



Space Intelligence
enquiries@space-intelligence.com
www.space-intelligence.com

ECOREGION REPORT

Pantanal

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Authors and Contributors

Professor Ed Mitchard, Chief Scientist & Co-founder, (ed@space-intelligence.com)
Jocelyne Wardley, Ecologist (jocelyne@space-intelligence.com)

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The Pantanal: Brazil's floodplains

The Pantanal is the world's largest perennial floodplains.¹ Spanning an estimated **15 million hectares**, this biome lies primarily in Mato Grosso do Sul, and extends into Bolivia, and Paraguay.

The Pantanal is closely linked to the Upper Paraguay River Basin, where the dominant vegetation is **Cerrado**. As a result, ecological changes in the Cerrado have direct hydrological impacts downstream. The region receives an estimated **180 million litres** of water daily from major rivers such as the Cuiabá, São Lourenço, Aquidauana. During the rainy season these rivers inundate up to 80% of the biome. This seasonal flooding transforms the landscape into an expansive wetland, with elevated patches of land, often rich in vegetation, which provide critical refuges for wildlife.²

Biome type:

Tropical wetland and flooded savanna

Dominant vegetation:

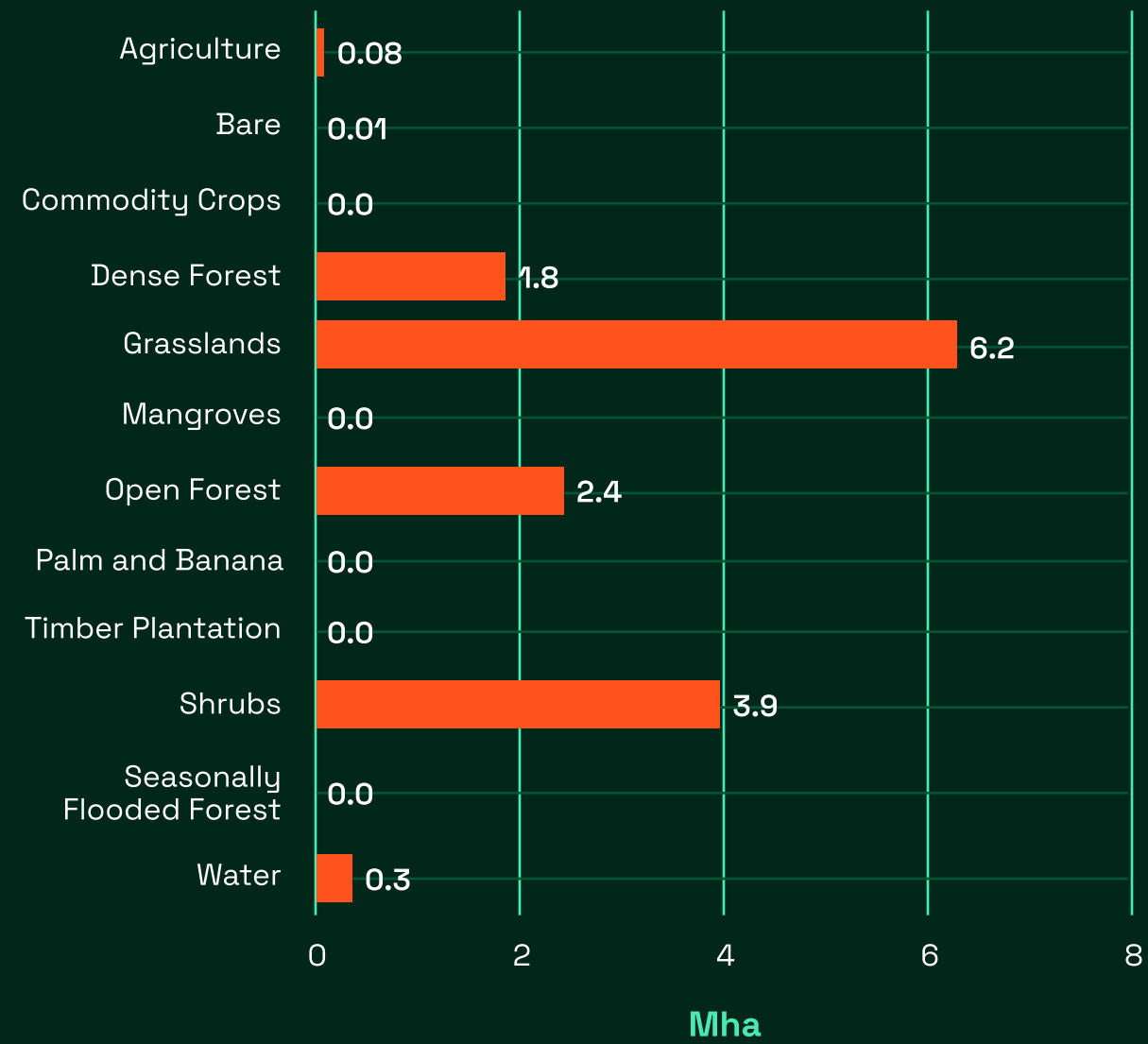
Flooded grasslands, riparian forests, open and dense forests

Geographic range:

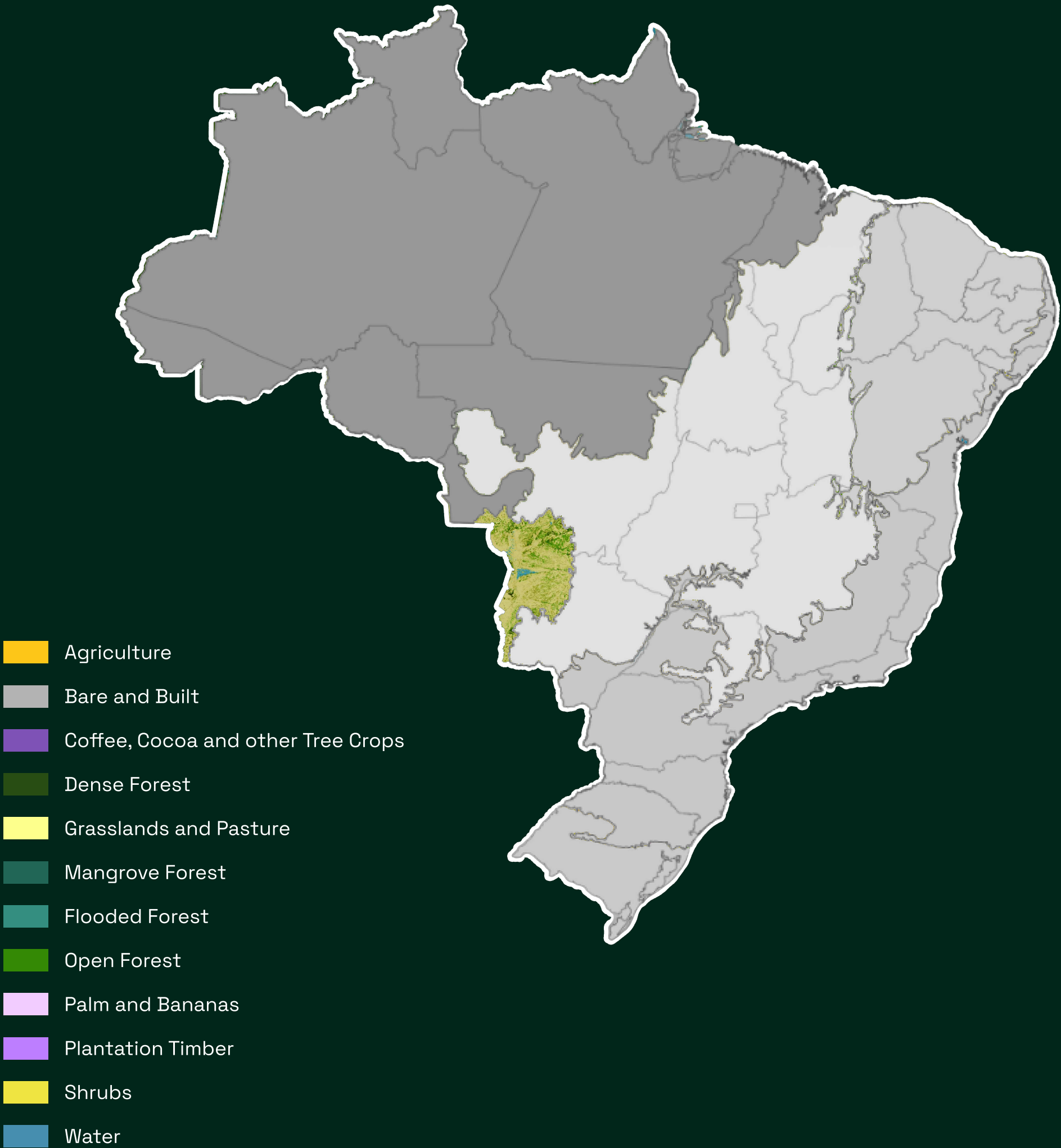
Brazil, Bolivia, Paraguay

Land cover distribution in the Pantanal, 2024 (Mha)

Source: Space Intelligence Land Cover Data



Pantanal



Source: Space Intelligence Land Cover Brazil Data, 2024

NATURAL PROFILE

A look at nature

The region supports dense populations of aquatic birds, reptiles, amphibians, and fish, many of which rely on the Pantanal's seasonal rhythms.

One of the highest densities of

Jaguars

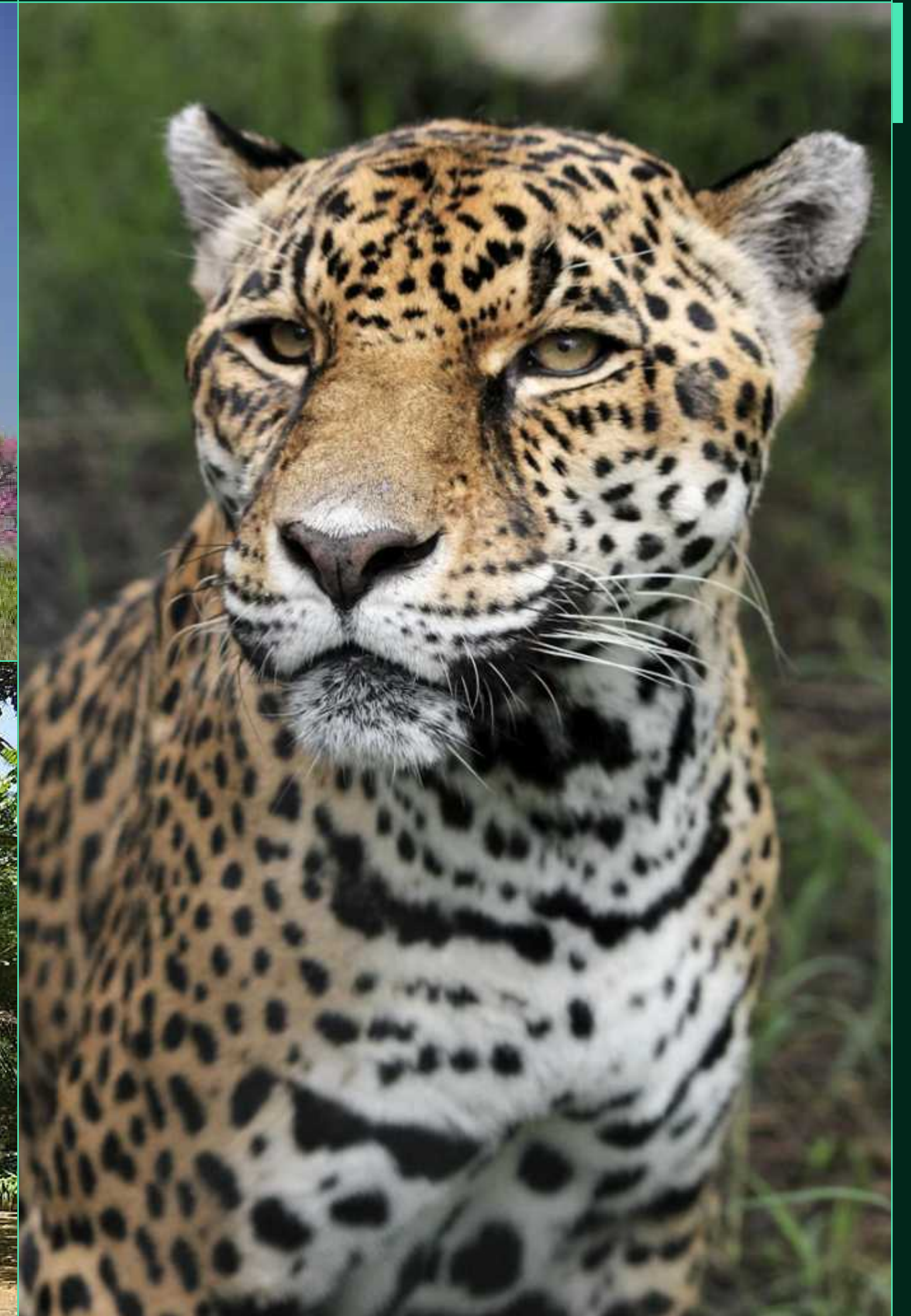
(*Panthera onca*) in the world³

The Acuri palm

Attalea phalerata provides shelter and food for birds and mammals, and is used by local communities for crafts and nutrition⁴

The pink ipê tree

is known for its beauty, medicinal bark, and cultural importance during spring flowering⁵

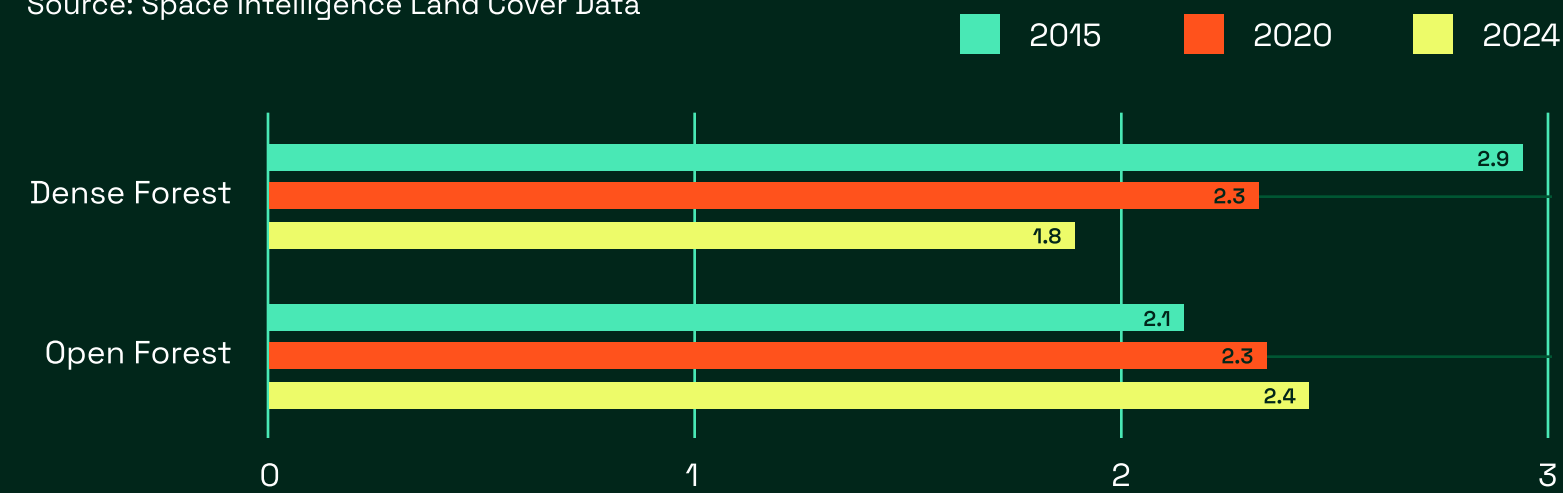


Land use changes in Pantanal, 2015-2024

The Pantanal’s vegetation is shaped by alternating periods of flooding and drought. The total forest area covers **4.7 Mha** or **31%** of biome area in 2024. Dense forest has been gradually declining from 2015 to 2024, changing to open forest, largely due to fires.⁶

Forest cover change in the Pantanal across 2015, 2020 and 2024 (Mha)

Source: Space Intelligence Land Cover Data



- Grassland to shrubland in degraded zones
- Floodplain clearing for cattle and crop expansion

Total ecoregion area:

15.1 Mha

Dense forest (2024):

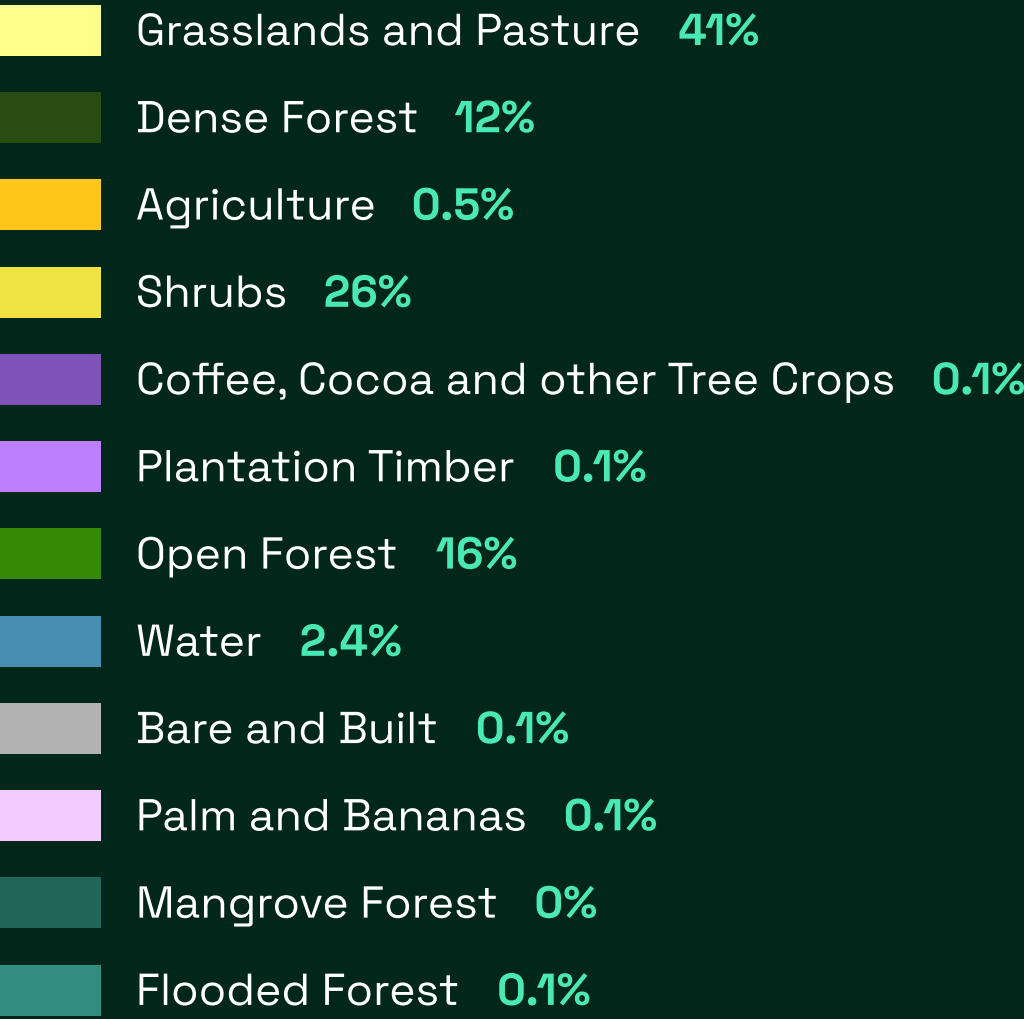
1.8 Mha

Total forest area (2024):

4.7 Mha

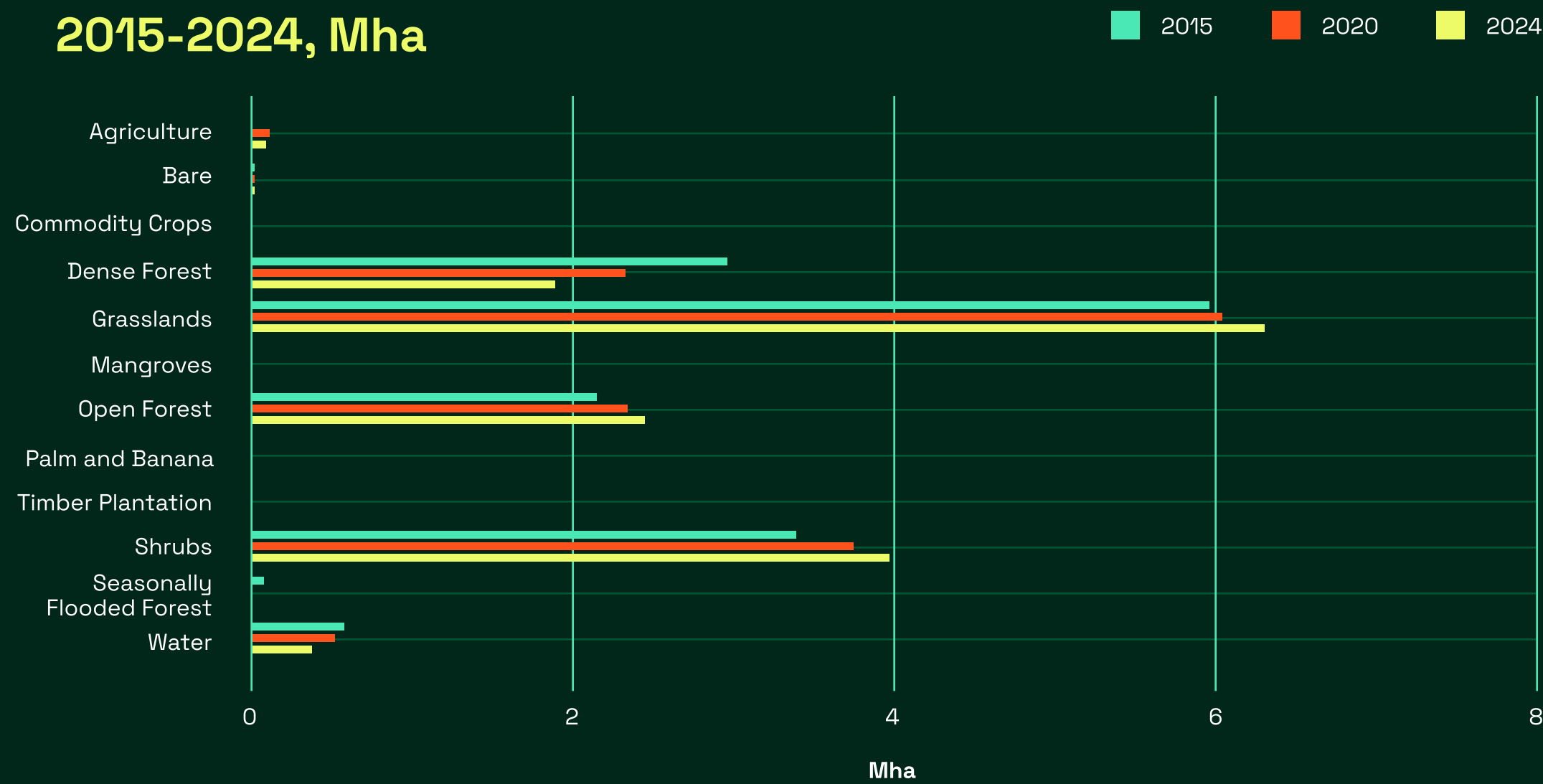
Open forest (2024):

2.4 Mha



Source: Space Intelligence Land Cover Brazil Data, 2024

Change in land use in the Pantanal, 2015-2024, Mha

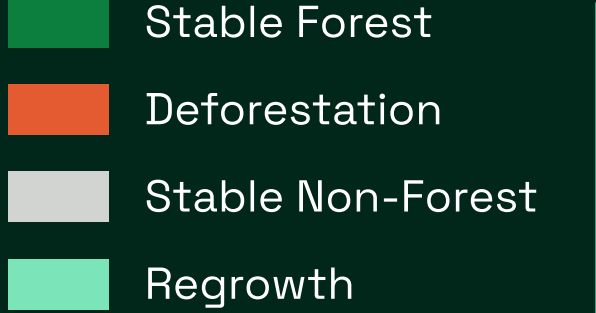
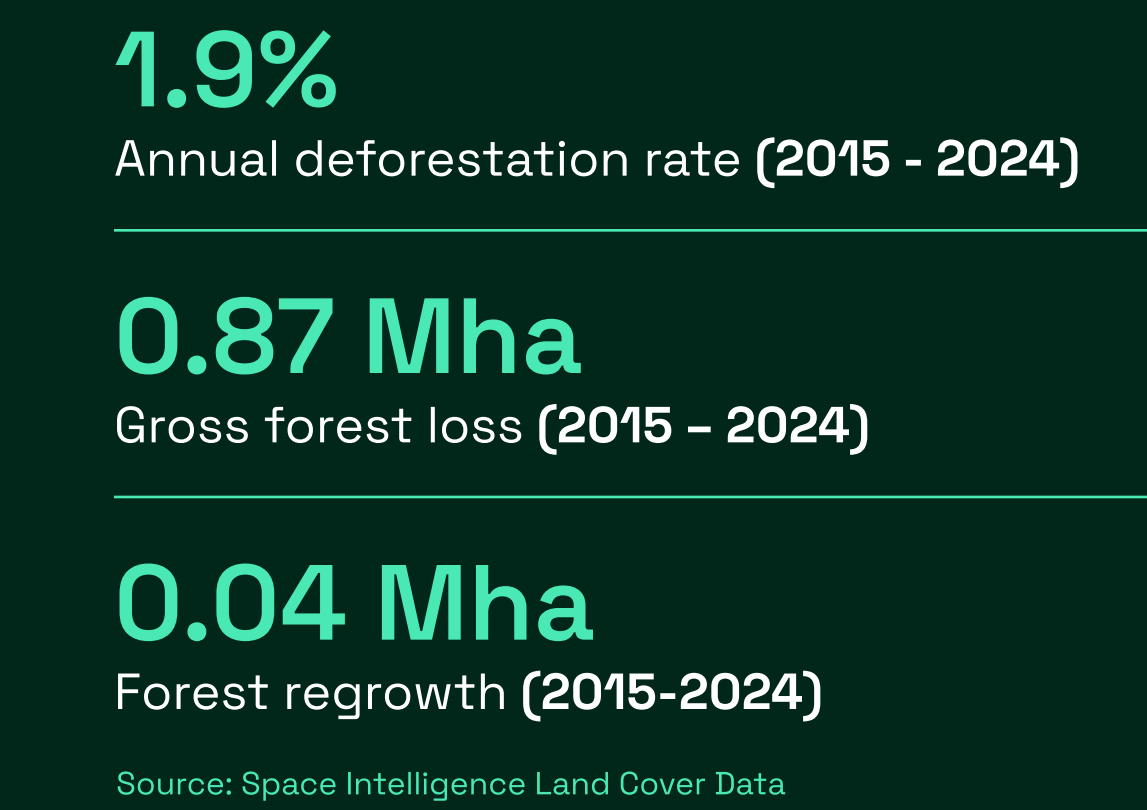
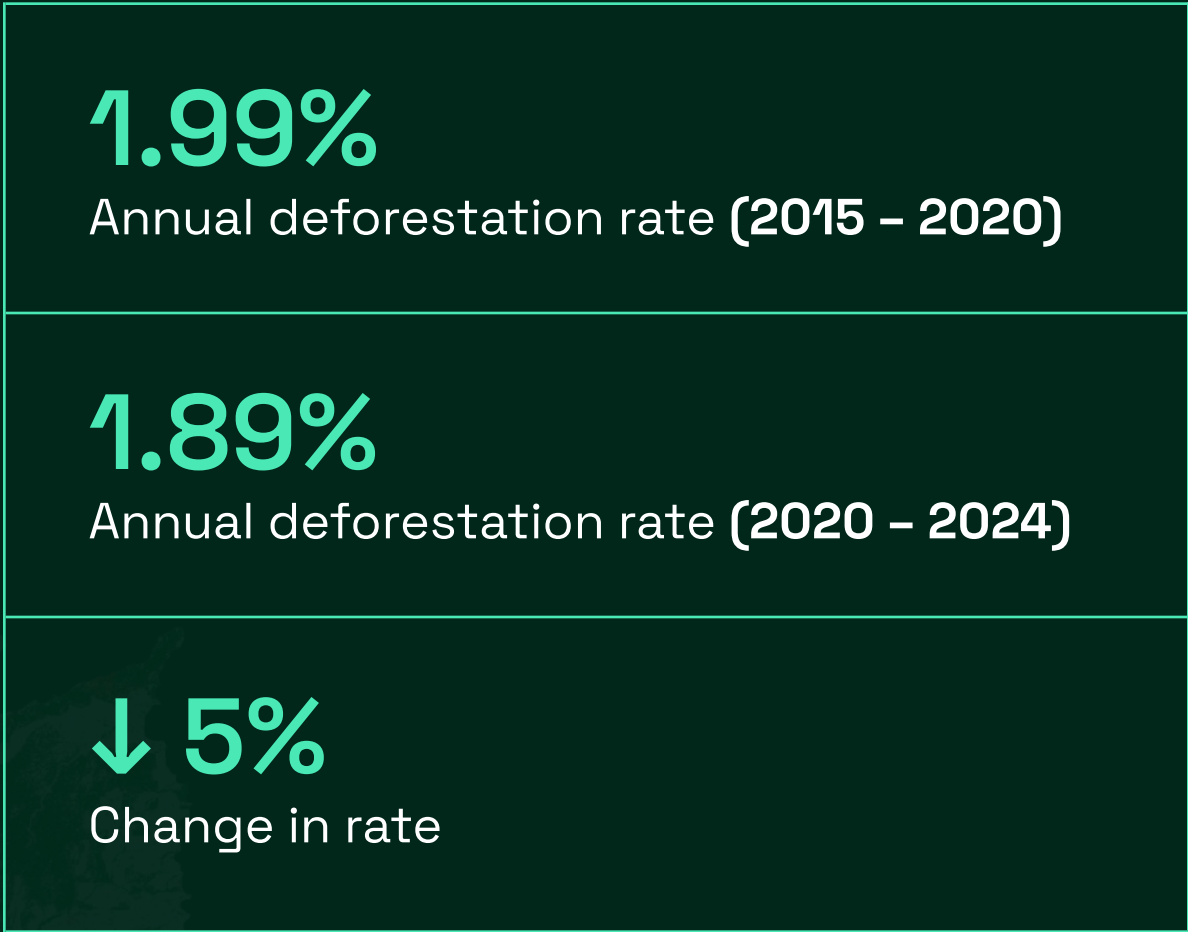


Deforestation and regrowth

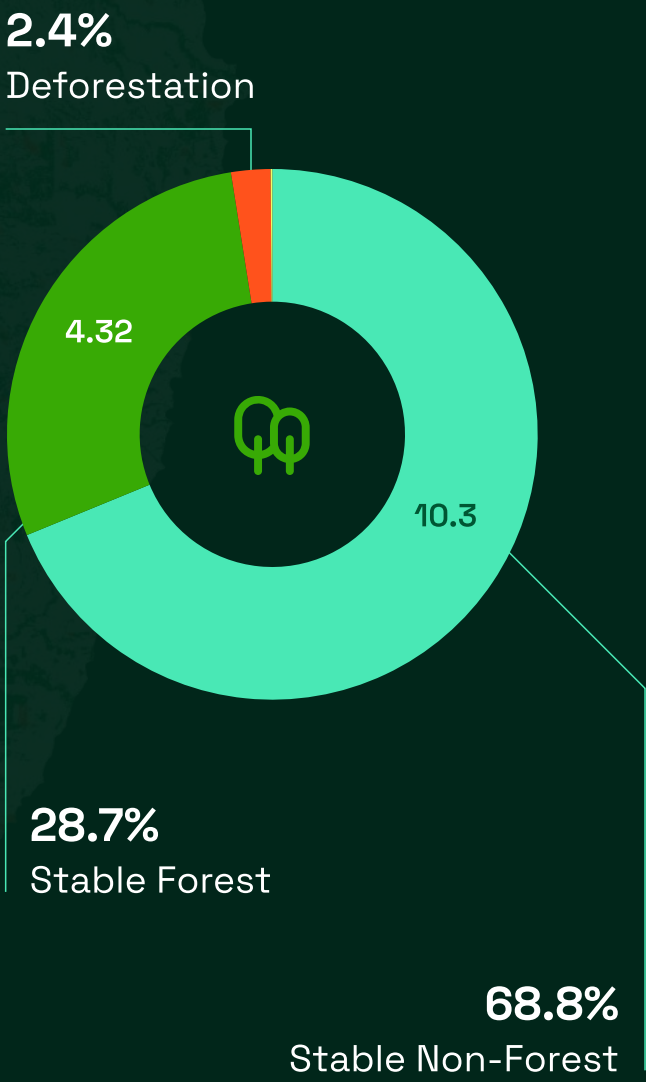
The Pantanal now has the highest deforestation rate in Brazil. While deforestation rates have slightly declined in recent years (from **1.99%** in 2020 to **1.89%** in 2024), they remain extremely high relative to other Brazilian biomes. The extent of this degradation is even seen on the change map on the right - despite the high resolution of 10m, the red patches indicating deforestation are clearly visible.

As mentioned, fires are the main cause of this degradation. Fire is not a natural part of this ecosystem, and the vegetation (unlike that of the neighbouring Cerrado) is not fire adapted. This means the fires cause serious damage to the biodiversity and carbon storage of this ecosystem.

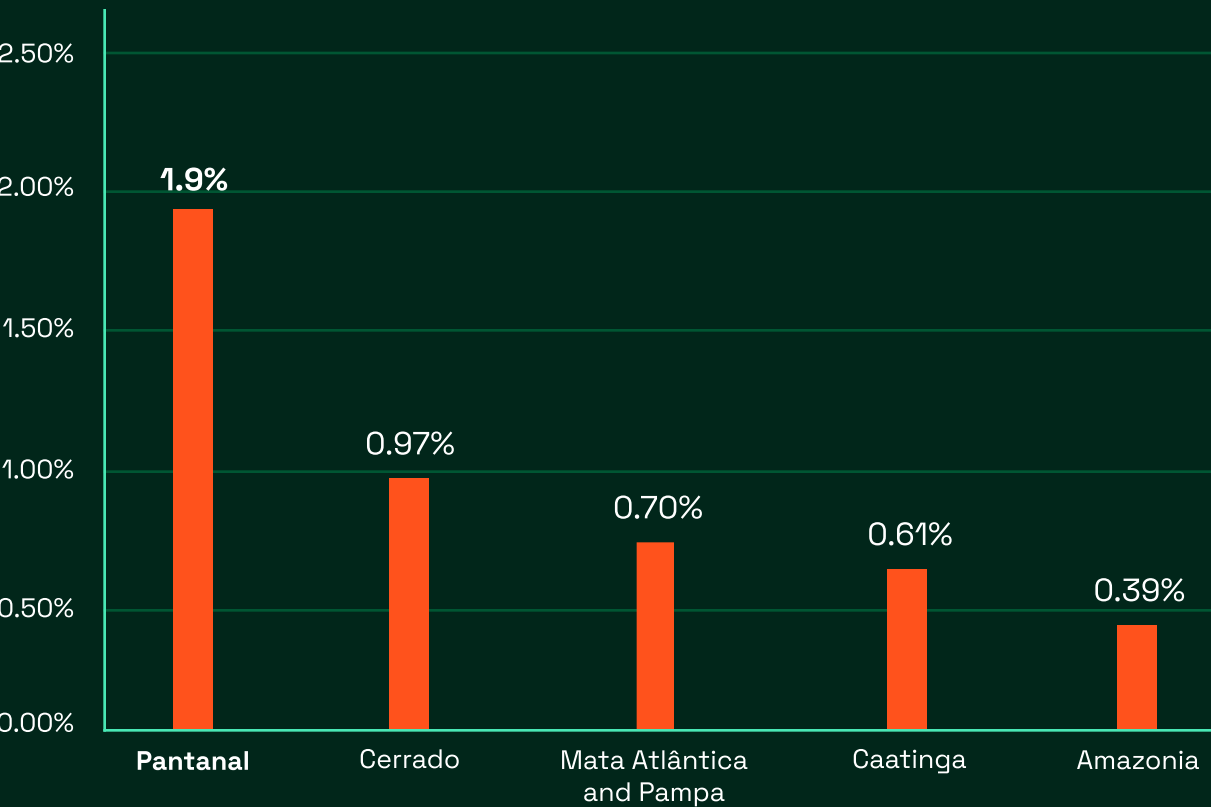
The region continues to lose **265 hectares** of forest per day, which is approximately **147 trees/min.**



Change classes distribution, 2020-2024
Source: Space Intelligence Land Cover Data



Annual deforestation rates (2015 - 2024) across biomes
Source: Space Intelligence Land Cover Data



Source: Space Intelligence Change Map over the Pantanal, 2020-2024

Opportunity for protection

The Pantanal is a wetland - an ecosystem that should not burn, and yet it has suffered increasingly frequent and intense burns in recent years, driven by habitat loss, encroachment, and climate change. Conservation, restoration, and fire prevention are what needs to happen to preserve this unique landscape.

We estimated the carbon storage of existing and restored forest areas using a combination of forest carbon plots and carbon stock maps over the region. For REDD+ the emissions reductions potential were based on what carbon would be saved if deforestation stopped, based on the average deforestation rate for the past **10 years**.

For ARR, we estimated the maximum land available for restoration, made assumptions about maximum nursery capacity, and used growth rates from existing restoration projects in Brazil, to estimate an upper limit of ARR capacity.

According to our calculations, there are over **4.66 million hectares** of forest available for protection under REDD+ under various standards or approaches and over **790 thousand hectares** available for ARR. Note in both cases an enormous amount of capital and joint effort from companies, NGOs and government would be required to achieve reductions/removals on these levels.

Regrowth within in the Pantanal, particularly riparian forests, tends to be impressively fast when recovering from flooding or fires.⁷

Estimated annual sequestration potential:

15,822,000 tCO₂
REDD+

738,000 tCO₂
ARR

Average sequestration rate
(over 20 years for ARR):

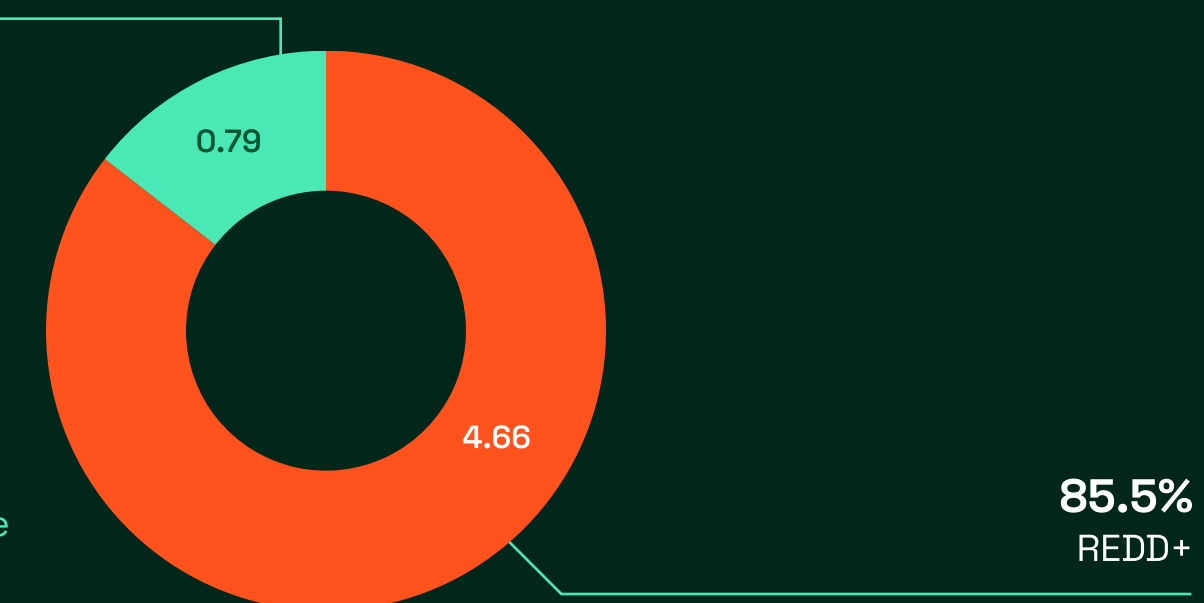
ARR: 5-10 tCO₂e/ha/yr

Areas available for ARR and REDD+ in the Pantanal (Mha)

Source: Space Intelligence Land Cover Data

14.5%
ARR

Source: Space Intelligence
Land Cover Data.



Summary Snapshot

0.04 Mha

Forest Gain (2015-2024)

0.87 Mha

Forest Loss (2015-2024)

265 ha/day

Daily Deforestation
(2023 - 2024)

Pantanal’s Carbon Potential

0.79 Mha

Eligible Area for ARR

15,822,000 tCO₂e

Annual Carbon Potential for ARR

4.66 Mha

Eligible area for REDD+

738,000 tCO₂e

Annual Carbon Potential for REDD+

1.9%

Annual Deforestation Rate
(2015-2024)

References

¹ <https://www.wwf.org.br/?50183/Infographics-show-the-importance-of-the-Pantanal-and-the-main-threats-faced-by-the-biome>

² *ibid.*

³ Eriksson, C.E., Kanteke, D.L., Miyazaki, S.S., Morato, R.G., dos Santos-Filho, M., Ruprecht, J.S., Peres, C.A. and Levi, T., 2022. Extensive aquatic subsidies lead to territorial breakdown and high density of an apex predator.

⁴ https://plantiary.com/plant/attalea-phalerata_19150.html

⁵ https://growbilliontrees.com/blogs/tree-stories/pink-trumpet-tree-tree-the-stunning-showstopper-of-spring-blooms-you-need-to-know-about?srsId=AfmBOoo2uLdPUZzIHr3YmyhAre6wJOIf8JUBnB_WUI2FMplcHU5wny64

⁶ Guerra, A., de Oliveira Roque, F., Garcia, L.C., Ochoa-Quintero, J.M., de Oliveira, P.T.S., Guariento, R.D. and Rosa, I.M., 2020. Drivers and projections of vegetation loss in the Pantanal and surrounding ecosystems. *Land Use Policy*, 91, p.104388.

⁷ de Oliveira, M.T., Damasceno-Junior, G.A., Pott, A., Paranhos Filho, A.C., Suarez, Y.R. and Parolin, P., 2014. Regeneration of riparian forests of the Brazilian Pantanal under flood and fire influence. *Forest Ecology and Management*, 331, pp.256-263.

Authors and contributors



Prof. Ed Mitchard
Co-founder & Chief Scientist

Professor Ed Mitchard has spent ~20 years using satellite data to map the changing carbon stocks of the world’s forests and peatlands. As a professor at Edinburgh University, he published over 100 scientific papers and measured >15,000 trees across 13 countries. He has been deeply involved in the evolution of carbon standards, including Verra’s VCS and the Plan Vivo Standard.



Jocelyne Wardley
Ecologist

Jocelyne Wardley is a tropical ecologist with over four years of experience in ecology and conservation. For the past two years, Jocelyne has worked for Space Intelligence, helping to create various maps across the tropics, including being the lead ecologist on the Brazil mapping. Before this, he has worked for the likes of World Agroforestry, Lions Guardians, and Ol Pejeta Conservancy.

About Space Intelligence

Space Intelligence is a NatureTech company enabling zero deforestation and mass restoration of biodiverse forests globally by providing the highest quality nature mapping data.

We combine our extensive expertise in remote sensing, data analytics, and forest ecology to provide highly accurate and comprehensive baseline reporting and dMRV solutions for forest carbon project developers and investors.

Our approach is rooted in science, with our co-founders leveraging over 30 combined years of academic and on-the-ground research to develop our products, which are used and trusted by some of the largest nature-based market participants, including Everland, Forest Carbon, Wildlife Conservation Society, and Verra.

Contributors

- Will Briggs, Senior Data Scientist
- Dr Aneesh Naik, Data Scientist
- Rachel Noach, Data Analyst
- Kinjal Desai, Data Scientist
- Dr Magdalena Navarro Torres Arpi, Senior Mapping Scientist
- Anna Fumagalli, Senior Mapping Scientist
- Dr Christopher Andrews, Senior Ecologist
- Anna Chirumbolo, Ecologist
- Jip Vader, Mapping Quality Expert
- Klara Winther, Mapping Quality Expert
- Snezhanna Markova, Content Marketing Lead

Invest and Offset with Confidence - Backed by Audit-Grade Data

Our geospatial, ecology, and carbon standards expertise underpin our suite of tools and services for carbon project developers and portfolio builders.

With pre-processed data available across Brazil, we have the data, expertise, and agility to help you originate, due diligence, or monitor NbS projects to support Brazil’s carbon capture and storage potential.

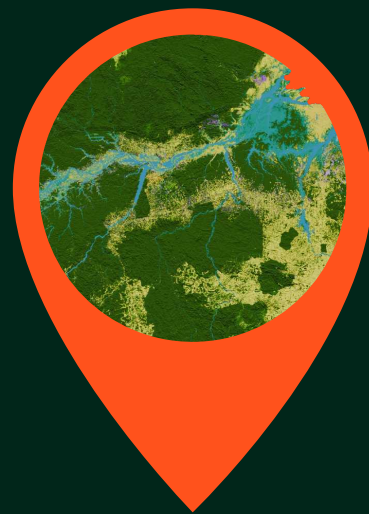
Project Verification



Maximise credit integrity with our support in baseline creation + MRV across avoidance and removals projects, including VM0047 dynamic baseline creation.

Download our sample report (VM0047 baseline) →

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Quickly find eligible areas for your ARR or REDD+ projects

Enquire about the Beta program →

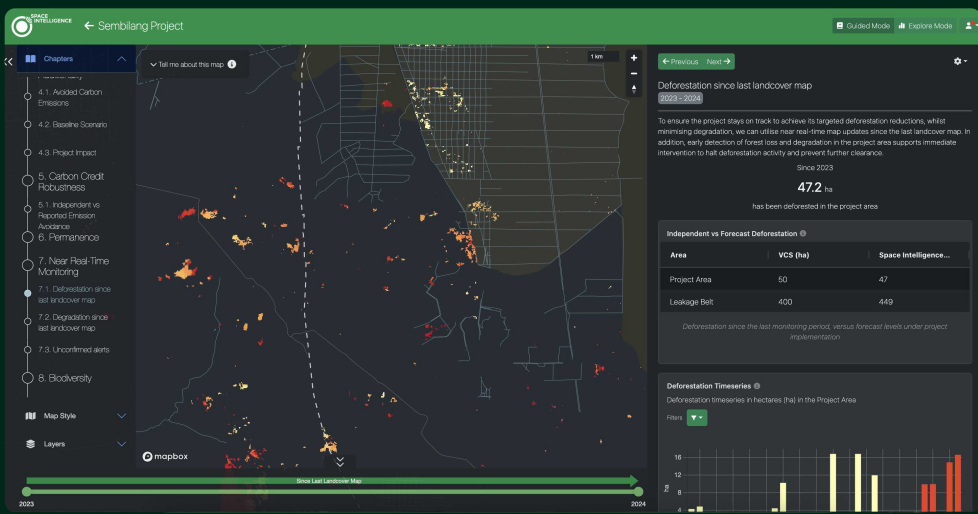
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Assess your project’s carbon potential from the outset under VM0048 methodology

Download the sample report →

Project Monitoring



See project impact and monitor small scale canopy loss in near-real time

Take the tour →