

Regrown tropical forests may have short lifespans, says new study

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The threatened Brazilian Atlantic Forest is one of the most biodiverse places on the planet. It is home to some 2,200 species of mammals, birds, reptiles and amphibians, many of them endemic to the region, such as this green-headed tanager. Credit: Pedro Piffer

Preventing the re-clearing of second-growth forests is a major challenge

for restoration efforts in tropical regions, according to a new study led by researchers from Columbia University, University of São Paulo and the Federal University of ABC in Brazil. The study found that a third of regenerating areas in the Brazilian Atlantic Forest were cut down again, most after just 4 to 8 years of regeneration.

Natural [forest regeneration](#) is regarded as a cost-effective strategy for countries to meet their [ecological restoration](#) and [carbon sequestration](#) goals. While reports of forest recovery in [tropical regions](#) generate optimism, recent research by the study authors and others has suggested that restored forests have a high probability of being cleared within a few years.

The new study, published in *Environmental Research Letters*, quantifies forest regeneration in the Brazilian Atlantic Forest and identifies factors that influence how long the regenerated forest survives.

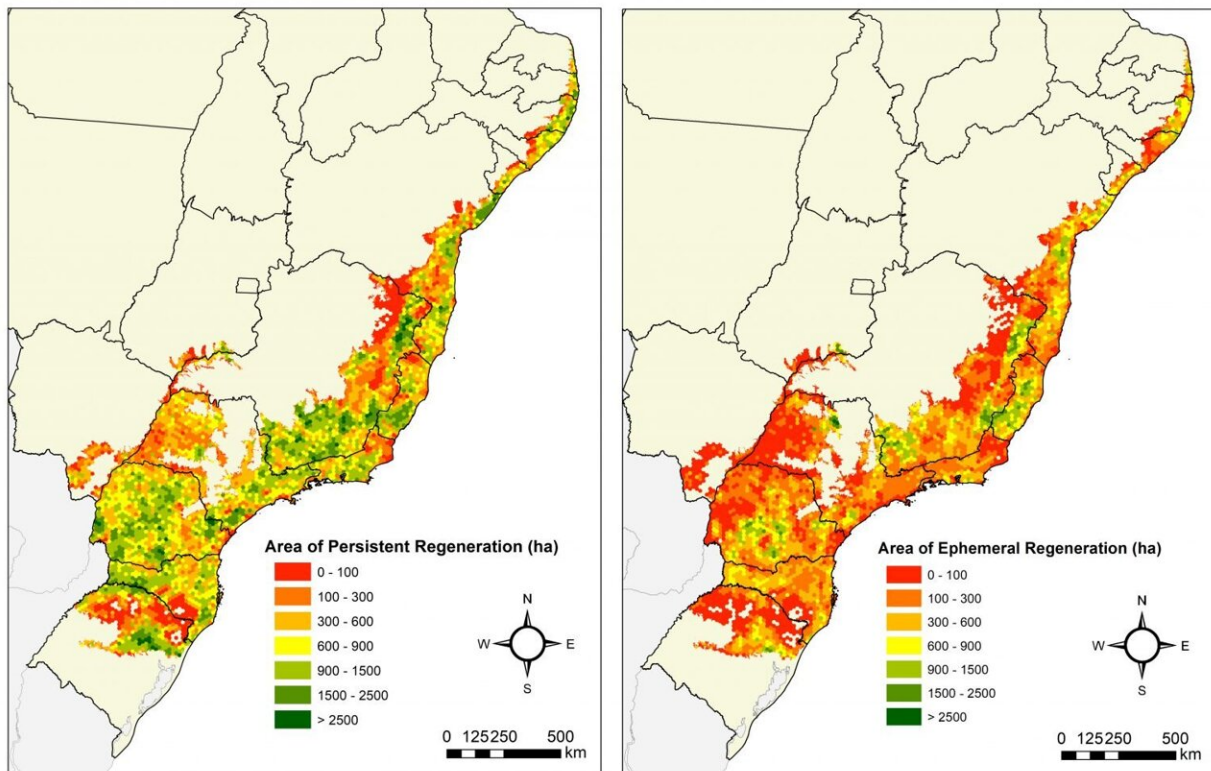
The Brazilian Atlantic Forest is a rich natural area that originally occupied 150 million hectares along the Atlantic coast. Only about 32 million hectares remain today. The highly fragmented and threatened ecosystem is now considered a regeneration hotspot.

The authors used detailed land use cover data from 1985 to 2019 to map and track the fate of over 4.5 million hectares of regenerated forests in the Brazilian Atlantic Forest. They found that only 3.1 million hectares persisted until 2019.

"While the persistence of two-thirds of regenerated forest in the region casts a [positive outlook](#) for the biome's conservation, the short life span of regenerated forests emerges as a new challenge for [restoration efforts](#) in the region," said Pedro Ribeiro Piffer, a Ph.D. candidate at Columbia and the lead author of the study.

The ephemeral nature of these regrown forests limits the [biodiversity and carbon storage benefits](#) of regeneration, he said.

"Carbon sequestration through tropical reforestation and natural regeneration can make an important contribution to [climate change mitigation](#), given that [forest cover](#) in many tropical regions increased during the early part of the 21st century," said senior author María Uriarte, a professor at Columbia's Earth Institute who studies tropical forest dynamics. "However, the size of this carbon sink will depend on the degree to which these forests are permanent and protected from re-clearing."



Area of persistent and ephemeral native forest regeneration across the Brazilian Atlantic Forest. Area is shown in hectares of forest per 250 square kilometer hexagon. Credit: Piffer et al., Environmental Research Letters 2022

In a [previous paper](#), Piffer and Uriarte found that without these reversals in reforestation, forests in the Brazilian Atlantic Forest region could have sequestered 1.75 billion tons of carbon—more than three times the estimated actual sequestration of 0.52 billion tons.

"Our results underline a double challenge for [forest conservation](#) in tropical regions, where not only do we need to restore degraded areas, but we also need to ensure the persistence of these young regenerating forests," said Jean Paul Metzger, an ecology professor at the University of São Paulo and a co-author on the new study.

The researchers note that ensuring the persistence of tropical forest regeneration is crucial for nations to achieve their restoration and carbon sequestration commitments under the Paris Agreement.

They also identified factors that may help to protect regrown forests. They found that regenerated forests had greater chances of surviving on steeper slopes, close to rivers and existing forests, and near permanent agriculture. The forests were less likely to persist in more rural areas. Also, while regeneration occurred predominantly in pasturelands and areas of shifting agriculture, it was also less likely to persist within these dynamic landscapes.

"Regenerated forests can take decades to recover pre-disturbance species richness and biomass levels, so identifying the conditions that allow for a greater persistence of these young forests is vital for developing effective public policies targeted at increasing [forest](#) cover in the Brazilian Atlantic Forest," said Piffer.

More information: Pedro Ribeiro Piffer et al, Turnover rates of regenerated forests challenge restoration efforts in the Brazilian Atlantic

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Provided by Columbia University

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