

Reserves found to be 'effective tool' for reducing fires in Brazilian rainforests

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Rainforest reserves - even those disturbed by roads - provide an important buffer against fires that are devastating parts of the Brazilian Amazon, according to a new study by a trio of researchers at Duke University published April 8 in the open-access, peer-reviewed journal *PLoS ONE*.

"Our findings show that reserves are making a difference even when they are crossed by roads," said lead author, Marion Adeney, a PhD candidate at Duke University's Nicholas School of the Environment. "We already knew, from previous studies, that there were generally fewer fires inside reserves than outside - what we didn't know was whether this holds true when you put a road across the reserve."

[Fire](#) is one of the chief causes of deforestation in tropical rainforests. Fires in humid tropical forests are always caused by people, Adeney says - they typically start on farms or ranches and spread to the nearby forest. Since tropical forest trees have no natural protection against fire, even a small fire can kill most of the trees.

Nearly 90 percent of fires occur within 10 kilometers of a road, a key factor, Adeney says, in explaining why fires are much more common and concentrated in the southern Amazon, where roads are more numerous.

Determining whether reserves with roads provide protection against deforestation caused by fires was critical, she explains, because the pace

of road-building has accelerated in recent years in many parts of the Brazilian [Amazon rainforest](#), including in many reserves. Especially important are the region's indigenous reserves, which cover five times the area of fully protected parks. Despite having roads and settlements, many of these indigenous reserves contain ecologically important areas of rainforest still largely unaffected by the human development in surrounding areas.

"There is a lot of discussion about how to curb deforestation and fire as new roads are built or paved into these forests," says Adeney's co-author and faculty co-advisor, Stuart Pimm, Doris Duke Professor of Conservation Ecology at Duke's Nicholas School.

To assess what degree of protection reserves with roads provide against these fires, Adeney, Pimm and Norm Christensen, professor of ecology at the Nicholas School, analyzed ten years of satellite-detected fire data from the entire Brazilian Amazon.

Overall, they found no significant difference in fire incidence between sustainable-use reserves, indigenous reserves and protected parks. Location and timing were found to be much more important factors than type of reserve, Adeney notes. Fires were more likely to occur during El Niño years, as a result of drought. But, the increase in fire in El Niño years was greater outside than inside of reserves, suggesting that reserves are also buffering against these climate effects. "Still, although there are overall many fewer fires inside than outside reserves, we found that reserves in highly impacted areas still experienced more fires than reserves in remote areas. Large and remote reserves, not surprisingly, had the fewest roads and the fewest fires," she says.

"This reinforces the importance of reserves for protecting forest cover in the Amazon" says Pimm. "Our results show that even inhabited reserves can be an effective tool to reduce fires, even when they have roads built

through them."

More information: Adeney JM, Christensen NL Jr, Pimm SL (2009) Reserves Protect against Deforestation Fires in the Amazon. PLoS ONE 4(4): e5014. doi:10.1371/ journal.pone.0005014, [dx.plos.org/10.1371/journal.pone.0005014](https://doi.org/10.1371/journal.pone.0005014)

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