

National parks preserve more than species

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A jaguar photographed in Braulio Carrillo National Park, Costa Rica, by a Tropical Ecology Assessment and Monitoring (TEAM) Network camera trap. Credit: TEAM Network

National parks are safe havens for endangered and threatened species, but an analysis by Rice University data scientists finds parks and protected areas can preserve more than species.

In a study published online this week in the journal *Biotropica*, Rice

ecologists and data scientists Daniel Gorczynski and Lydia Beaudrot used thousands of camera trap photos to assess the large mammal diversity in the protected rainforest of Costa Rica's Braulio Carrillo National Park.

In [wildlife conservation](#), diversity often refers to the variety of [species](#) in an ecosystem. But ecologists also study functional diversity, the abundance and variation of traits like body size, diet and reproductive rate. Trait diversity can be measured independent of species diversity and provide additional insight about the overall health of an ecosystem.

In the study, Gorczynski and Beaudrot analyzed more than 4,200 photos of mammals taken in the park between 2007 and 2014 and found the diversity of mammal traits within the park did not decline, despite deforestation that fragmented the forests on more than half of the surrounding private lands.

"It is a bit of a surprise," said Gorczynski, a Ph.D. student in Rice's Department of Biosciences. "Previous studies in other places have shown that trait diversity is more sensitive to human disturbance than species diversity. Trait [diversity](#) can decline more quickly than [species diversity](#), both in cases where species go extinct and where they don't."

There were no mammal extinctions in Braulio Carrillo during the eight years of the study, and Beaudrot, an assistant professor of biosciences at Rice, said the trait analysis revealed a level of functional redundancy that could allow the [park](#)'s ecosystem to continue functioning even if some of its mammals go extinct in the future.

"It's well-established that [national parks](#) preserve species, and our results show national parks can be more resilient than expected, at least over the time period we examined," she said.

Beaudrot said the results are encouraging, but she said it would be a mistake to assume that all national parks are as resilient as Braulio Carrillo.

"This shows what's possible, but the situation could be very different at other parks or over longer time periods," she said. "We need comparable studies for other parks, other protected areas and nonprotected areas.

"This is an area where [data science](#) can make a difference," she said. "Some of the data needed to make those comparisons are already available."

More information: Daniel Gorczynski et al, Functional diversity and redundancy of tropical forest mammals over time, *Biotropica* (2020). [DOI: 10.1111/btp.12844](https://doi.org/10.1111/btp.12844)

Provided by Rice University

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