

Extent of human encroachment into world's protected areas revealed

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A study of human activity within thousands of conservation spaces in over 150 countries suggests that—on average across the world—protected areas are not reducing the "anthropogenic pressure" on

our most precious natural habitats.

Protected areas are vital to preserving diverse life on Earth, as well as mitigating climate change by conserving carbon-sequestering vegetation, say Cambridge scientists. They argue that the findings show the effects of chronic underfunding and a lack of involvement of local communities.

"Rapidly establishing new [protected areas](#) to meet global targets without providing sufficient investment and resourcing on the ground is unlikely to halt the unfolding extinction crisis," said lead author Dr. Jonas Geldmann from the University of Cambridge Conservation Research Institute.

The research, published today in *Proceedings of the National Academy of Sciences*, is by far the largest analysis of its kind to date. Scientists used satellite evidence of "night lights" and agriculture, as well as census and crop yield data, to assess levels of human encroachment in 12,315 protected areas between 1995 and 2010.

The scientists matched every satellite 'pixel' (64 square kilometres) of each protected area to a local pixel of commensurate soil type, elevation, and so on—but without conservation status. This allowed researchers to gauge the effect of protected areas when compared to an "appropriate sample" of unprotected land.

The majority of protected areas in every global region had suffered increases in human pressure. However, across the Northern Hemisphere and Australia, protection had—on average—proved effective at slowing human encroachment when compared with unprotected habitats.

In regions such as South America, Sub-Saharan Africa and South-East Asia, home to the world's richest biodiversity as well as some of its

poorest communities, pressure from damaging human activity inside protected areas was "significantly higher" on average than in matched areas across fifteen years of data.

The researchers found a link between increased human encroachment on protected areas and nations with fewer roads and a lower rank on the Human Development Index.

"Our study suggests that protected areas in more remote and wild parts of the tropics have experienced alarming increases in human pressure since 1995," said Geldmann. "These places house a disproportionately high amount of the Earth's biodiversity, and play an irreplaceable role in maintaining our most threatened species."

Previous studies to compare protected and unprotected land have been limited to forests, and shown that protected areas reduce deforestation. The new research confirms that protected areas are more effective in places like the Amazon, but have struggled to safeguard many other habitats such as savannahs.

Rises in human activity were found to be particularly acute in the protected areas of East and Central Africa. In Sub-Saharan grasslands, for example, cropland inside protected areas had increased at almost double the rate seen in matched unprotected land. In African mangroves, pressure from agriculture had increased by around 13% more inside protected areas than outside.

While in the remote grassland habitats of South East Asia, agriculture had increased by 8% more in protected areas compared to similar non-protected areas. Likewise, some forested areas in South America, particularly outside the Amazon, saw agricultural encroachment increase around 10% more in protected areas.

"Our study shows that agriculture is the driving force behind threats to protected areas, particularly in the tropics," said Geldmann. "Our data does not reveal the causes, but we suspect factors that play a major role include rapid population growth, lack of funding, and higher levels of corruption. Additionally, most unprotected land suitable for agriculture is already farmed."

"We think that what we are seeing are the effects of establishing protected [areas](#) on paper, but not following through with the right funding, management and community engagement that is needed," Geldmann said.

"Important ambitions to protect 17% of land by the end of this decade, expected to increase to 30% at a pivotal meeting next year in China, will not mean much if not accompanied by enough resources to ensure the preservation of precious habitats."

The research team argue that protected area designation can sometimes undermine the rights of local communities, which in turn can end up encouraging over-exploitation and paving the way for opportunistic "outsiders". Other studies have shown that supporting indigenous people to manage reserves themselves can reduce habitat loss.

More information: Jonas Geldmann et al., "A global-level assessment of the effectiveness of protected areas at resisting anthropogenic pressures," *PNAS* (2019).

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