

# Huge Amazon swamp carbon stores are under threat, study says

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Palm swamp in lowland Peruvian Amazonia. Credit: Ian T. Lawson, University of St Andrews

The largest peatlands in the Amazon rainforest, which hold a vast, concentrated amount of carbon, are under increasing threat from

changing land use, research suggests.

## **CO<sub>2</sub> emissions**

Urgent protection is needed to prevent carbon gas emissions from decomposing peat swamps in lowland Peruvian Amazonia (LPA), which are bigger than previously thought.

Scientists discovered small but growing areas of deforestation across the LPA, including an 11-fold increase in CO<sub>2</sub> emissions linked to mining, between 2000 and 2016.

## **Peat density**

The research, published in *Nature Geoscience* and led by the Universities of Edinburgh and St. Andrews, used field, satellite and land-cover data to estimate harmful greenhouse gas emissions, develop maps and create the first data-driven peat thickness models of Peru's tropical [peatlands](#).

Field teams including scientists from Peru's Instituto de Investigaciones de la Amazonía Peruana, the University of Leeds and other collaborating institutions mapped new stretches of peat swamps and estimated the distribution of peat across Peruvian Amazonia for the first time.

## **Precious resource**

At 62,714 km<sup>2</sup>—an area approximately the size of Sri Lanka—the peatlands contain twice as much carbon as previously estimated.

Peat in the LPA stores around 5.4 billion tons of carbon, which is almost as much as all of Peru's forests but in just five percent of its land area, showing how valuable a resource these peatlands are, experts say.

## **Under threat**

Tropical peatlands are among the most carbon dense ecosystems in the world, but agriculture expansion, infrastructure development and mining have led to the loss of large peatland areas.

Deforestation and drainage inhibits the accumulation of essential organic matter in the swamps and promotes rapid decomposition of peat, which in turn releases large quantities of carbon dioxide and nitrous oxide into the atmosphere.

Drained peatlands are also prone to fires, which can lead to a large and rapid increase of emissions.

## **Legislation**

In recognition of these threats, Peru has passed legislation, that for the first time mandates the explicit protection of its peatlands for climate change mitigation.

Enforcing this legislation will depend on continued mapping of peatland distribution and upon further investigation of its carbon storage.

"We knew that Peru contained substantial peatlands but we previously only had ground data from a few regions, and we didn't realize how extensive the peatlands were. Our high-resolution maps can be used to directly inform conservation and climate mitigation policies and actions such as Nationally Determined Contributions to the Paris Agreement, to avoid further degradation and CO<sub>2</sub> emissions," said lead author Dr. Adam Hastie of the School of GeoSciences, University of Edinburgh.

"Peatlands are increasingly recognized as carbon hotspots and a key

component of the planet's carbon cycle. They store half of all the soil carbon on the planet, but they're vulnerable to human pressures. It's important for all of us that we know where they are so that we can protect them and help to mitigate climate change. This work is the latest result of more than a decade of sustained international collaboration. It has taken a lot of effort by the team, making measurements and collecting samples throughout the [swamp forests](#), to produce this first map of peatlands covering all of Peru's Amazonian region. The next step is to apply the same methods in other parts of the Amazon Basin. There's still a lot to be learned," added Dr. Ian Lawson, international project lead of the University of St. Andrews.

Project partner Dr. Dennis del Castillo Torres, from Instituto de Investigaciones de la Amazonia Peruana, noted, "Our peatlands in Peru have the potential to mitigate climate change because the sustainable use of the most abundant peatland palm species, *Mauritia flexuosa*, can be promoted."

"Conserving peatlands will also support livelihoods and prevent a situation like South-East Asia where almost 80 percent of peatlands have been cleared and drained," observed Dr. Euridice Honorio Coronado, co-author and NERC Knowledge Exchange Fellow of the University of St. Andrews.

**More information:** Adam Hastie et al, Risks to carbon storage from land-use change revealed by peat thickness maps of Peru, *Nature Geoscience* (2022). [DOI: 10.1038/s41561-022-00923-4](https://doi.org/10.1038/s41561-022-00923-4)

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