



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

ECOREGION REPORT

Mata Atlântica and Pampa

Part 1 - Natural Profile	1
Part 2 - Regional Land Cover Dynamics	5
Part 3 - Carbon Potential	7
Part 4 - Developer Spotlight	9
Summary	10
References	11
Authors and contributors	12
Next steps	13

Authors and Contributors

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

July 2025

Brazil's most degraded forest

Mata Atlântica (or the Atlantic Forest) is one of Brazil's most diverse - and most degraded - biomes.

Once spanning **1.2 million km²**, the Atlantic Forest now survives in scattered fragments over just under **100,000 km²** today.¹ The true extent of this loss is visible in the land cover map on the right - where continuous forest once stood, less than **10%** remains, replaced by pasture, cropland, and urban areas, and is in desperate need of restoration and protection.

Biome type:

Humid tropical and subtropical rainforest²

Dominant vegetation:

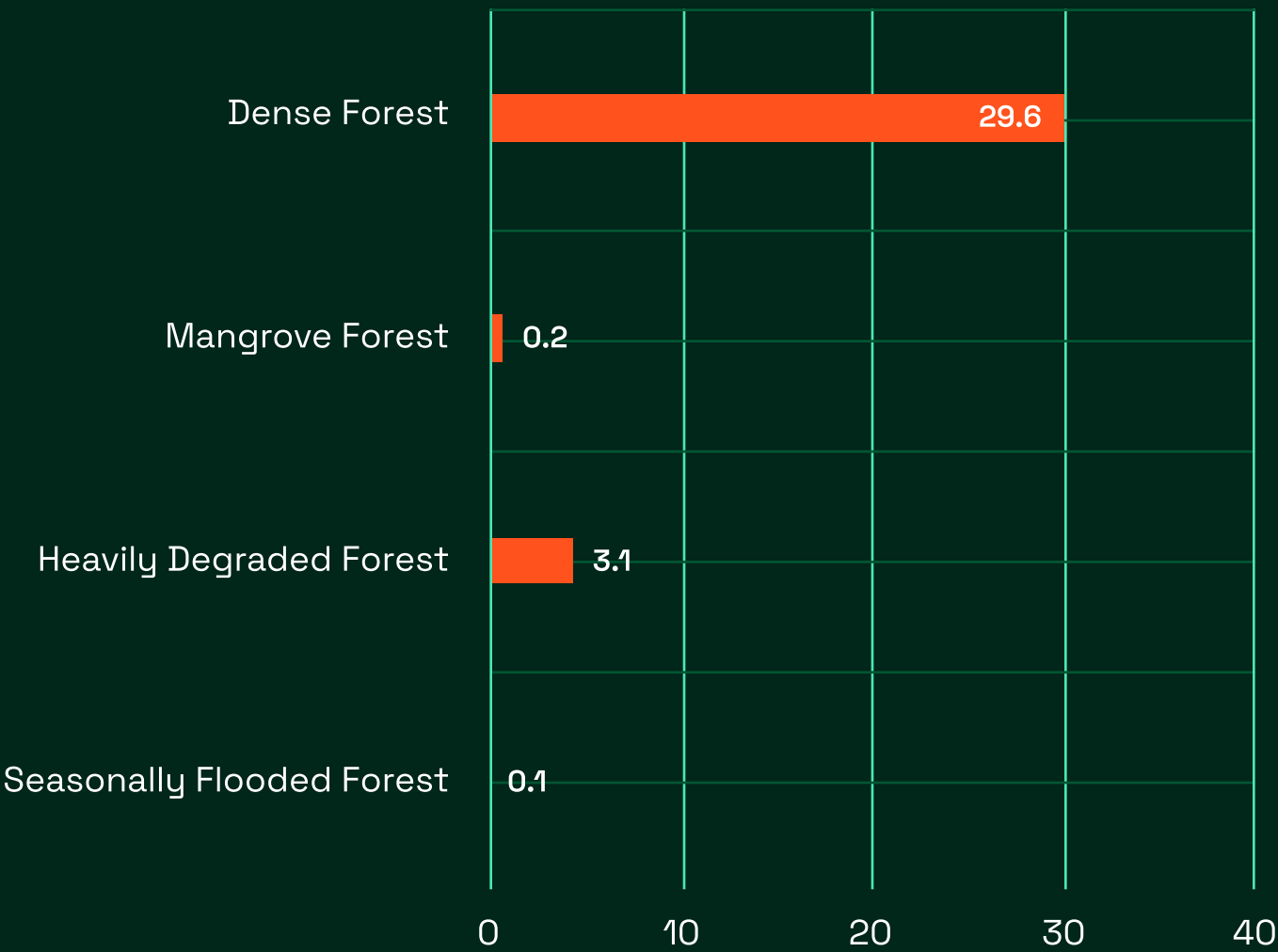
Evergreen terra firme forest, coastal forest, mangroves³

Geographic range:

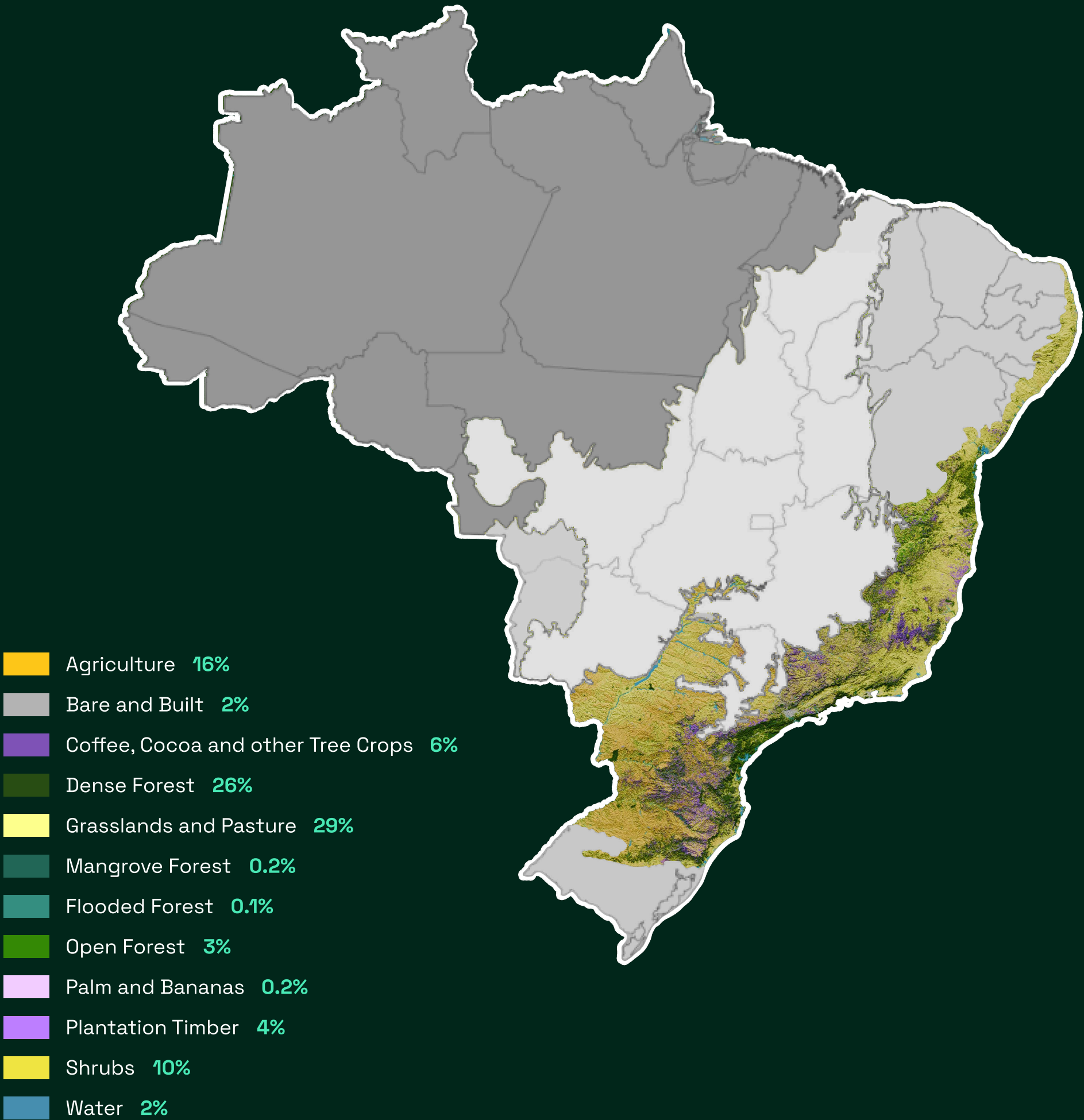
Spans Brazil's Atlantic coast extending into Paraguay, Argentina, and Uruguay

Forest cover distribution in Mata Atlântica, 2024 (Mha)

Source: Space Intelligence Land Cover Data



Mata Atlântica



Source: Space Intelligence Land Cover Data

NATURAL PROFILE

A hotspot of biodiversity

Despite the deforestation pressure, the Atlantic Forest is home to remarkable biodiversity.

Among its most iconic species is the **Brazilwood** (*Paubrasilia echinata*), Brazil's national tree.⁴

Endemic to this biome and now classified as endangered, it has been heavily exploited for its valuable orange-red heartwood, historically used in dye production and still targeted for high-end timber.⁵

Another important species is the **Paraná pine** (*Araucaria angustifolia*), which forms distinct high-altitude forests in the southern reaches of the biome. These forests hold deep cultural and spiritual significance for the Kaingáng people, who rely on the tree for food, building materials, and ceremonial use.⁶



88%

of the original forest
has been lost

home to

>23,000

plant species, **40%** found
nowhere else in the world

Pampa: Atlantica’s grassland neighbour

Stretching across the southern tip of Brazil in the state of Rio Grande do Sul, the Pampa biome is a vast expanse of temperate grasslands, shrublands, and wetlands.⁷ It covers approximately **19.3 million hectares**.

Often overshadowed by Brazil’s tropical forests, the Pampa is one of the country’s most unique and least protected biomes. It forms part of the larger Uruguayan savanna ecoregion, extending into Argentina and Uruguay.

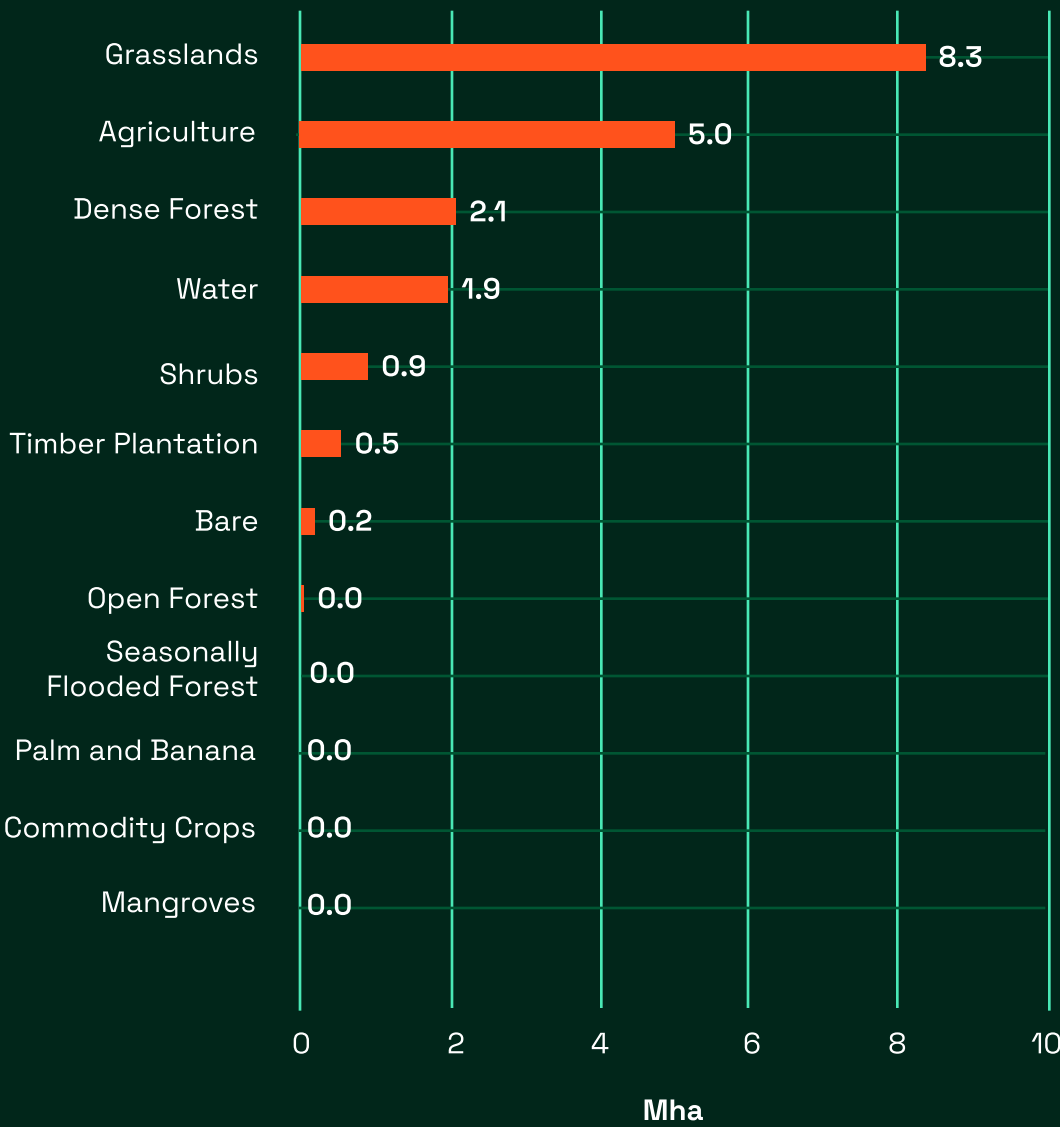
Today, over a third of the original vegetation of the Pampas has been lost, much of it replaced by soybean farms, cattle pasture, and tree plantations.⁸

only **0.7%** of the Brazilian Pampas is officially protected

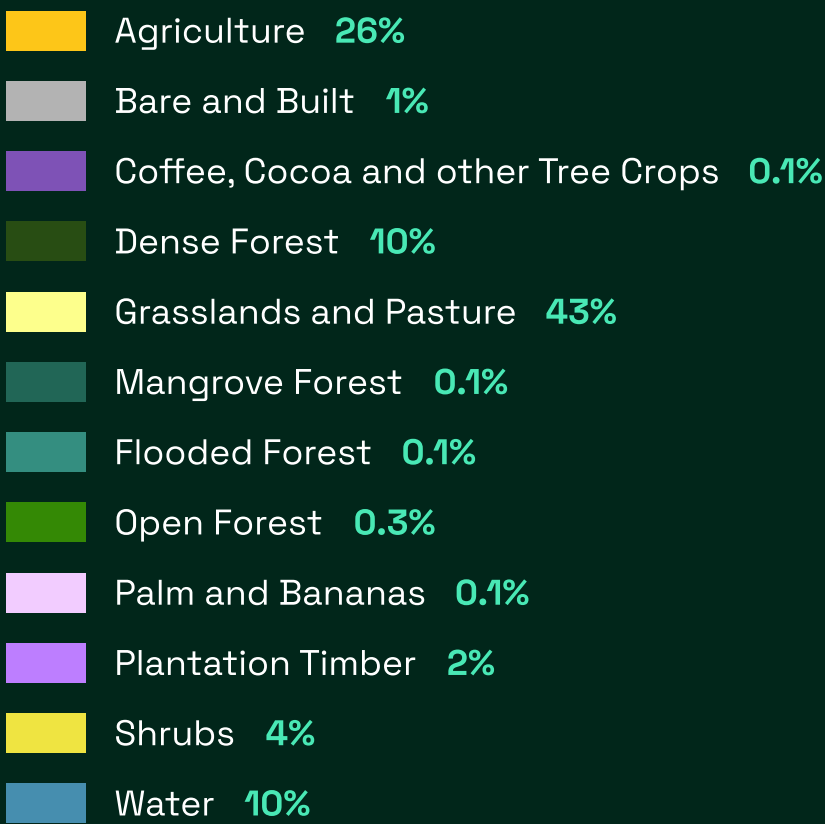
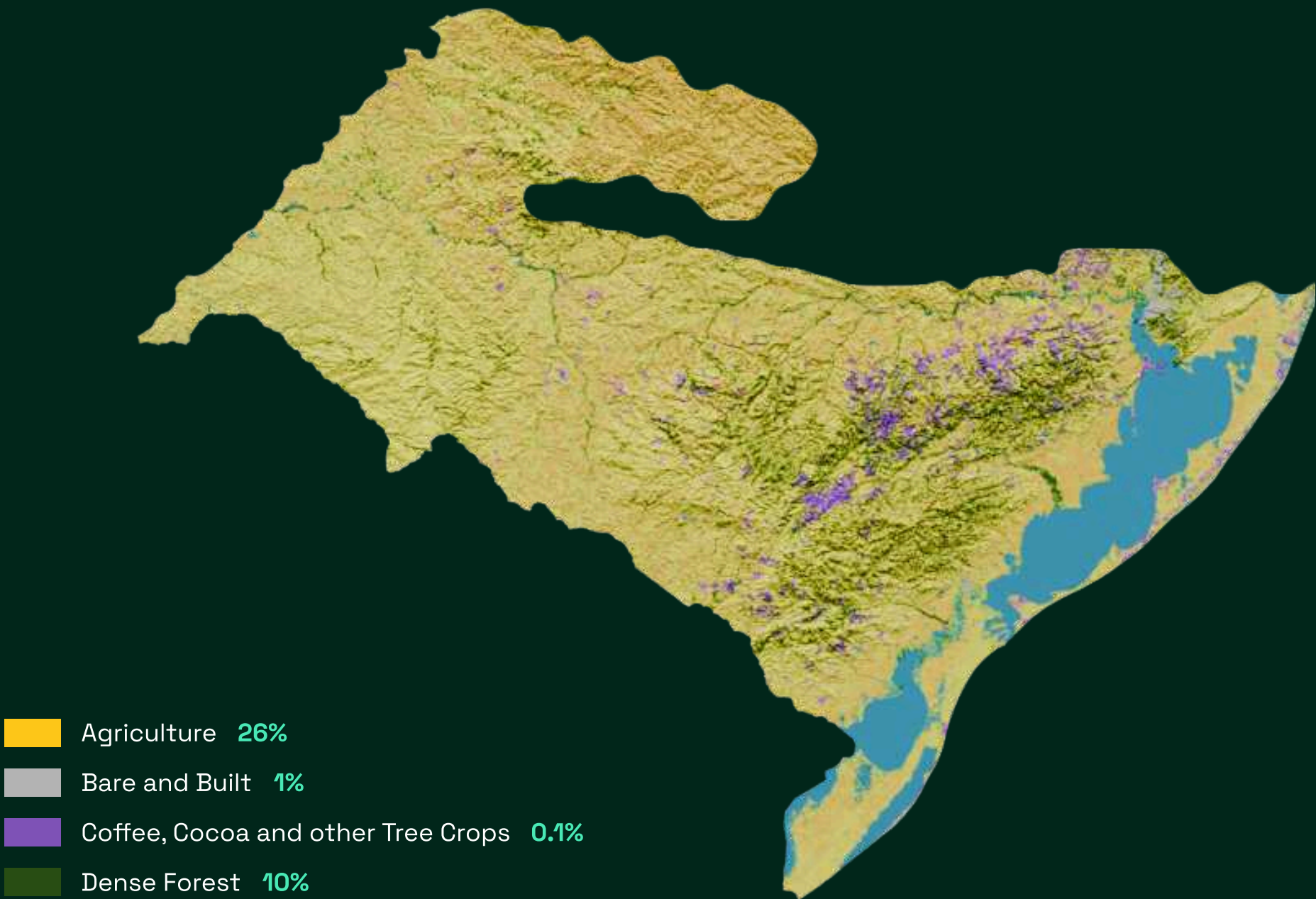
1/3 of native grassland cover has been lost or altered since 1985

Land cover distribution in Pampa, 2024 (Mha)

Source: Space Intelligence Land Cover Data



Pampa



Source: Space Intelligence Land Cover Data

Pampa's endangered species

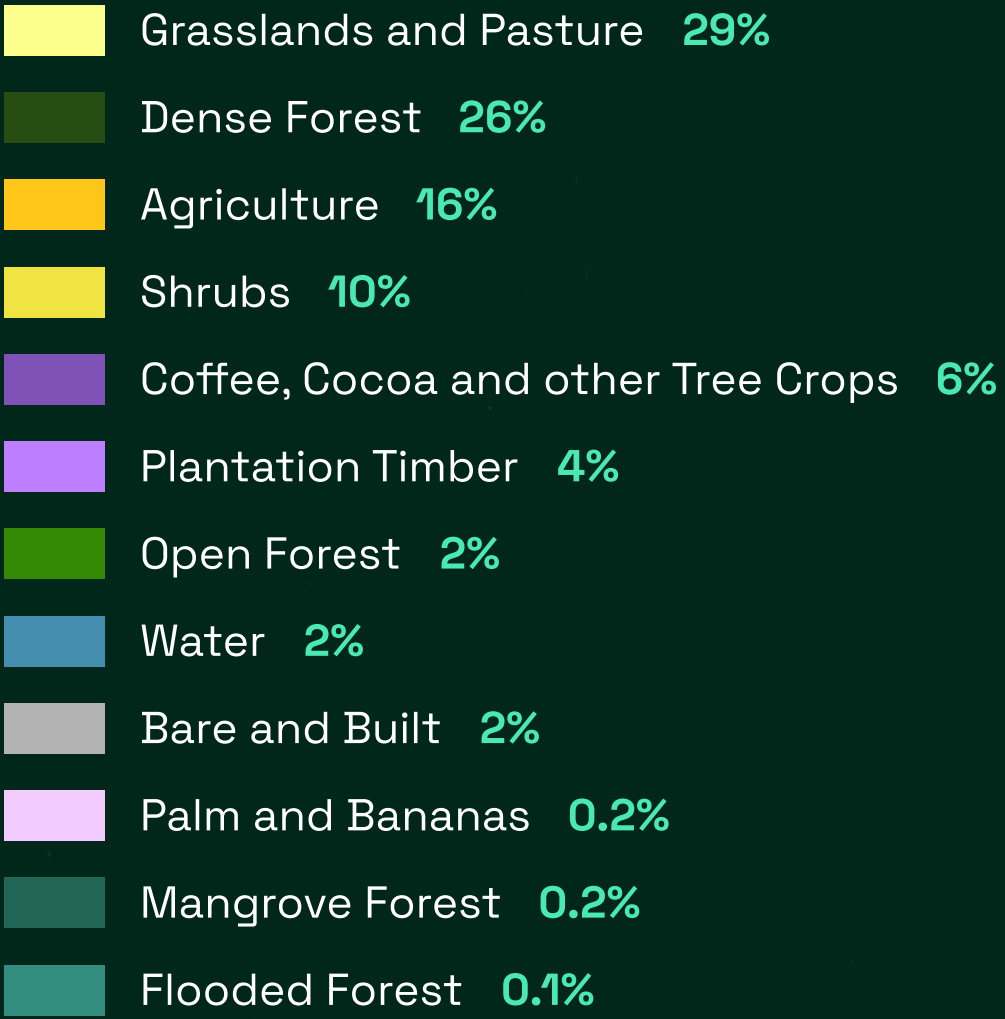
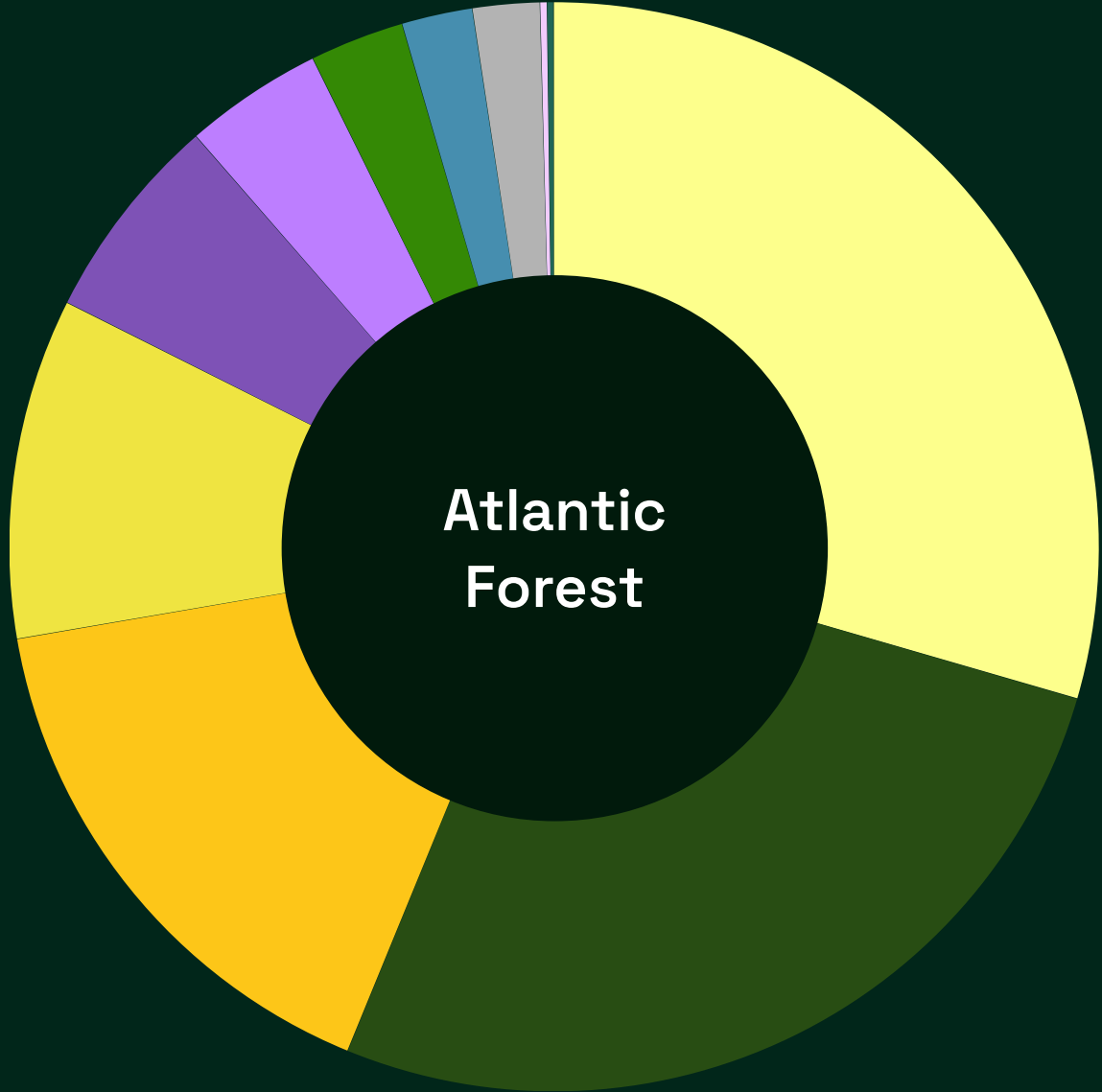
The Pampa is rich in species diversity, particularly among grasses, herbs, and low shrubs. Its ecosystems are shaped by seasonal variation, grazing pressure, and natural fires, and flora and fauna adapted to open, wind-exposed conditions.⁹

The Pampas cat (*Leopardus colocolo*), is one of the many near-threatened species native to the Pampa grasslands. Its numbers are dropping due to habitat loss and sport hunting.¹⁰



Regional land cover dynamics in the Atlantic Forest and Pampa

As of 2024, forest cover in the Atlantic Forest and the Pampa stands at approximately **36 million hectares**, or **32.4%** of the total area - most of it in fragmented patches.



Total ecoregion area:

111 million hectares (Mha)

Total forest area (2024):

36 Mha

Dense forest (2024):

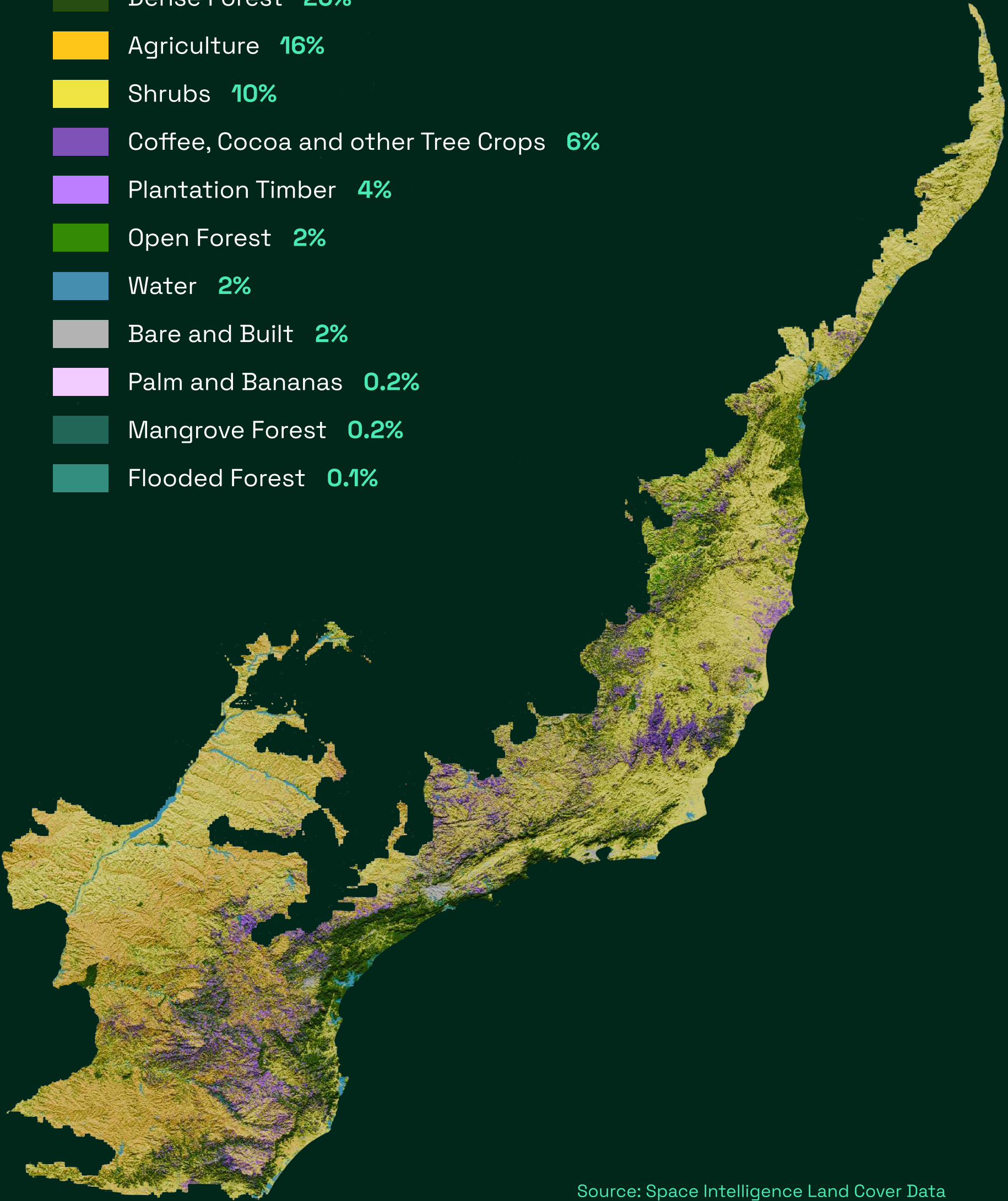
31.7 Mha

Open forest (2024):

3.1 Mha

Seasonally flooded forest & mangroves (2024):

0.24 Mha (combined)



Source: Space Intelligence Land Cover Data

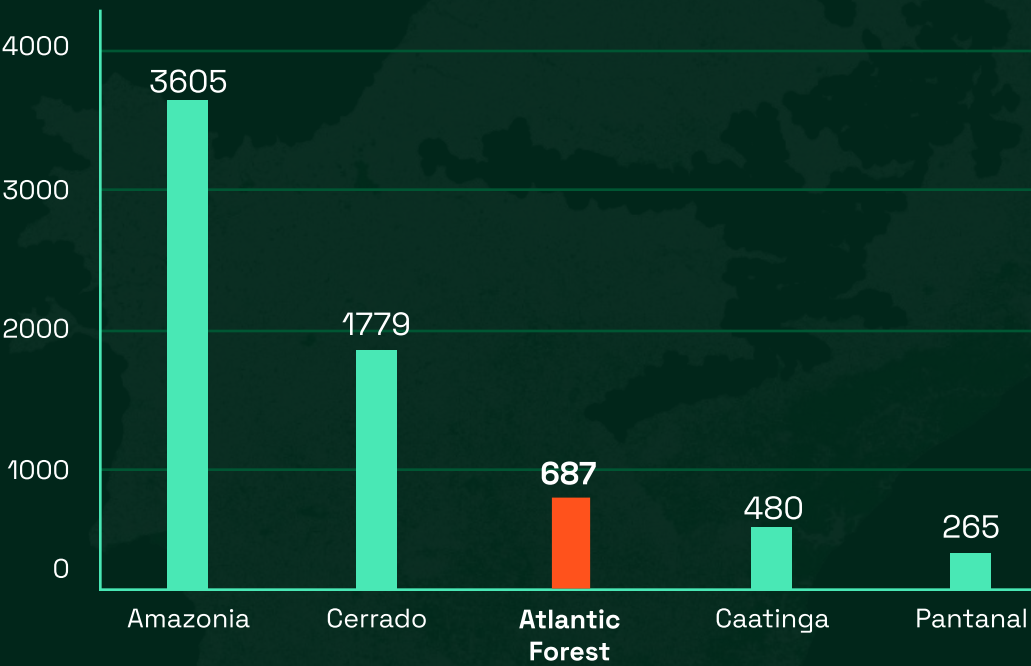
Deforestation and regrowth in Mata Atlântica

Despite long-standing legal protections, deforestation in the Mata Atlântica has continued over the past decade.

While the annual deforestation rate declined in the 5-year period of 2020-2024 (**0.77%**) compared to 2015-2020 (**0.59%**), the pace remains significant given how little native forest remains. In 2024, deforestation continued at a rate of approximately **687 hectares** per day, or about **382 trees** lost per minute.

Forest lost per day, per biome, 2024 (Mha)

Source: Space Intelligence Land Cover Data



0.77%

Annual deforestation rate (2015 – 2020)

0.59%

Annual deforestation rate (2020 – 2024)

↓ 23%

Change in rate

0.70%

Annual deforestation rate (2015 - 2024)

2.25 Mha

Gross forest loss (2015 – 2024)

0.97 Mha

Forest regrowth

Source: Space Intelligence Land Cover Data

The biggest drivers of deforestation are **cattle expansion** and **agriculture**, particularly soybeans.¹¹ **Coffee** remains the predominant plantation in 2024.

Land use change distribution in Mata Atlântica, 2020-2024

Source: Space Intelligence Land Cover Data

0.7%

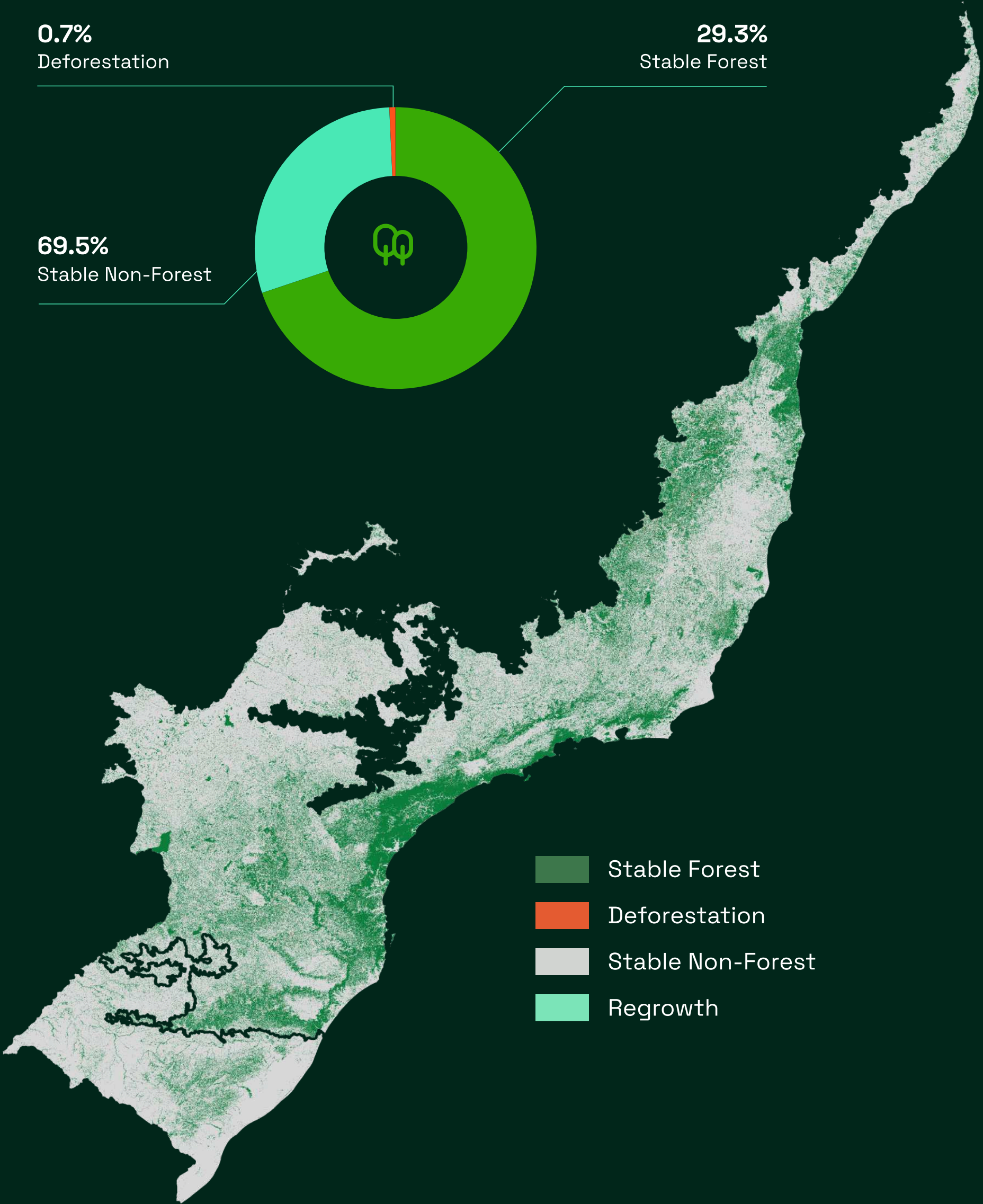
Deforestation

29.3%

Stable Forest

69.5%

Stable Non-Forest



Opportunity for restoration

With **nearly 90%** of the original Atlantic Forest gone and annual deforestation still high, restoration efforts (ARR) will be crucial. Along with that, preserving the forest that remains presents an even bigger opportunity.

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 by 2030.

Annual sequestration potential:

100 million tCO₂e

REDD+

4.6 million tCO₂e

ARR

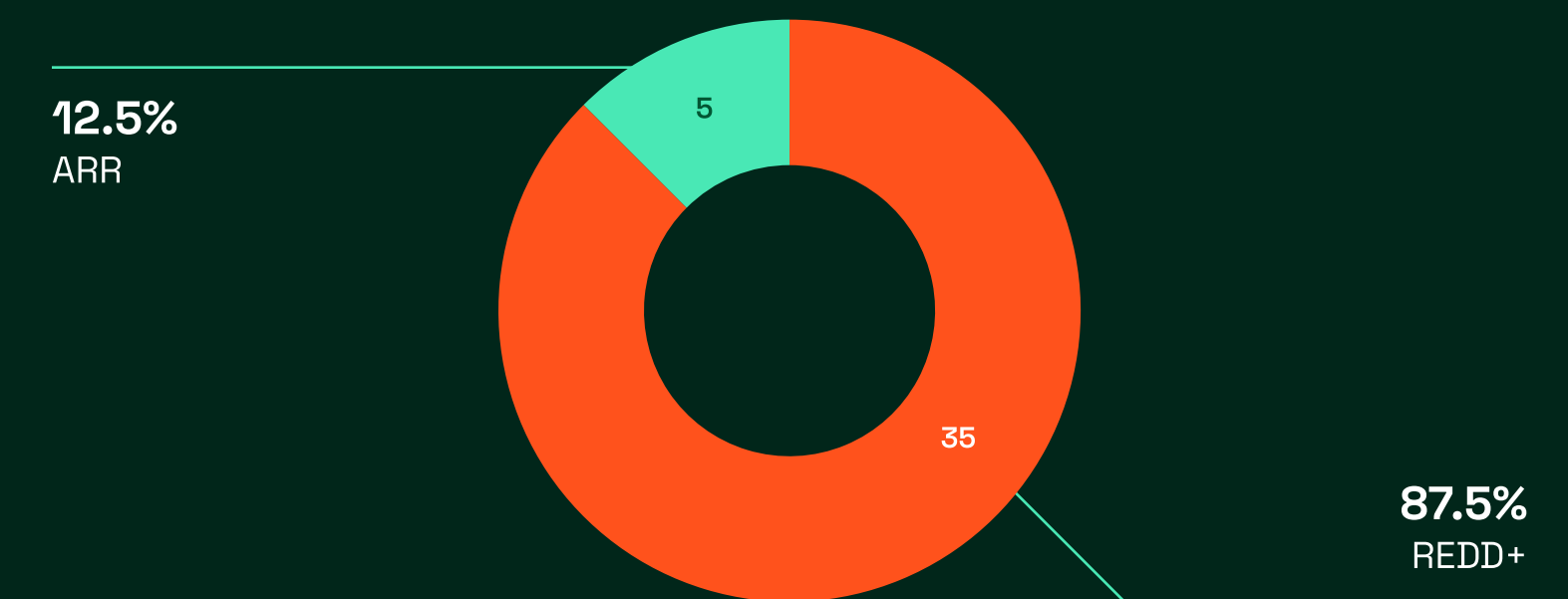
According to our estimations, there are over **35 million hectares** of forest available for protection under REDD+ under various standards or approaches (Verra VCS VM0048, Verra JNR, ART TREES, ERS/ Equitable Earth, Plan Vivo, Article 6) and **over 5 million hectares** available for ARR. Note in both cases an enormous amount of capital and joint effort from companies, NGOs and government would be required to achieve reductions/removals on these levels.

In contrast, the Pampa biome offers significant opportunities for carbon projects that protect or restore native grasslands, however we have not assessed the magnitude of these here.

Average sequestration rate (over 20 years for ARR):

5-12 tCO₂e/ha/yr

Areas available for ARR and REDD+ in Mata Atlântica (Mha)



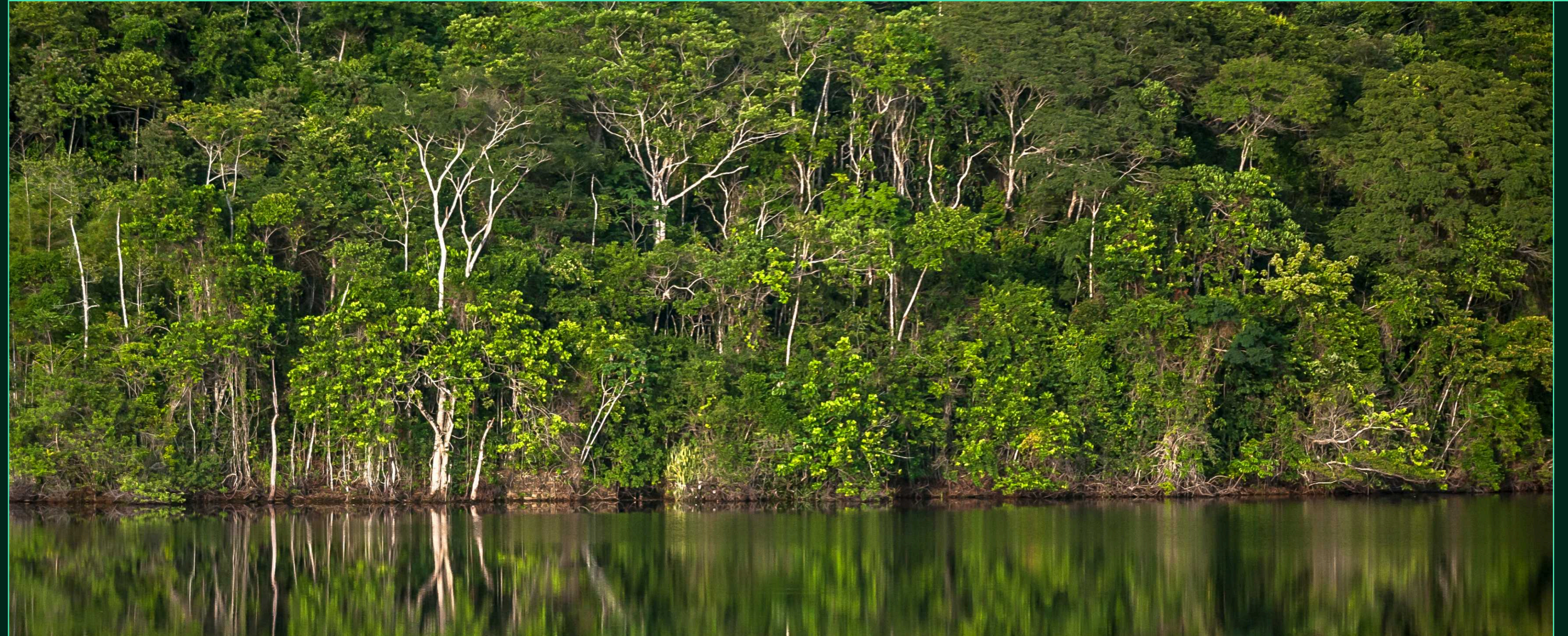
Source: Space Intelligence Land Cover Data.

Additional co-benefits

Forest protection and restoration in the Mata Atlântica are critical not only for biodiversity, but also for sustaining essential ecosystem services in one of Brazil's most densely populated regions.

The remaining fragments are home to highly threatened species and ecosystems, many of which are found nowhere else. Protecting and restoring these landscapes offers immense biodiversity benefits and holds significant potential for job creation through large-scale restoration efforts.

Given how much has already been lost, preserving what remains is urgent.



Symbiosis Continuous Cover Forest Project

Verra VCS ID: 4592

The Symbiosis Continuous Cover Forest Project focuses on planting biodiverse forests using seeds collected from native mother trees. Since 2010, their approach has combined long-term forest restoration with high-quality, responsibly managed wood production.

818

Hectares of forests planted for production

6,718

Tons of CO₂ fixed annually

1,302,806

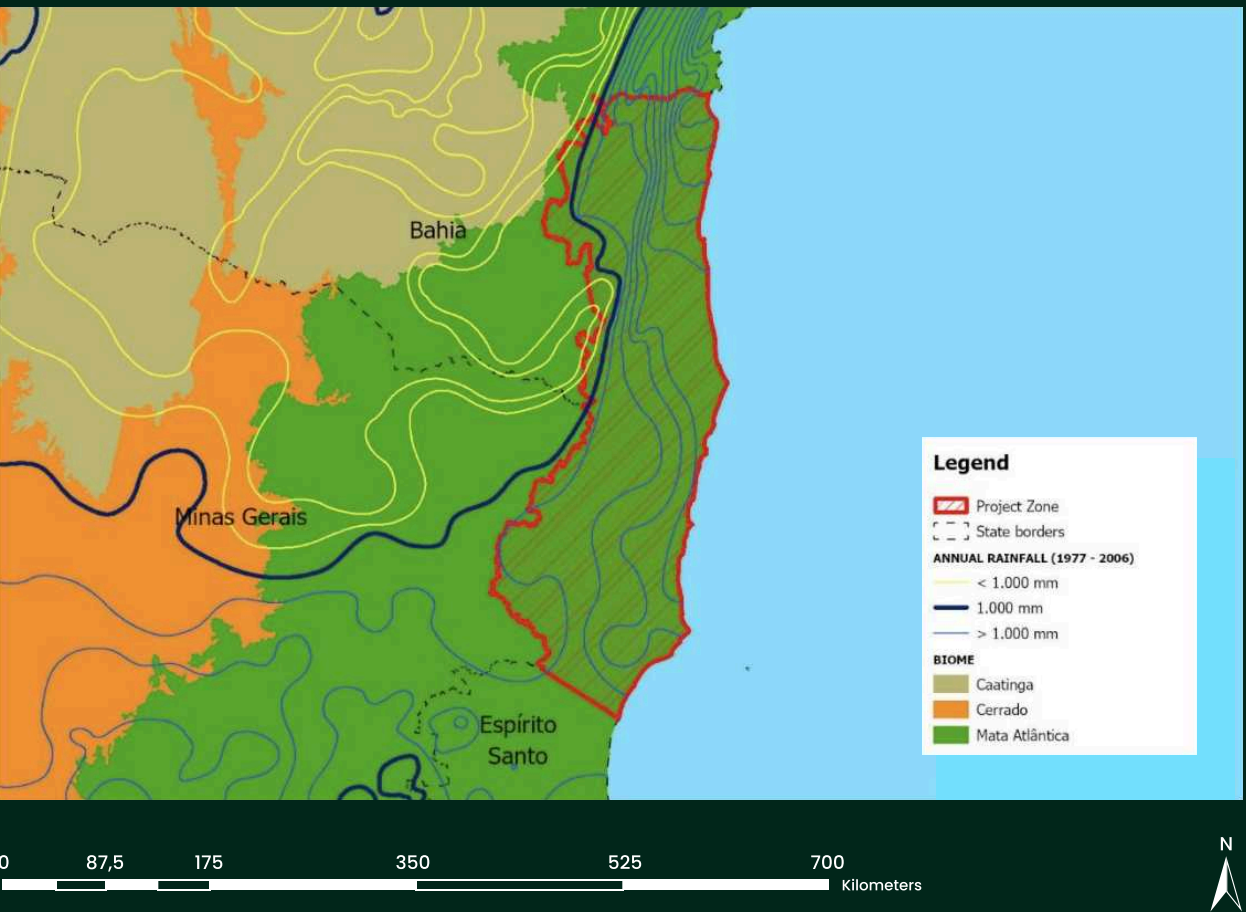
Trees planted of 55 species

Source: 2024 Symbiosis Investments website

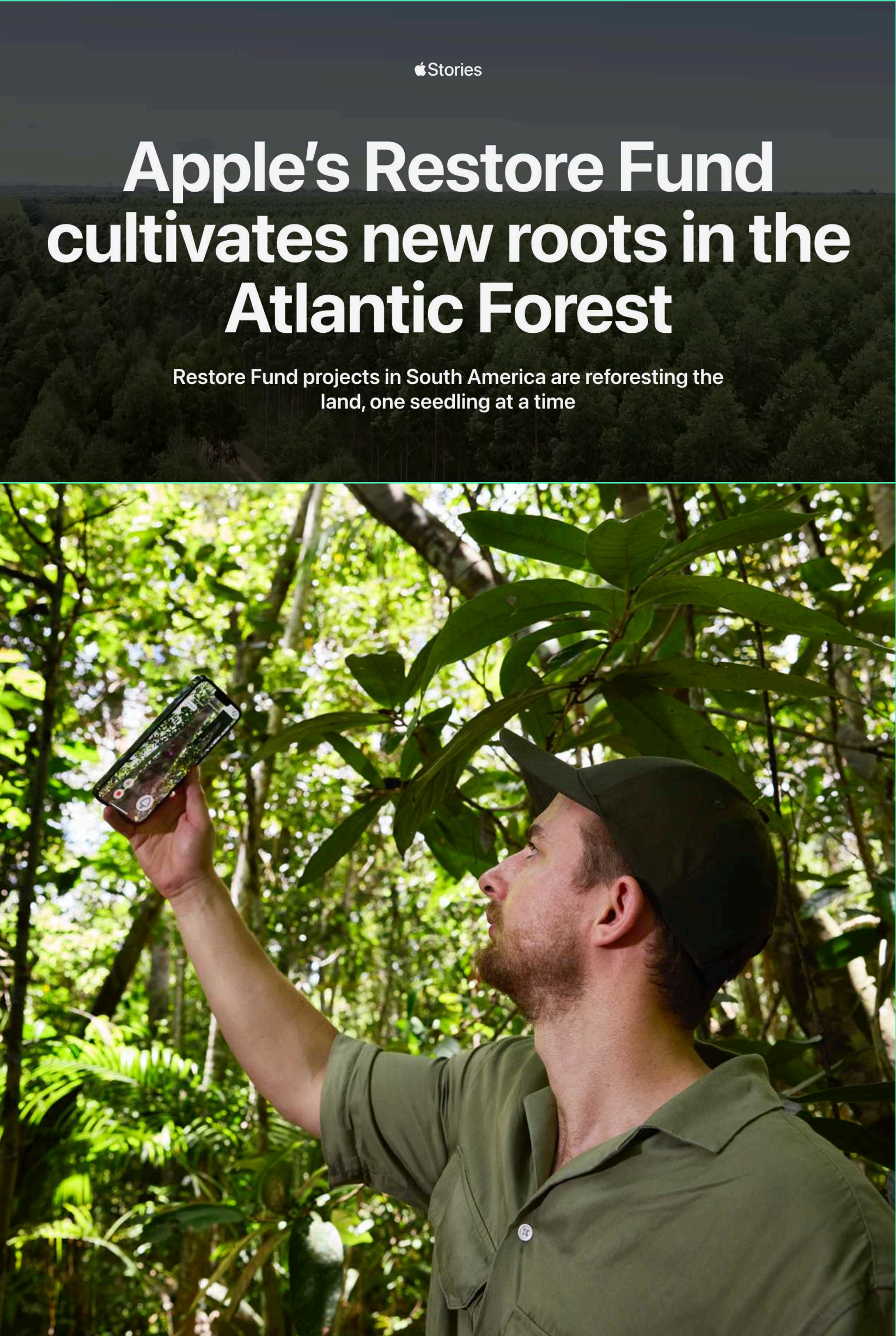
Local Impact

Today, Symbiosis is part of **Apple’s Restore Fund**, aimed at scaling nature-based solutions to address climate change. Symbiosis protects **40%** of its land as permanent conservation forest, rich in native tree species, while the remaining area supports a sustainable hardwood economy. This model reduces pressure on natural forests, creates long-term local jobs, and helps reverse biodiversity loss.

The project has integrated **Space Intelligence** biomass data collected using LiDAR to measure the carbon stored on its land.



Project area map. Source: Verra VCS PDD.



Summary Snapshot

0.97 Mha

Forest Gain (2015-2024)

2.25 Mha

Forest Loss (2015-2024)

687 ha/day

Daily Deforestation
(2024)

Mata Atlântica and Pampa’s Carbon Potential

5+ million ha

Eligible area for ARR

4.6 million tCO₂e

Annual carbon potential for ARR

35 million ha

Eligible area for REDD+

100 million tCO₂e

Annual carbon potential for REDD+

0.70%

Annual Deforestation Rate
(2015-2024)

References

- ¹ <https://worldrainforests.com/mata-atlantica/>
- ² <https://www.worldwildlife.org/places/atlantic-forest>
- ³ <https://www.nature.org/en-us/get-involved/how-to-help/places-we-protect/atlantic-forest/>
- ⁴ Lichtenberg, S., Huber-Sannwald, E., Nehren, U. and Reyes-Agüero, J.A., 2019. Use and conservation of the threatened Brazilian national tree *Paubrasilia echinata* Lam.: a potential for Rio de Janeiro state?. *Strategies and tools for a sustainable rural Rio de Janeiro*, pp.205-219.
- ⁵ <https://www.inaturalist.org/taxa/874491-Paubrasilia-echinata>
- ⁶ <https://news.mongabay.com/2022/10/loss-of-brazilian-pines-threatens-kaingang-indigenous-culture#:~:text=It%20is%20used%20for%20food,into%20a%20flour%20called%20pis%C3%A9>
- ⁷ Lanfranco, B., Fernández, E., Ferraro, B. and de Lima, J.M.S., 2022. Historical changes in the Pampas biome, land use, and climate change. In *Handbook of Behavioral Economics and Climate Change* (pp. 162-191). Edward Elgar Publishing.
- ⁸ <https://brasil.mapbiomas.org/en/2022/10/13/pampa-passa-por-profundas-transformacoes-e-esta-cada-vez-mais-distante-de-sua-configuracao-original/>
- ⁹ Renner, S., Périco, E., Dalzochio, M.S. and Sahlén, G., 2019. Ecoregions within the Brazilian Pampa biome reflected in Odonata species assemblies. *Austral Ecology*, 44(3), pp.461-472.
- ¹⁰ <https://felidaefund.org/learn/cats/pampas-cat>
- ¹¹ <https://www.cepf.net/our-work/biodiversity-hotspots/atlantic-forest/threats>

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.

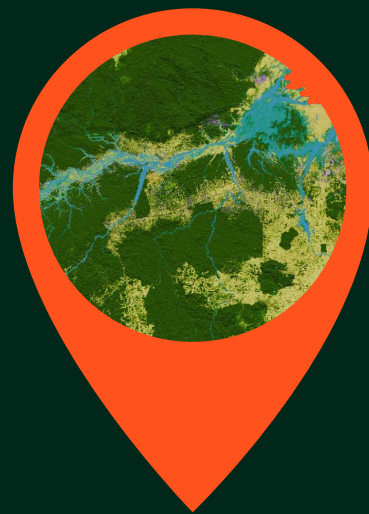
Project Verification



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) →

Rapid Area Screening (In beta)



Quickly find eligible areas for your ARR or REDD+ projects

Enquire about the Beta program →

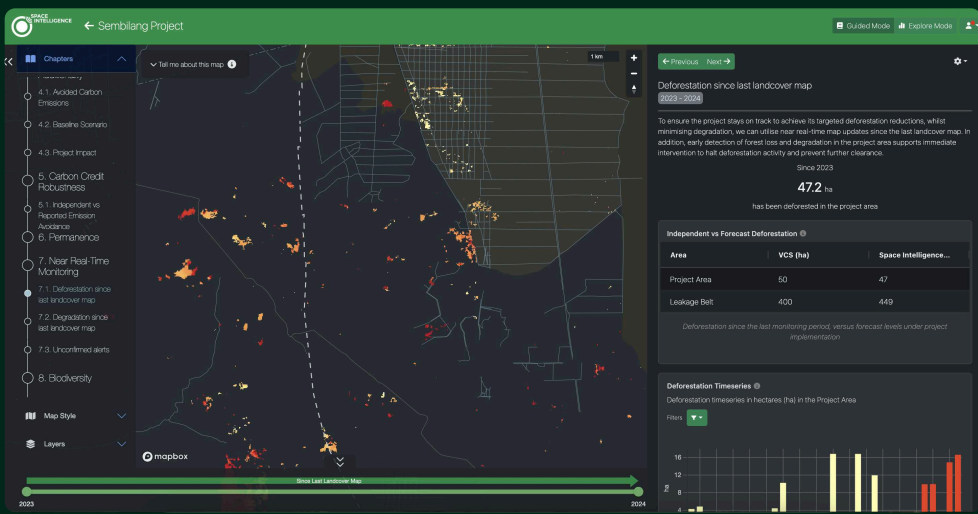
Pre-Feasibility Report



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 →