toward creating incentives aimed at curbing greenhouse gas emissions and reducing the anthropogenic impact on the climate. This regulation is a strategic approach to achieving environmental goals in alignment with international commitments, such as those set forth in the Paris Agreement. The carbon credit trading system not only contributes to the reduction of global emissions but also promotes an effective approach to tackling climate change by aligning the economic interests of companies with environmental objectives.

Traditional and quilombola territories contribute to deforestation control, as these communities traditionally make sustainable use of natural resources. To support this, it is vital to strengthen actions aimed at improving the regulatory process for the regularization of quilombola territories and those of traditional peoples and communities (13.10.1). Moreover, such action will also help reduce land concentration, distribute wealth, combat land grabbing and rural violence, and provide greater legal security for these groups, who generally rely on family farming as their primary livelihood.

Finally, permits for vegetation suppression, which may go by various names such as Authorization for Vegetation Suppression (ASV), are at the center of several national discussions. Currently, integration between national, state, and municipal databases remains inadequate, which hinders clear identification of legal and illegal deforestation and limits transparency in tracking this issue. In addition, no federal regulation currently defines clear criteria and minimum standards for granting vegetation suppression permits, nor is there an effective monitoring system to verify whether authorized activities have actually been carried out. It is evident that the entire process involving vegetation suppression permits in Brazil, including the Pantanal, needs to be revised to make the instrument effective for deforestation control and monitoring. In light of this need, PPPantanal proposes the creation of a regulatory instrument to standardize the criteria for issuing and integrating data on Vegetation Suppression Authorizations (ASVs) and Authorizations for Alternative Land Use (UASs) issued by federal entities in the Sinaflor system (Ibama), as well as to define standards for making this information publicly accessible (13.11.1).

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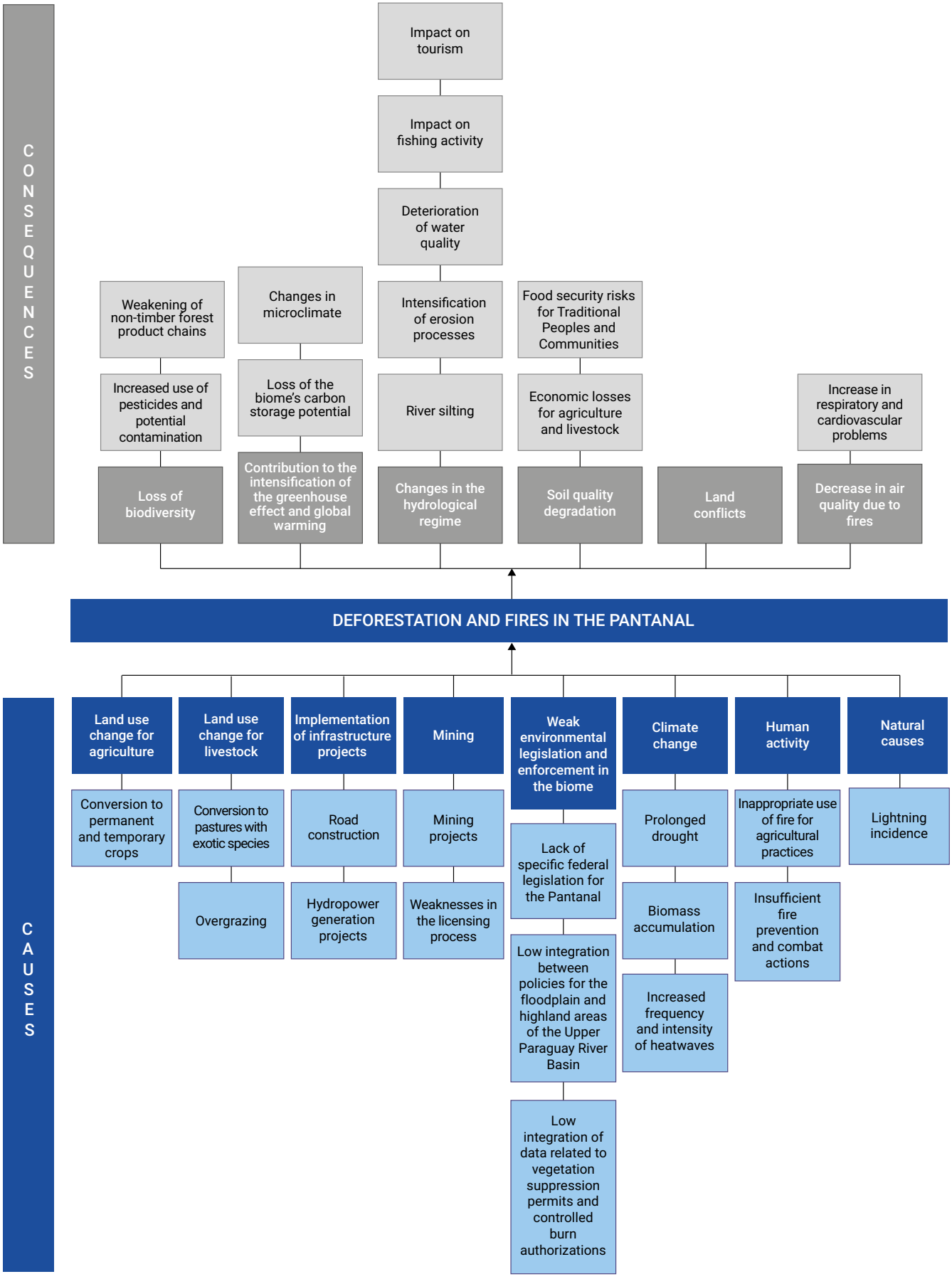
ANNEX A - PROBLEM TREE



ANNEX B - SUMMARY CHART OF STRATEGIC OBJECTIVES, EXPECTED RESULTS, AND LINES OF ACTION

Axis I - Sustainable Productive Activities				
Strategic Objective 1. Promote sociobioeconomy, sustainable forest management, and the recovery and restoration of deforested or degraded areas.				
Expected Result 1.1. Bioeconomy, sociobiodiversity, and agroecological transition expanded and strengthened.				
Line of Action 1.1.1. Develop and implement programs and actions to support the bioeconomy.				
Goal	Indicator	Deadline	Key Actor	Partners
1.1.1.1. Prepare the National Bioeconomy Plan	Plan prepared	2025	MMA	MDA / MIDR MCTI / MDIC / MAPA / Conab / MF / MDS
1.1.1.2. Establish a priority bioregional territory in the Pantanal biome	Territory established	2027	MIDR	MMA
1.1.1.3. Promote the sustainable use of natural resources, aligned with the cultural and economic needs of traditional communities	Number of sustainable management projects developed and implemented with community participation	2026	ICMBio	Peoples of the Pantanal, CNPCT
1.1.1.4. Map the species of socioeconomic use that are important to Pantanal communities.	Establishment of a biocultural community protocol and a monitoring protocol for the Pantanal's sociobiodiversity	2026	ICMBio	Terrestrial GEF; Pantanal Traditional Communities Network
1.1.1.5. Generate a database of traditional knowledge associated with the biodiversity of the Pantanal.	Scientific article published	2026	ICMBio	Terrestrial GEF; Pantanal Traditional Communities Network
1.1.1.6. Increase support for sustainable production inclusion projects for indigenous peoples, traditional peoples and communities, family and rural farming and community enterprises by 50%, valuing socio-biodiversity product chains.	a) Number of supported projects b) Number of territories and families benefited	2027	MDA	SNPCT – MMA/ MDIC/ MAPA/ MCTI/ Funai/ MPI/ Conab
	a) Number of applied technologies and social technologies for sociobiodiversity chains b) Number of sociobiodiversity value chains benefited	2027	MDA	SNPCT – MMA/ MDIC/ MAPA/ MCTI/ Funai/ MPI/ Conab
1.1.1.7. Implement 15 projects to stimulate sociobiodiversity and agroecological product chains through productive support and/or expansion of local infrastructure for transport, sanitation, connectivity, and renewable energy.	a) Number of implemented projects b) Number of enterprises benefited c) Total investment amount (BRL)	2027	Mapa	ANA, ICMBio and SNPCT-MMA / MD / MDS / SBC-MMA / SNPCT, SBC - MMA / GSIPR / MCOM / MA

1.1.1.8. Implement 10 projects to stimulate sociobiodiversity and agroecological product chains through productive support and/or expansion of local infrastructure for transportation, sanitation, connectivity, and renewable energy.	a) Number of implemented projects b) Number of enterprises benefited c) Total investment amount (BRL)	2027	MIDR	ANA, ICMBio and SNPCT-MMA / MD / MDS / SBC-MMA / SNPCT, SBC - MMA / GSIPR / MCOM / MA
1.1.1.9. Implement 30 projects to stimulate sociobiodiversity and agroecological product chains through productive support and/or expansion of local infrastructure for transportation, sanitation, connectivity, and renewable energy.	a) Number of implemented projects b) Number of enterprises benefited c) Total investment amount (BRL)	2027	MDA	ANA, ICMBio and SNPCT-MMA / MD / MDS / SBC-MMA / SNPCT, SBC - MMA / GSIPR / MCOM / MA
Line of Action 1.1.2. Strengthen and expand government procurement policies and programs (PAA, PNAE, PGPM, PGPM-Bio, and the Family Farming Seal).				
Goal	Indicator	Deadline	Key Actor	Partners
1.1.2.1. Increase commercialization actions through government procurement programs (PAA, PNAE) compared to 2022 values.	% increase in government purchases	2027	Conab	MDA/ MDS/ MPI/ MMA/ MDIC
1.1.2.2. Monitor the generation of information and data on sociobiodiversity products supported by PGPM-Bio.	Annual publication of monitoring data	2027	Conab	MDA/ MMA / IBGE
1.1.2.3. Inclusion of more Pantanal products in the PGPMBio program (e.g., licuri and murici)	Number of products included	2027	Conab	MDA/ MMA/ IBGE – MPO
Line of Action 1.1.3. Promote sustainable businesses and create green jobs, strengthening the bioeconomy, agroecological transition, and ethnodevelopment.				
Goal	Indicator	Deadline	Key Actor	Partners
1.1.3.1. Increase support for sustainable productive inclusion projects for Indigenous peoples, traditional communities, family and peasant farming, and community enterprises, valuing sociobiodiversity product chains compared to the average of the past four years.	% increase in supported projects	2024	Conab -MDA	SNPCT – MMA/ MDIC MAPA/ MCTI/ MDIC/ Funai – MPI
1.1.3.2. Adjust and strengthen the Pronatec Extrativista program.	Number of people assisted	2027	SNPCT - MMA	ICMBio/ Conab/ MPI/ MEC/ MDS
1.1.3.3. Promote initiatives for socioproductive inclusion, territorial and environmental management, and institutional strengthening for traditional peoples, communities, and family farmers.	Number of initiatives carried out	2024	SNPCT - MMA	IDH / Funatura / IEB
Expected Result 1.2. Nature tourism, ethnotourism, and regenerative tourism promoted and expanded.				
Line of Action 1.2.1. Expand nature, rural, community-based, and conservation unit tourism.				
Goal	Indicator	Deadline	Key Actor	Partners

1.2.1.1. Establish pilot projects to promote ecotourism and regenerative tourism per year.	Number of projects established	2027	MTur	Embratur / SBC-MMA / MDIC
1.2.1.2. Establish a community-based and ethnotourism program in the Pantanal.	Community-based and ethnotourism program established	2027	MTur	Embratur / SBC - MMA / MDICZ MPI - Funai
1.2.1.3. Ensure 100% of Conservation Units (CUs) in categories where visitation is a primary goal (National Parks and Natural Monuments) have visitor number monitoring.	% of conservation units with monitoring of the number of visits, in accordance with Normative Instruction No. 05/2018	2027	ICMBio	Private sector
1.2.1.4. Offer training slots to 20% of staff in Pantanal CUs in courses promoted by the General Coordination of Public Use and Environmental Services or on the topic of visitation management in conservation units.	Number of training places offered to develop skills related to the management of visitation in conservation units	2025	ICMBio	
1.2.1.5. 100 km of signposted long-distance trails.	Cumulative kilometers of long-distance trails marked in federal CUs under Joint Ordinance MMA/MTUR/ ICMBio No. 407/2018	2025	ICMBio	MMA
1.2.1.6. Strengthen visitation in federal CUs, including RPPNs, and promote sustainable and responsible tourism, contributing to valuing sociobiodiversity and boosting the local economy through the implementation of the Program for Visitation and Sustainable Tourism in federal CUs.	a) Program phases implemented b) Number of Conservation Units benefited	2027	ICMBio	MMA, MTur, Embratur
1.2.1.7. Implement the National Development Plan for Recreational and Sport Fishing (PNPA), taking into account the particularities of the biome	Number of fishers benefited per year	2027	MPA	MMA
Expected Result 1.3. Expanded sustainable forest management				
Action Line 1.3.1. Promote sustainable multiple-use forest management (including timber, non-timber, and livestock use) and good production practices for the economic exploitation of native timber and non-timber species and fauna.				
Goal	Indicator	Deadline	Key Actor	Partners
1.3.1.1. Implement actions under the National Program for Productive Forests and support for productive organization, rural extension, and technical assistance for forest and community enterprises.	Number of family farmers and rural entrepreneurs supported	2027	MDA	SFB and SBC-MMA / MEC / MF / MAPA /
Expected Result 1.4. Expansion of native vegetation restoration, with social participation and the establishment of community-based and collaborative foundations, income generation for the local population, and technological innovation in the ecological restoration of semi-arid areas.				
Action Line 1.4.1. Promote the recovery and restoration of native vegetation, supporting and strengthening the national policy for native vegetation recovery (PROVEG), through the implementation of PLANAVEG, contributing to reducing degradation, combating desertification, conserving biodiversity, increasing carbon stocks, and generating employment and income.				
Goal	Indicator	Deadline	Key Actor	Partners
1.4.1.1. Implement the macro actions provided in PLANAVEG, with emphasis on implementation arrangements for the recovery of native vegetation in APP and RL, in public areas (Conservation Units and Indigenous Lands) and in low-productivity rural areas in the Pantanal.	Number of completed steps for plan implementation.	2027	SBio -MMA	CONAVEG Members

1.4.1.2. Incorporate actions to promote native vegetation recovery into state public policies in the Pantanal and strengthen other forms of collective organization at the landscape scale through the work of the Planaveg Territorial Articulation Center.	Number of state public policies and other forms of collective organization aligned with Planaveg.	2027	MMA	Members of the PLANAVEG Territorial Articulation Unit.
1.4.1.3. Improve the monitoring of native vegetation recovery in public and private areas.	Monitored recovery areas, in hectares	2027	PF-MJSP	MMA / OEMAs
1.4.1.4. Develop a portfolio of projects for the restoration and recovery of natural vegetation.	Project portfolio developed.	2025	MIDR	SBio - MMA / OEMAS
1.4.1.5. Promote integrated management of micro-basins, including actions for soil and water conservation, vegetation cover recovery, and social mobilization.	Number of micro-basins covered.	2027	MIDR	SBio - MMA / OEMAS
1.4.1.6. Execute projects from the Management Committee of the Accounts of the Endangered Species (PAN) Basins Revitalization Program and from the Thematic Climate Adaptation Plan for Water Resources aimed at soil recovery in the Pantanal river basins.	a) Number of drainage basins served; b) hectares recovered	2027	SNPCT - MMA	OEMAs
1.4.1.7. Implement measures to reintroduce and preserve native fauna species in degraded forest areas, aiming to contribute to ecosystem recovery and restoration, resilience, pollination, seed dispersal, and ecological balance.	Number of areas covered by the project.	2027	MMA	Ibama
1.4.1.8. Carry out compensatory planting due to road and railway construction, duplication, capacity increase, modernization, maintenance, etc., and indicate priority areas for planting.	Area (ha) with compensatory planting carried out per year.	2027	MT	MMA
1.4.1.9. Promote actions of diagnosis, implementation, or monitoring of ecological restoration of ecosystems in at least 10,000 hectares of degraded areas within federal CUs, corridors, and critical areas for species conservation in the Pantanal.	Degraded area (ha) with diagnosis, implementation, or monitoring of restoration.	2027	ICMBio	MMA, IBAMA, SFB, NGOs and local organizations
1.4.1.10. Make available the polygons of degraded areas in federal CUs in the Pantanal that are eligible to receive restoration projects.	Website implemented providing polygons of degraded areas available for restoration projects in federal Conservation Units as open data.	2025	ICMBio	MMA
1.4.1.11. Train more than 90% of managers of federal conservation units in the Pantanal in ecological restoration project management.	% of Pantanal CUs with staff trained in ecological restoration project management.	2027	ICMBio	MMA, IBAMA, SFB, NGOs and local organizations
1.4.1.12. Promote actions of diagnosis, implementation, or monitoring of ecological restoration of ecosystems in at least 10,000 hectares of degraded areas within federal CUs, corridors, and critical areas for species conservation in the Upper Paraguay River Basin.	Degraded area (ha) with diagnosis, implementation, or monitoring of restoration.	2027	ICMBio	MMA, IBAMA, SFB, NGOs and local organizations
1.4.1.13. Make available the polygons of degraded areas in federal CUs in the Upper Paraguay River Basin that are eligible to receive restoration projects.	Website implemented providing polygons of degraded areas available for restoration projects in federal Conservation Units as open data.	2025	ICMBio	MMA

1.4.1.14. Develop specific restoration plans for the Pantanal National Park, the Taiamã Ecological Station, and the Serra da Bodoquena National Park.	Number of restoration plans developed for the Conservation Units.	2027	ICMBio	MMA, IBAMA, SFB, Universities and local research centers, and NGOs and local organizations
1.4.1.15. Implement actions of the National Program for Productive Forests to disseminate sustainable and biodiverse productive systems, through rural credit and other instruments, with incentives for the recovery of degraded pastures, extractivism, and the implementation of sustainable productive activities.	a) Number of milestones achieved for project/program implementation; b) Area of recovered pasture and other low-carbon technologies (ha); c) Area of agroforestry systems implemented.	2027	MDA	MAPA/SAF – MDA/SBC– MMA/MF
Action Line 1.4.2. Promote the integration of native vegetation recovery and restoration actions with those provided in the Drainage Basin Revitalization Program.				
Goal	Indicator	Deadline	Key Actor	Partners
1.4.2.1. Five integrated micro-watershed management projects supported annually through partnership agreements.	Number of projects supported per year.	2027	MIDR	
1.4.2.2. Promote the coincidence of priority areas in federal Conservation Units, ecological corridors, or critical habitats for the conservation of endangered species and areas for basin revitalization in more than 90% of recovery/restoration investments in the Upper Paraguay River Basin.	% of investments (Number of public calls or other related initiatives) in basin recovery/restoration considering federal CUs, ecological corridors, and critical habitats for species.	2027	ICMBio	MMA, ANA
Strategic Objective 2. Encourage sustainable agricultural and livestock activities.				
Expected Result 2.1. Expansion of sustainable agriculture and livestock.				
Action Line 2.1.1. Encourage sustainable livestock and agricultural production, reducing pressure on critical areas of deforestation, while ensuring the social, environmental, and economic promotion of agriculture and livestock.				
Goal	Indicator	Deadline	Key Actor	Partners
2.1.1.1. Develop and implement the National Program for Rural Environmental Management.	a) Number of phases completed for program development. b) Program under implementation in priority territories.	2027	SNPCT - MMA	MDA / MAPA / MIDR
Action Line 2.1.2. Strengthening and expanding access to markets and public policies for family farming.				
Goal	Indicator	Deadline	Key Actor	Partners
2.1.2.1. Design and implement the Socio-environmental Development Program for Rural Family Production (Proambiente).	a) Number of phases completed for program development. b) Program under implementation in priority territories.	2027	SNPCT - MMA	MDA
Line of Action 2.1.3. Disseminate the Integrated Fire Management approach, including prevention practices, alternatives to the use of fire, and substitution of fire for agricultural and livestock purposes.				
Goal	Indicator	Deadline	Key Actor	Partners

2.1.3.1. Support the Integrated Fire Management subnetwork of the Pantanal Research Network (no funding planned)	Subnetwork supported	2027	MCTI	Cemaden, UFMS, UFMT, and others.
Strategic Objective 3. Expand research, knowledge production, training, and technical assistance for sustainable production activities.				
Expected Result 3.1. Research, training, capacity building, and knowledge for use and conservation expanded and disseminated.				
Action Line 3.1.1. Produce knowledge, disseminate information, raise awareness, and train and empower different social agents on the importance of conservation by adopting sustainable production and consumption practices to reduce deforestation and fires.				
Goal	Indicator	Deadline	Key Actor	Partners
3.1.1.1. Survey and publication of informational panels on bioeconomy initiatives in the Pantanal.	Panels published	2025	SFB - MMA	
3.1.1.2. Develop and implement a training and capacity-building program in technical assistance and rural extension with a focus on agroecological transition to address climate change.	a) Number of phases completed for program development. b) Program under implementation in priority territories.	2027	SNPCT - MMA	IFSP / GPP-Esalq
3.1.1.3. Implement the National Forest Inventory in the Pantanal biome.	Percentage of biome area with field data collection under the NFI.	2026	SFB - MMA	Universities; State Governments
3.1.1.4. Support the Pantanal biome subnetwork of the Biodiversity Research Program.	Subnetwork supported	2027	MCTI	UFMG
3.1.1.5. Expand applied research, the production of technical-scientific and traditional knowledge, and strengthen training and technical assistance in sustainable practices for the productive activities of traditional communities in the Pantanal, focusing on bioeconomy, sustainable management, and strengthening of sociobiodiversity.	a) Number of research projects carried out focusing on sustainable productive practices and natural resource management in Pantanal communities. b) Number of publications and educational materials produced based on scientific and traditional knowledge about sustainable productive activities. c) Number of training sessions and capacity-building events held with local communities promoting sustainable management and production techniques. d) Number of families or communities assisted with technical support from CNPT to implement sustainable productive activities. e) Annual % increase in the adoption of sustainable productive practices in traditional communities, based on participatory monitoring.	2027	ICMBio	UNIVERSITIES
3.1.1.6. Implement a fisheries research and monitoring system to support sustainable fishing activity in the biome.	Fisheries research and monitoring system implemented.	2027	MPA	MMA, MCTI
Axis II - Environmental Monitoring and Control				
Strategic Objective 4. Strengthen the role of federal institutions and ensure accountability for environmental crimes and administrative violations related to deforestation, fires, and forest degradation.				

Expected Result 4.1. High level of resolution and administrative, civil, and criminal accountability for illegal deforestation and forest degradation achieved.				
Action Line 4.1.1. Ensure accountability for crimes and administrative violations related to deforestation, forest fire occurrence, and forest degradation.				
Goal	Indicator	Deadline	Key Actor	Partners
4.1.1.1 Monitor, through intensive patrolling, federal highways and areas of interest to the Federal Administration.	Number of actions carried out per year	2027	PRF	IBAMA, ICMBio and other environmental law enforcement agencies.
4.1.1.2. Provide support through personnel deployment upon request by other agencies.	Number of actions supported/year	2027	PRF	IBAMA, ICMBio and other environmental law enforcement agencies.
4.1.1.3. Establish 40 administrative proceedings per year to investigate administrative violations against flora in the Pantanal	Number of proceedings opened/year	2025	IBAMA	
4.1.1.4. File 10 public civil actions (ACP) per year to seek compensation for damage to Pantanal flora.	Number of proceedings opened/year	2027	AGU	IBAMA
4.1.1.5. Conduct at least one national-level enforcement activity (as a priority Conservation Unit) in federal Conservation Units of the Pantanal by 2027.	Number of inspection activities carried out in federal Conservation Units/year	2027	ICMBio	PM, PRF, PF, IBAMA and others.
4.1.1.6. Conduct at least two regional-level enforcement activities (as priority Conservation Unit) in federal Conservation Units of the Pantanal by 2027.	Number of inspection activities carried out in federal Conservation Units/year	2027	ICMBio	PM, PRF, PF, IBAMA and others.
4.1.1.7. Carry out at least 8 local-level enforcement activities in federal Conservation Units of the Pantanal by 2027.	Number of inspection activities carried out in federal Conservation Units/year	2027	ICMBio	PM, PRF, PF, IBAMA and others.
4.1.1.8. Establish 400 administrative proceedings per year to investigate administrative violations against flora in the Pantanal.	Number of proceedings opened/year	2025	Ibama	
4.1.1.9. File 10 public civil actions (ACP) per year to seek compensation for damage to Pantanal flora.	Number of ACPs filed per year	2027	AGU	Ibama / ICMBio
4.1.1.10. Investigate liability for fires started on private properties through monitoring of hotspots (FIRMS) and cross-checking with the Rural Environmental Registry (CAR).	Number of infraction notices in federal CUs	2027	ICMBio	OEMA, PM
4.1.1.11. Increase by 40% the number of operations related to deforestation, fires, and forest degradation in the Pantanal biome, by strengthening investigations and implementing effective accountability measures, using 2024 as the baseline year.	Number of operations related to crimes of deforestation, fires and forest degradation in the Pantanal biome	2027	PF	
Expected Result 4.2. Human, technological, and logistical resources available to effectively combat environmental crimes and violations.				
Action Line 4.2.1. Human, technological, and logistical resources available to effectively combat fires and other environmental crimes and violations.				
Goal	Indicator	Deadline	Key Actor	Partners

4.2.1.1. Support the implementation of vehicle license plate recognition equipment to assist in monitoring timber transportation from the biome on federal highways.	Number of federal highways with equipment installed.	2027	DNIT	
4.2.1.2. Adjust maintenance, environmental management, and concession contracts to include specific technological and logistical resources to support environmental monitoring and control in the biome.	Number of federal highways covered.	2027	DNIT	
4.2.1.3. Hire 200 environmental analysts through public examination to work on combating deforestation and fires by 2027.	Number of environmental analysts hired per year.	2027	Ibama	MMA
Strategic Objective 5. Improve the capacity for control, prevention, analysis, and monitoring of deforestation, degradation, and productive chains.				
Expected Result 5.1. Monitoring capacity of deforestation and degradation in the biome expanded.				
Action Line 5.1.1. Improvement of monitoring systems for vegetation suppression and degradation, including the detection of vegetation physiognomies and conservation status.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.1.1. Expand the monitored area in the biome.	% increase in the monitored area in the biome.	2027	Censipam	Ibama, ICMBio MMA / Inpe - MCTI
5.1.1.2. Support the Biomas-Br Cerrado Project.	Project supported	2027	INPE	UFG, UFMG
5.1.1.3. Develop a technology solution using SAR imagery for deforestation detection	a) Number of phases completed related to solution development (during the development phase). b) Number of operations carried out in critical areas identified through the technological deforestation prediction solution per year	2025	Censipam	Ibama, ICMBio MMA / Inpe - MCTI and PF /
Action Line 5.1.2. Implement monitoring mechanisms and establish parameters and procedures to measure the impact of native vegetation suppression and degradation on air, soil, and water resources.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.2.1. Include in highway maintenance contracts, DNIT's environmental management contracts, and concession contracts, monitoring and even firefighting actions within the right-of-way of highways and railways, with greater intensity in federal road sections that cross the biome	Number of contracts adjusted / year	2027	DNIT	MT/MMA
Action Line 5.1.3. Strengthen community monitoring initiatives of deforestation and fires in native vegetation, and provide safety mechanisms for the actors involved.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.3.1. Support the Pantanal Research Network.	Amount (BRL) allocated per year	2027	MCTI	UFMG, UFMS, Cemaden, UFMT, and others

5.1.3.2. Training in fire prevention and combat.	Number of training events held	2027	ICMBio	Prevfogo / IBAMA
5.1.3.3. Train and equip communities to fight fires.	Number of communities trained	2027	ICMBio	IBAMA Prevfogo and the Pantanal Traditional Communities Network
5.1.3.4. Reforest the surroundings of communities with native species.	a) Number of seedlings produced and planted. b) Number of communities served.	2027	ICMBio	IBAMA Prevfogo and the Pantanal Traditional Communities Network
Action Line 5.1.4. Strengthen governance and institutional cooperation for monitoring, including through a joint communication protocol on deforestation and fire events, enabling risk identification (prevention) and a more coordinated and efficient response.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.4.1. Establish communication protocols between its own agents and contracted companies for carrying out construction and/or maintenance upon detection of deforestation and fire events.	Communication protocol established.	2026	DNIT	MMA
Action Line 5.1.5. Implement/develop air pollution monitoring, inventories, and State Plans for Air Emissions Control in the Pantanal biome states, as well as promote awareness campaigns against fires and burnings.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.5.1. Enforcement, through ostentatious patrols focused on vehicle emissions, on federal roads and areas of interest to the Federal Administration.	Number of inspections carried out per year.	2027	PRF	
Line of Action 5.1.6. Strengthen and integrate deforestation prevention and control actions provided for in the National Action Plans for the Conservation of Endangered Species (PAN) as a strategy for conserving endangered species.				
Goal	Indicator	Deadline	Key Actor	Partners
5.1.6.1. Integrate and implement at least 80% of the actions.	% of PAN actions implemented and integrated.	2027	ICMBio	MMA, IBAMA, Education and research institutions, NGOs, OEMAS, Society
Expected Result 5.2. Improved monitoring of production chains				
Action Line 5.2.1. Implement and improve systems for monitoring and controlling the environmental origin and traceability of wood, minerals, and agricultural products.				
Goal	Indicator	Deadline	Key Actor	Partners
5.2.1.1. Implement the wood traceability system	Wood traceability system implemented	2026	Ibama	SECD-MMA

Strategic Objective 6. Implement Integrated Fire Management to prevent and combat fires in native vegetation.				
Expected Result 6.1. Capacity for prevention, preparedness, and response to fires improved.				
Action Line 6.1.1. Implement and equip the Federal Brigades Program, aiming to reduce the number of fires in native vegetation in priority federal areas.				
Goal	Indicator	Deadline	Key Actor	Partners
6.1.1.1. Increase the number of brigade members hired in federal CUs	% increase in the number of brigade members hired per year.	2027	ICMBio	Prevfogo / IBAMA
6.1.1.2. Install and equip brigades for prevention and control of fires in the states comprising the biome.	Number of brigades installed per year.	2027	Ibama	MMA
Action Line 6.1.2. Implement the National Policy for Integrated Fire Management.				
Goal	Indicator	Deadline	Key Actor	Partners
6.1.2.1. Promote the participation of researchers from the Integrated Fire Management sub-network of the Pantanal Research Network.	Number of researchers involved	2027	MCTI	UFMG, UFMS, UFMT, and others.
6.1.2.2. Develop and implement Integrated Fire Management Plans for Federal Conservation Units.	100% of Federal Conservation Units with contracted brigades and a PMIF drawn up and approved.	2027	ICMBio	Several
6.1.2.3. Establish a specialization course in Integrated Fire Management at ACADEBio, with the aim of training specialists to act in the prevention and control of fires in native vegetation and in the implementation of the National Policy for Integrated Fire Management.	Number of staff members graduated from the Integrated Fire Management specialization	2027	ICMBio	MMA / Ibama
Action Line 6.1.3. Improve fire monitoring systems and their impact assessments.				
Goal	Indicator	Deadline	Key Actor	Partners
6.1.3.1. Support the Alert System Sub-network of the Pantanal Research Network.	Subnetwork supported	2027	MCTI	UFMG, Cemaden, UFMS, UFMT
Line of Action 6.1.4. Support awareness campaigns and training related to deforestation and fire prevention and control.				
Goal	Indicator	Deadline	Key Actor	Partners
6.1.4.1. Environmental education through lectures on deforestation and fire in the biome for users of federal highways and areas of interest of the Federal Administration.	Number of people trained/year	2027	PRF	IBAMA, ICMBio and other environmental law enforcement agencies.
Expected Result 6.2. Scientific, technical, and operational improvement for Integrated Fire Management actions.				
Line of Action 6.2.1. Encourage research and studies on the effects of fire to support decision-making.				
Goal	Indicator	Deadline	Key Actor	Partners

6.2.1.1 Support two sub-networks (Integrated Fire Management and fire effects) of the Pantanal Research Network	Number of supported sub-networks	2027	MCTI	UFMG, Cemaden, UFMS, UFMT, and others.
Strategic Objective 7. Improve systems and integrate data on deforestation authorizations, embargoes, and infraction notices issued by state and municipal authorities into federal systems.				
Expected Result 7.1. Authorizations for vegetation suppression, embargoes, and infraction notices integrated into federal systems.				
Action Line 7.1.1. Integrate the data on Vegetation Suppression Authorizations (ASV) and Alternative Land Use Authorizations (UAS) under the responsibility of federal, state and municipal agencies into the federal systems.				
Goal	Indicator	Deadline	Key Actor	Partners
7.1.1.1. Integrate the state bases into Sinaflor/Ibama.	Number of states with databases integrated into Sinaflor.	2026	Ibama	MMA
Line of Action 7.1.3. Improve and make available a platform to integrate data on environmental infractions and embargoes under the responsibility of federative entities into a federal system.				
Goal	Indicator	Deadline	Key Actor	Partners
7.1.3.1. Integrate state databases of infraction notices and forest embargoes into the federal database.	Number of states with integrated databases.	2027	MMA / Ibama	ICMBio
Strategic Objective 8. Strengthen federative coordination to promote actions to control deforestation and fires and implement the Native Vegetation Protection Law.				
Expected Result 8.1. State and municipal initiatives for deforestation and fires prevention and control aligned with federal plans for deforestation and fire prevention and control in the biomes.				
Action Line 8.1.1. Support the development and updating of State and Municipal Plans for Deforestation and Fire Prevention and Control (PPCDQs) and other strategic actions.				
Goal	Indicator	Deadline	Key Actor	Partners
8.1.1.1. Engage and support Pantanal states in the development of PPCDQs.	Number of states with PPCDQs developed.	2027	SECD-MMA	
Action Line 8.1.2. Promote coordination with state and municipal agencies involved in the prevention and response to fires for the implementation of Integrated Fire Management.				
Goal	Indicator	Deadline	Key Actor	Partners
8.1.2.1. Engage states and municipalities in participation in the Federal Ciman.	Number of states and municipalities participating in Ciman per year.	2027	Ibama	SECD-MMA
Expected Result 8.2. Sicar improved to support states in the implementation of the Native Vegetation Protection Law.				
Action Line 8.2.1. Improve the environmental regularization process through the analysis of properties in the CAR conducted by states, support for implementation of PRAs and other mechanisms under the Native Vegetation Protection Law.				

Goal	Indicator	Deadline	Key Actor	Partners
8.2.1.1. Solutions for promoting and monitoring the environmental regularization of rural properties made available.	Number of solutions made available.	2027	SFB and MGI	SECD / MMA
Axis III - Land and territorial planning				
Strategic Objective 9. Ensure the designation of public land parcels for protection, conservation, and sustainable use of natural resources, especially for Indigenous Peoples, quilombola communities, other traditional peoples and communities, and family farmers.				
Expected Result 9.1. Federal and state land parcels designated, land tenure databases with improved controls, and land tenure insecurity reduced.				
Action Line 9.1.1. Designate federal land parcels for protection, conservation, sustainable use of natural resources, recognition of territorial rights, and deforestation prevention and control.				
Goal	Indicator	Deadline	Key Actor	Partners
9.1.1.1. Recognize and protect the territories of artisanal fishers under the Artisanal Fishing Peoples Program established by Decree No. 11626, 2 August 2023.	Number of territories recognized and protected.	2027	MPA	MMA / MDA / INCRA
9.1.1.2. Implement the Terms of Authorization for Sustainable Use (TAUS). Established by Ordinance No. 89, 15 April 2010, and, where applicable, the Concession of Real Right of Use (CDRU), crucial for the protection of the territorial rights of traditional communities, including artisanal fishing	Number of TAUS and CDRUs implemented.	2027	MPA	MMA / MDA /
Line of Action 9.1.2. Encourage and strengthen the creation of interinstitutional bodies and programs for land conflict management.				
Goal	Indicator	Deadline	Key Actor	Partners
9.1.2.1. Establish free, prior, and informed consultation protocols, according to the principles established by ILO 169, for resolving land issues related to traditional communities, including fishing communities.	Number of protocols established per year.	2027	MPA	MMA / MDA / INCRA
Strategic Objective 10. Expand and strengthen the management of protected areas.				
Expected Result 10.1. Protected areas created, consolidated, and with strengthened management.				
Action Line 10.1.1. Create and consolidate Protected Areas focusing on critical deforestation areas.				
Goal	Indicator	Deadline	Key Actor	Partners
10.1.1.1. Create 200,000 hectares in conservation units.	a) Number of finalized processes submitted to the MMA. b) Area of Conservation Units created.	2027	ICMBio	MMA, OEMAS, GEF
10.1.1.2. 100% of conservation units with established and active advisory/deliberative councils.	Number/proportion of Conservation Units with advisory/deliberative councils established and active	2027	ICMBio	Civil society, community representatives.

10.1.1.3. Four instruments for rights compatibility developed or made permanent in overlapping or dual-affectation areas between federal conservation units and territories of traditional peoples and communities.	Number of rights compatibility instruments developed or made permanent, or with negotiations or development initiated.	2027	ICMBio	Civil society, community representatives, research institutions.
10.1.1.4. Create a Sustainable Development Reserve (RDS) in the Community of Barra do São Lourenço, according to administrative proceeding No. 02013.000343/2009-05.	Creation of an RDS	2027	ICMBIO	MMA
Action Line 10.1.2. Strengthen, recognize, and implement territorial governance and management instruments for protected area connectivity, such as mosaics, ecological corridors, biosphere reserves, Ramsar sites, RPPNs, restoration plans, and others.				
Goal	Indicator	Deadline	Key Actor	Partners
10.1.2.1. Recognize a mosaic of protected areas	Mosaic of protected areas recognized	2026	ICMBIO	MMA, REMAP, OEMAs, MIR, FUNAI, MPI
Action Line 10.1.3. Strengthen and integrate habitat connectivity actions provided in the National Action Plans for the Conservation of Endangered Species (PAN) as a strategy for species conservation.				
Goal	Indicator	Deadline	Key Actor	Partners
10.1.3.1. Integrate and implement 80% of actions.	% of PAN actions implemented and integrated.	2027	ICMBio	MMA, IBAMA, Education and research institutions, NGOs, OEMAS, Civil Society
Expected Result 10.2. Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities identified, delimited, demarcated, approved, regularized, and with improved management.				
Action Line 10.2.1. Identify, delimit, demarcate, approve, and regularize Indigenous Lands and Quilombola Territories to ensure recognition of their territories.				
Goal	Indicator	Deadline	Key Actor	Partners
10.2.1.1. Develop a normative instrument to regulate the identification, recognition, and regularization of the territories of traditional peoples and communities.	Normative instrument developed.	2027	MDA	SNPCT - MMA / GSIPR / MME
Action Line 10.2.2. Develop and implement territorial and environmental management plans for Indigenous Lands, Quilombola Territories, and territories of traditional peoples and communities, with technological and economic support and technical assistance for carrying out sustainable activities.				
Goal	Indicator	Deadline	Key Actor	Partners
10.2.2.1. Develop the National Sustainable Development Plan for Traditional Peoples and Communities.	a) Number of phases completed for Plan development. b) Plan published. c) Plan under implementation.	2027	SNPCT - MMA	CNPCT
10.2.2.2. Promote the development of 100 territorial and environmental management plans for Indigenous Lands, Quilombola Territories, and territories of traditional peoples and communities in accordance with the Indigenous and Quilombola Territorial and Environmental Management Policy.	Number of territorial management plans developed per year.	2027	MDA	MGI,RFB

Strategic Objective 11. Coordinate and/or align the planning of major projects and infrastructure developments in the region with the goal of achieving zero deforestation by 2030.				
Expected Result 11.1. Planning and decision-making processes for the implementation of large-scale developments and infrastructure and development projects improved and aligned with Brazil's environmental and development goals.				
Action Line 11.1.1. Regulate, develop, and implement instruments (Technical, Economic, and Environmental Feasibility Studies - EVTEA, Strategic Environmental Assessment - AEE, etc.) to, preventively, contribute to environmental and territorial governance for deforestation control; promote restoration of deforested areas; prevent or mitigate impacts and ensure the rights of affected populations; and promote mitigation of GHG emissions resulting from land use change in the area of influence of large-scale developments and infrastructure and regional development projects.				
Goal	Indicator	Deadline	Key Actor	Partners
11.1.1.1. Identify infrastructure projects with a significant impact on deforestation and GHG emissions in the Pantanal.	Number of identified projects.	2027	MMA	MMA / MPO / MF / MGI, RFBSP / CCPR / MME / MT / MPor / Mapa
11.1.1.2. Set up an inter-institutional working group to present a proposal for regulating, developing, and implementing environmental and territorial governance instruments for major infrastructure and development projects in the Pantanal.	Working group established.	2026	MMA	MMA / MPO / MF / MGI, RFBSP / CCPR / MME / MT
11.1.1.3. Reduce deforestation and GHG emissions resulting from land use change in the area of influence of large infrastructure and development projects.	Number of actions carried out in areas of influence of large projects.	2027	SECD, Ibama, ICMBio -MMA	MME, MT and MF, OEMAs
11.1.1.4. Align National Sectoral Plans with national deforestation reduction targets.	% of National Sectoral Plans aligned.	2027	MT	Office of the Chief of Staff-PR, MF, MMA / SECD, Ibama and ICMBio
11.1.1.5. Increase the recovery of degraded areas in the area of influence of large infrastructure and development projects.	Number of hectares of degraded areas recovered per year.	2027	SECD and Ibama - MMA	MME, MT, MF, MT, MME, ANTT, ANM, MDIC, MIDR, DNIT and INFRA S.A and OEMAs
11.1.1.6. Propose and implement integrated planning instruments for large infrastructure and development projects.	Number of projects with integrated planning instruments.	2027	SECD and Ibama - MMA	MME, MT, MF, MT, MME, ANTT, ANM, MDIC.MIDR, DNIT and INFRA S.A and OEMAs
11.1.1.7. Propose and implement actions to reduce the socio-environmental impact of developments in traditional community territories.	Number of projects with proposed and implemented actions per year.	2027	Ibama - MMA	MME, MT, MF, MT, MME, ANTT, ANM, MDIC.MIDR, DNIT and INFRA S.A and OEMAs

Strategic Objective 12. Conduct territorial planning and implement existing legal instruments to ensure the role of native vegetation in maintaining and restoring water regimes and water quality.				
Expected Result 12.1. Instruments provided in the Native Vegetation Protection Law (Law No. 12651/2012) implemented.				
Action Line 12.1.1. Develop a proposal for priority areas for Legal Reserve compensation, focusing on spring restoration, aquifer recharge zones, wetlands, creation of ecological corridors, and conservation or restoration of vegetation, soil, ecosystems, and endangered species.				
Goal	Indicator	Deadline	Key Actor	Partners
12.1.1.1. Establish criteria for defining priority areas for restoration (under PROVEG), to be compiled and agreed upon in a prioritization protocol that can be replicated or adapted at the state and municipal level, considering the specificities of each land use typology.	Prioritization protocol for restoration areas developed	2025	MMA	MPI / FUNAI, INCRA, ICMBio, Biomatic Networks and Collectives, IIS and PLANAFLOR
1.2.1.1.2. Define priority areas for Legal Reserve compensation, including criteria and restrictions for CRA allocation, and pre-approval criteria for compensation and/or restoration projects in priority areas (regulation of Art. 66.7, Law No. 12651 / 2012).	Number of maps of priority areas for restoration developed.	2027	SBio - MMA	States
Expected Result 12.2. Water management instruments integrated with native vegetation conservation policy				
Line of Action 12.2.1. Include criteria for the conservation of native vegetation at the property and micro-basin level in the evaluation process for granting irrigation licenses.				
Goal	Indicator	Deadline	Key Actor	Partners
12.2.1.1. Establish environmental criteria to be observed in the licensing processes of Sisnama agencies for enterprises in the Upper Paraguay River Basin and other areas of influence for the Pantanal biome, pursuant to Art. 4.III and VI of Federal Law No. 6938/81.	Conama Resolution with environmental criteria published	2026	SQA-MMA	Ibama
12.2.1.2. Reactivate the Monitoring Group for the implementation and revision of the Water Resources Plan for the Paraguay River Hydrographic Region (GAP), in a representative and participatory manner.	Decree reactivating the Monitoring Group of the Water Resources Plan for the Paraguay River Hydrographic Region issued and published	2026	MMA	ANA
Axis IV - Regulatory and economic instruments				
Strategic Objective 13. Create, improve, and implement regulatory and economic instruments for controlling deforestation and fires, and conserving biodiversity.				
Expected Result 13.1. Incentive instruments for mitigation and adaptation activities implemented.				
Action Line 13.1.1. Implement initiatives for building a green and sustainable taxonomy.				
Goal	Indicator	Deadline	Key Actor	Partners
13.1.1.1. Develop a proposal for a Sustainable Green Taxonomy in partnership with government stakeholders, covering activities that integrate the climate change mitigation and adaptation strategy, to guide public and private activities.	Taxonomy proposal developed and approved.	2027	MF / BCB	MDIC / MGI, RFB / MPOR / MMA

Expected Result 13.2. Tax incentives, subsidies, and financing for productive activities and sustainable biodiversity businesses created and implemented				
Action Line 13.2.1. Propose standards and promote tax incentives for the bioeconomy and subsidies for sociobioeconomy products from sustainable and biodiverse production systems, sustainable extractivism, and agroforestry systems, especially from indigenous lands, territories of traditional peoples and communities, and family farming.				
Goal	Indicator	Deadline	Key Actor	Partners
13.2.1.1. Execute the transfer of credit benefits to beneficiaries from Quilombola, Indigenous, and traditional peoples and communities.	Number of beneficiaries served per year.	2027	MDA	MPI / SNPCT - MMA
13.2.1.2. Present a draft regulatory instrument to promote tax incentives for the bioeconomy and subsidies for sociobioeconomy products.	Draft regulatory instrument presented.	2026	SBio -MMA	MPI, MDA / MAPA
Expected Result 13.3. Rural credit improved.				
Action Line 13.3.1. Expand financing for pasture and degraded area restoration in critical deforestation areas, considering public and private sources.				
Goal	Indicator	Deadline	Key Actor	Partners
13.3.1.1. Provide financial support to pasture and degraded area recovery projects.	Number of beneficiaries supported per year.	2027	SBio - MMA / Mapa	MF / MDA
Expected Result 13.4. ENREDD+ aligned with current climate change mitigation challenges through forest policies.				
Action Line 13.4.1. Revise and implement the National REDD+ Strategy (ENREDD+).				
Goal	Indicator	Deadline	Key Actor	Partners
13.4.1.1. Revise and implement the National REDD+ Strategy (ENREDD+).	Number of states eligible for REDD+ resource mobilization.	2027	SECD-MMA	
Expected Result 13.5. Environmental compensation instruments implemented				
Action Line 13.5.1. Review the decree regulating the Environmental Reserve Quota to guarantee the environmental integrity of the instrument.				
Goal	Indicator	Deadline	Key Actor	Partners
13.5.1.1. Review regulation of operational Environmental Reserve Quota.	Decree revised.	2026	MMA	State Departments of the Environment / Private Sector
Expected Result 13.6. Technical assistance, sustainable use in federal conservation units, and community and family forest management strengthened.				
Action Line 13.6.1. Regulate existing normative instruments to encourage the sustainable use of resources in conservation units, considering aspects related to technical assistance, community forest management, the National Climate Change Policy, and ENREDD+.				
Goal	Indicator	Deadline	Key Actor	Partners

13.6.1.1. Develop and implement regulatory standards that encourage the sustainable use of natural resources in conservation units, especially in areas where traditional communities operate, integrating the principles of the National Climate Change Policy and ENREDD+.	a) Number of developed and innovative regulatory standards focused on the sustainable use of natural resources in conservation units. b) Number of traditional communities trained in community forest management practices and climate change mitigation policies.	2027	ICMBio	FUNAI, INCRA, MMA, CNPCT, NGOs
Expected Result 13.7. Bills, or other legal acts relevant to the prevention and control of deforestation and fires presented.				
Action Line 13.7.1. Improve infra-legal regulation related to Integrated Fire Management.				
Goal	Indicator	Deadline	Key Actor	Partners
13.7.1.1. Establish and improve norms, resolutions, and other infra-legal acts on Integrated Fire Management.	Number of legal acts established or improved.	2027	MMA	CCPR
13.7.1.2. Present a proposal for regulatory change with adjustments to the environmental parameters of the Rural Environmental Registry, to expand control, monitoring, and combat of deforestation and fires.	Regulatory proposal submitted.	2026	MMA	MGI
Action Line 13.7.2. Revise provisions of the Environmental Crimes Law, the Native Vegetation Protection Law, and Decree No. 6514/2008 to increase penalties related to environmental crimes against flora, including fires.				
Goal	Indicator	Deadline	Key Actor	Partners
13.7.2.1. Propose legal and infra-legal changes to increase penalties and sanctions related to environmental crimes and infractions against flora, including fires.	Number of proposals submitted.	2027	MMA	CCPR / Ibama / ICMBio
Expected Result 13.8. Law No. 14119/2021 regulated and new economic instruments and mechanisms for Payment for Environmental Services (PES) created or revised.				
Action Line 13.8.1. Implement the Bolsa Verde Program (Environmental Conservation Support Program) as a mechanism to encourage sustainable use and support local socio-economic development projects, with an emphasis on the collective management of territories and their traditional systems in protected areas.				
Goal	Indicator	Deadline	Key Actor	Partners
13.8.1.1. Promote sustainable fishing and the inclusion of artisanal fishers in social and economic support programs, such as Bolsa Verde and Pronaf.	Number of people assisted per year.	2027	MPA	MMA.MDA
Action Line 13.8.2. Implement incentives for sustainable activities and penalties for predatory practices aimed at conserving native vegetation and water resources, including for sustainable irrigation, such as those already developed in other contexts, like the Water Producer Program, supported by MIDR and implemented by the National Water and Basic Sanitation Agency.				
Goal	Indicator	Deadline	Key Actor	Partners

13.8.2.1. Regulate the Federal PES Program for priority assistance to family farming, indigenous peoples and traditional peoples and communities	Regulation approved.	2026	MMA	MPI / FUNAI /
Expected Result 13.9. Brazilian Emissions Reduction Market (MBRE) regulated.				
Action Line 13.9.1. Regulate the carbon market in Brazil, defining rules and operational standards, considering the specificities of the biome.				
Goal	Indicator	Deadline	Key Actor	Partners
13.9.1.1. Propose a normative instrument with a view to regulating the Brazilian emissions reduction market.	Regulatory instrument proposed.	2027	SMC-MMA / MF	MDIC / MCTI / CCPR / MME
Expected Result 13.10. Land regularization of Quilombola Territories and territories of traditional peoples and communities strengthened.				
Action Line 13.10.1. Improve the regulatory process for regularizing Quilombola territories and those of traditional peoples and communities.				
Goal	Indicator	Deadline	Key Actor	Partners
13.10.1.1. Draw up a normative instrument to regulate the identification, recognition, and regularization of territories collectively occupied and used by traditional peoples and communities.	Regulatory instrument developed and approved.	2027	"MDA / SNPCT - MMA"	MGI, RFB / GSIPR / MME
Expected Result 13.11. Regulatory standardization for issuing and integrating permits for suppression and alternative land use.				
Action Line 13.11.1. Establish a normative instrument to standardize the criteria for issuing and integrating data from Vegetation Suppression Authorizations (ASVs) and Alternative Land Use Authorizations (UASs) issued by federal, state and municipal agencies into Sinaflor (MMA), and define criteria for publicizing the information.				
Goal	Indicator	Deadline	Key Actor	Partners
13.11.1.1. Establish a CONAMA Resolution on minimum criteria for issuing ASVs and UASs.	CONAMA Resolution published.	2026	MMA	States / Ibama

Serra do Amolar, norte de Corumbá/MS . Photo: Ale Bertassoni

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