

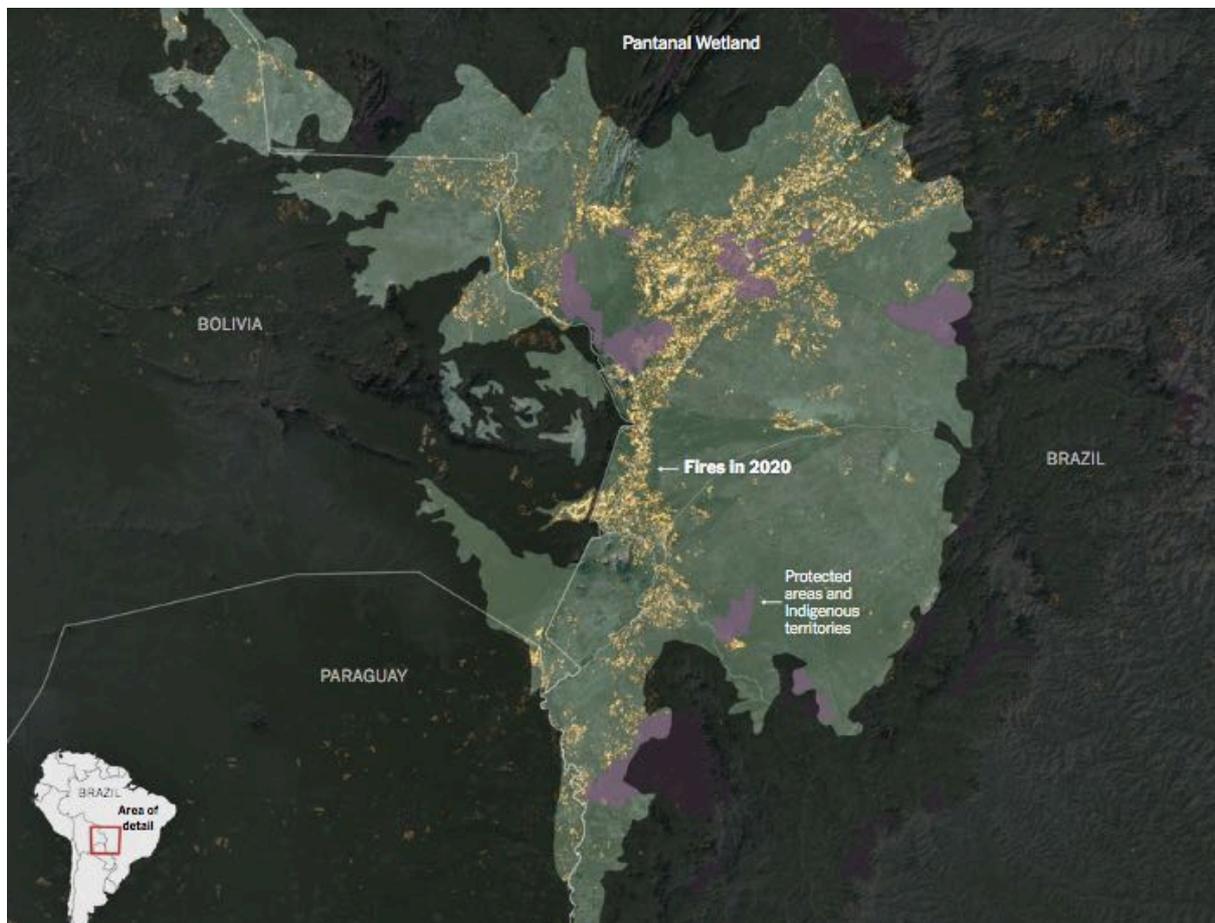
The World's Largest Tropical Wetland Has Become an Inferno

By [Catrin Einhorn](#), Maria Magdalena Arréllaga, [Blacki Migliozi](#) and Scott Reinhard Oct. 13, 2020

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This year, roughly a quarter of the vast Pantanal wetland in Brazil, one of the most biodiverse places on Earth, has burned in wildfires worsened by climate change. What happens to a rich and unique biome when so much is destroyed?

Pantanal Wetland Fires in 2020



By Scott Reinhard and Blacki Migliozi·Source: NASA Fire Information for Resource Management System data as of Oct. 12. Protected areas and indigenous territories from the Amazon Geo-Referenced Socio-Environmental Information Network.

The unprecedented fires in the wetland have attracted less attention than blazes in Australia, the Western United States and the Amazon, its celebrity sibling to the north. But while the Pantanal is not a global household name, tourists in the know flock there because it is home

to exceptionally high concentrations of breathtaking wildlife: Jaguars, tapirs, endangered giant otters and bright blue hyacinth macaws. Like a vast tub, the wetland swells with water during the rainy season and empties out during the dry months. Fittingly, this rhythm has a name that evokes a beating heart: the flood pulse.

The wetland, which is larger than Greece and stretches over parts of Brazil, Paraguay and Bolivia, also offers unseen gifts to a vast swath of South America by regulating the water cycle upon which life depends. Its countless swamps, lagoons and tributaries purify water and help prevent floods and droughts. They also store untold amounts of carbon, helping to stabilize the climate.

For centuries, ranchers have used fire to clear fields and new land. But this year, drought worsened by climate change turned the wetlands into a tinderbox and the fires raged out of control.



Fires raged through the northern Pantanal, in Mato Grosso State, in August. Maria Magdalena Arréllaga for The New York Times

“The extent of fires is staggering,” said Douglas C. Morton, who leads the Biospheric Sciences Laboratory at the NASA Goddard Space Flight Center and studies fire and food production in South America. “When you wipe out a quarter of a biome, you create all kinds of unprecedented circumstances.”

His analysis showed that at least 22 percent of the Pantanal in Brazil has burned since January, with the worst fires, in August and September, blazing for two months straight.

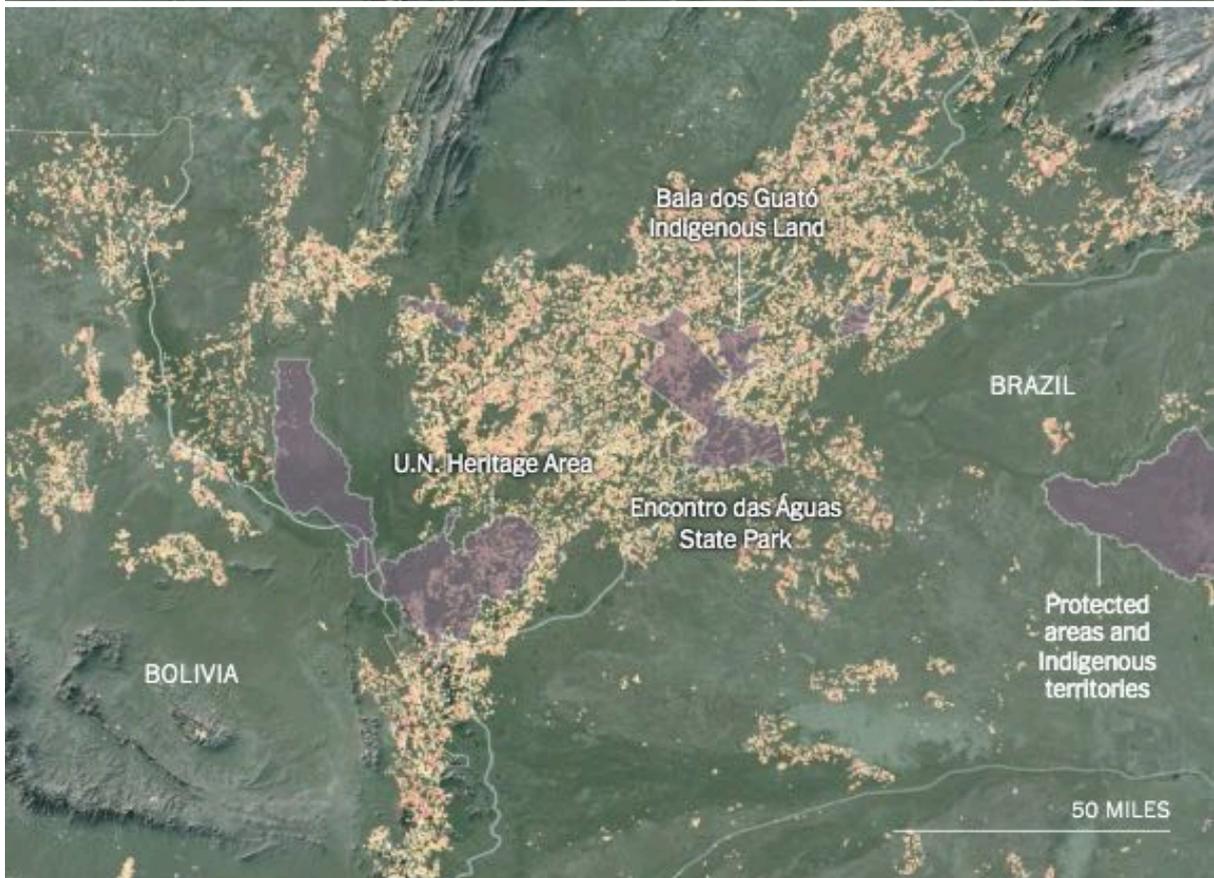
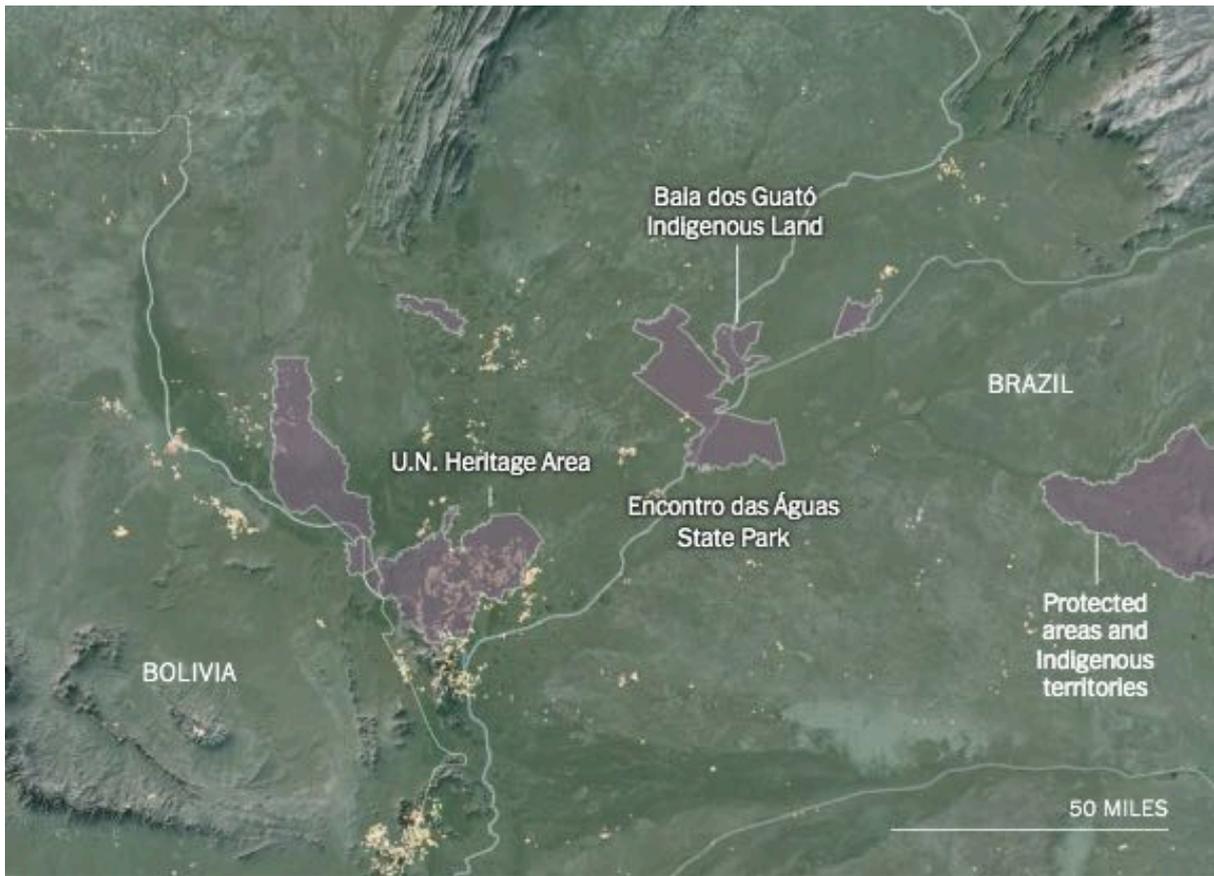
Naturally occurring fire plays a role in the Pantanal, in addition to the burning by ranchers. The flames are usually contained by the landscape’s mosaic of water. But this year’s drought

sucked these natural barriers dry. The fires are far worse than any since satellite records began.

Guató leaders in an Indigenous territory called Baía dos Guató said the fires spread from the ranches that surround their land, and satellite images confirm that the flames swept in from the outside. When fire started closing in on the home of Sandra Guató Silva, a community leader and healer, she fought to save it with the help of her son, grandson and a boat captain with a hose.

Fires in the Pantanal Protected Areas

July - October 2020



Baía dos Guató

By Scott Reinhard and Blacki Migliozi·Source: NASA Fire Information for Resource Management System data as of Oct. 12. Protected areas and indigenous territories from Amazon Geo-Referenced Socio-Environmental Information Network.

For many desperate hours, she said, they threw buckets of river water and sprayed the area around the house and its roof of thatched palm leaves. They succeeded in defending it, but at least 85 percent of her people's territory burned, according to Instituto Centro de Vida, a nonprofit group that monitors land use in the area. Throughout the Pantanal, almost half of the Indigenous lands burned, an investigative journalism organization called [Agência Pública](#) found.

Now Ms. Guató Silva mourns the loss of nature itself. "It makes me sick," she said. "The birds don't sing anymore. I no longer hear the song of the Chaco chachalaca bird. Even the jaguar that once scared me is suffering. That hurts me. I suffer from depression because of this. Now there is a hollow silence. I feel as though our freedom has left us, has been taken from us with the nature that we have always protected."



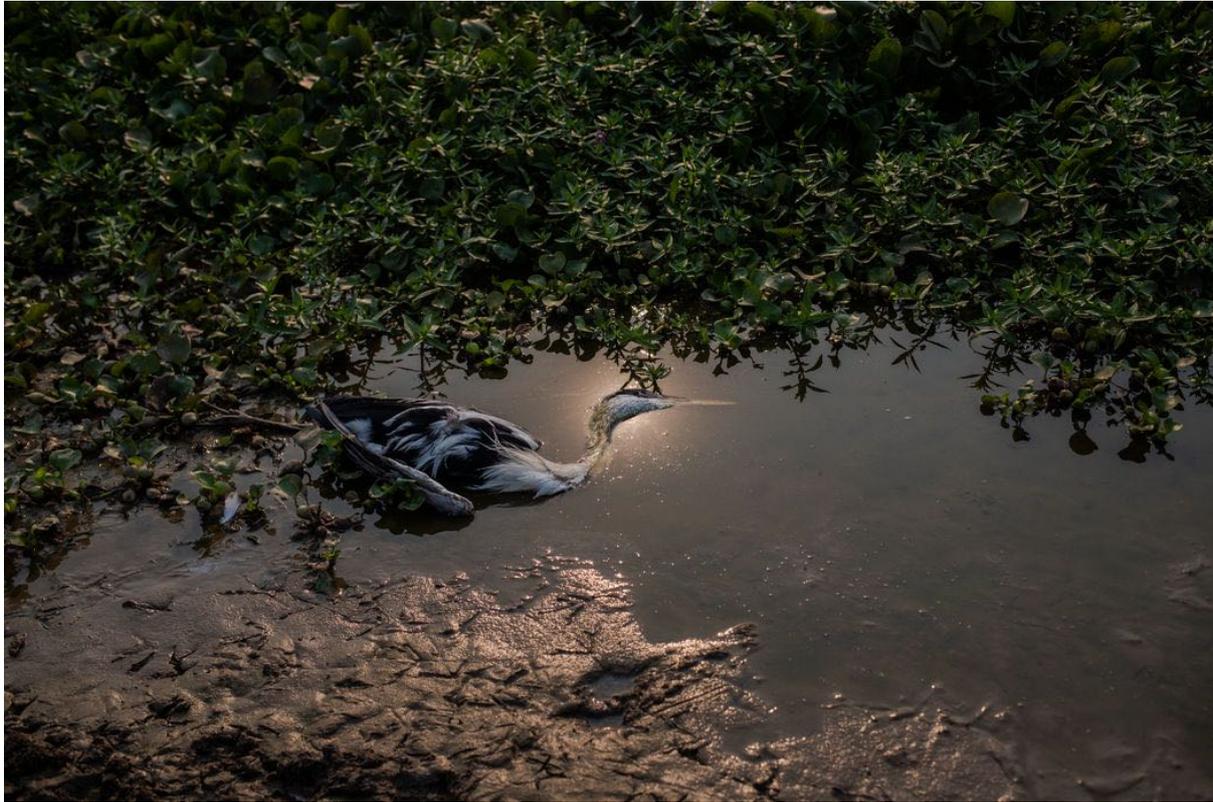
Sandra Guató Silva collected feathers and water hyacinths for a headdress near her home in the Baía dos Guató Indigenous area. Maria Magdalena Arréllaga for The New York Times
Now these people of the wetlands, some still coughing after weeks of smoke, are depending on donations of water and food. They fear that once the rains come in October, ash will run into the rivers and kill the fish they rely on for their food and livelihood.

"I couldn't help but think, our Pantanal is dead," said Eunice Morais de Amorim, another member of the community. "It is so terrible."

Scientists are scrambling to determine an estimate of animals killed in the fires. While large mammals and birds have suffered casualties, many were able to run or fly away. It appears that reptiles, amphibians and small mammals have fared the worst. In places like California,

small animals often take refuge underground during wildfires. But in the Pantanal, scientists say, fires burn underground too, fueled by dried-out wetland vegetation. One of the hard-hit places was a national park designated as a [United Nations World Heritage site](#).

“I don’t want to be an alarmist,” said José Sabino, a biologist at the Anhanguera-Uniderp University in Brazil who studies the Pantanal, “but in a region where 25 percent has burned, there is a huge loss.”



A dead heron in the Baía dos Guató Indigenous area. Maria Magdalena Arréllaga for The New York Times

As the worst flames raged in August and September, biologists, ecotourism guides and other volunteers turned into firefighters, sometimes working 24 hours at a time. Fernando Tortato, a conservation scientist with Panthera, a group that advocates for big cats, visited the Pantanal in early August to install cameras for his research monitoring jaguars and ocelots. But he found the camera sites burned.

“I said to my boss, I need to change my job,” Mr. Tortato said. “I need to be a firefighter.” Instead of returning home to his family, he spent much of the next two months digging fire breaks with a bulldozer in an urgent attempt to protect forested areas.

One day in September, working under an orange sky, he and his team finished a huge semicircular fire break, using a wide river along one side to protect more than 3,000 hectares, he said, a vital refuge for wildlife. But as the men stood there, pleased with their accomplishment, they watched as flaming debris suddenly jumped the river, igniting the area they thought was safe. They raced into boats and tried to douse the spread, but the flames quickly climbed too high.

“That’s the moment that we lost hope, almost,” Mr. Tortato said. “But the next day we woke up and started again.”



A jaguar in the Encontro das Águas State Park, more than 85 percent of which has burned. Maria Magdalena Arréllaga for The New York Times

Mr. Tortato knows of three injured jaguars, one with third-degree burns on her paws. All were treated by veterinarians. Now, biologists are braced for the next wave of deaths from starvation; first the herbivores, left without vegetation, and then the carnivores, left without the herbivores.

“It’s a cascade effect,” Mr. Tortato said.

Animal rescue volunteers have flocked to the Pantanal, delivering injured animals to pop-up veterinary triage stations and leaving food and water for other animals to find. Larissa Pratta Campos, a veterinary student, has helped treat wild boar, marsh deer, birds, primates and a raccoon-like creature called a coati.

“We are working in the middle of a crisis,” Ms. Pratta Campos said. “I have woken up many times in the middle of the night to tend to animals here.”

Last week, the [O Globo newspaper reported](#) that firefighting specialists from Brazil's main environmental protection agency were stymied by bureaucratic procedures, delaying their deployment by four months.



Veterinarians and volunteers in Poconé, Mato Grosso, changed the bandages of a coati that was burned. Maria Magdalena Arréllaga for The New York Times

Given the historic scope of the fires, their long-term consequences on the Pantanal are unclear. The ecosystem's grasslands may recover quickly, followed by its shrublands and swamps over the next few years, said Wolfgang J. Junk, a scientist who specializes in the region. But the forests will require decades or centuries.

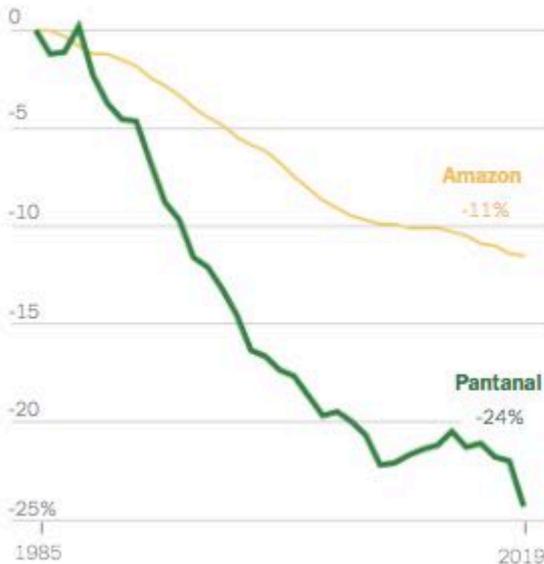
Even more critical than the impact of this year's fires, scientists say, is what they tell us about the underlying health of the wetlands. Like a patient whose high fever signals a dangerous infection, the extent of the wildfires is a symptom of grave threats to the Pantanal, both from inside and out.

More than 90 percent of the Pantanal is privately owned. Ranchers have raised cattle there for hundreds of years, and ecologists emphasize that many do so sustainably. But new farmers are moving in, often with little understanding of how to use fire properly, said Cátia Nunes, a scientist from the Brazilian National Institute for Science and Technology in Wetlands. Moreover, cattle farming in the highlands has put pressure on local farmers to increase the size of their herds, using more land as they do so.

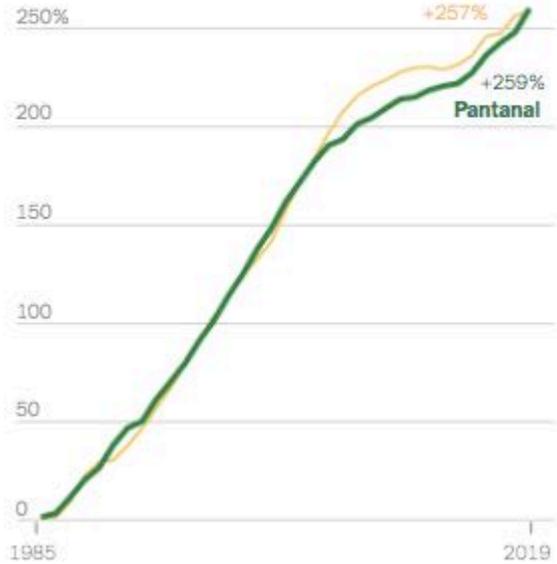
Forests Are Falling, Agriculture Is Rising

Percentage change in Brazilian land use

Forests



Agriculture



Source: MapBiomas Project - Collection 5.0 of the Annual Coverage and Land Use

Source: MapBiomas Project - Collection 5.0 of the Annual Coverage and Land Use

Eduardo Eubank Campos, a fifth-generation rancher, remembers his family using controlled burns to clear the land when he was a boy. He said they stopped after adding an ecotourism lodge to their 7,000 hectare property, which now includes reserves and fields on which they raise about 2,000 head of cattle and horses. This year, thanks to firebreaks, a water tank truck and workers quickly trained to fight fire, they were able to keep the flames at bay. The worst impact was on his ecotourism business, hit first by the coronavirus and then by the wildfires. It brings in three-quarters of his revenue.

Mr. Eubank Campos struggles to understand who would set fires when the land was so dry. “Pantaneiros know this is not the time to do burns,” Mr. Eubank Campos said, using a term for the locals that also conveys a culture built up over centuries ranching in the wetland. “They don’t want to destroy their own land.”

The Brazilian federal police are investigating the fires, some of which appear to have been [illegally targeting](#) forests.

Still, when asked about the biggest threat to the Pantanal, Mr. Eubank Campos’s answer highlights the region’s political and cultural fault lines. “I fear those organizations that come here wanting to exploit the issue and eventually ‘close’ the Pantanal, turn it into one big reserve and kick out the Pantaneiros,” he said.

Brazil’s president, Jair Bolsonaro, who campaigned on a promise to weaken conservation regulations, is popular in the region.



A farmer tried to put out a fire near the Trans-Pantanal Highway in late August. Maria Magdalena Arréllaga for The New York Times

But Mr. Eubank Campos agrees with ecologists on a major threat to the Pantanal that comes from its borders and beyond.

Because ecosystems are interconnected, the well-being of the wetland is at the mercy of the booming agriculture in the surrounding highlands. The huge fields of soy, other grains and cattle — commodities traded around the world — cause soil erosion that flows into the Pantanal, clogging its rivers so severely that some have become accidental dams, robbing the area downstream of water.

The rampant deforestation and related fires in the neighboring Amazon also create a domino effect, disrupting the rainforest’s “flying rivers” of precipitation that contribute to rainfall to the Pantanal. Damming for hydroelectric power deflects water away, scientists say, and a proposal to channelize the wetland’s main river would make it drain too quickly.

But perhaps the most ominous danger comes from even further afield: climate change. The effects that models have predicted, a much hotter Pantanal alternating between severe drought and extreme rainfall, are already being felt, scientists say. [A study published](#) this year found that climate change poses “a critical threat” to the ecosystem, damaging biodiversity and impairing its ability to help regulate water for the continent and carbon for the world. In less than 20 years, it found that the northern Pantanal may turn into a savanna or even an arid zone.

“We are digging our grave,” said Karl-Ludwig Schuchmann, an ecologist with Brazil’s National Institute of Science and Technology in Wetlands and one of the study’s authors.

To save the Pantanal, scientists offer solutions: Reduce climate change immediately. Practice sustainable agriculture in and around the wetland. Pay ranchers to preserve forests and other natural areas on their land. Increase ecotourism. Do not divert the Pantanal’s waters, because its flood pulse is its life.

“Everybody talks about, ‘we have to avoid this and that,’” Dr. Schuchmann said. “But little is done.”



A dead caiman in a burned area near the Trans-Pantanal Highway. Maria Magdalena Arréllaga for The New York Times

An earlier version of this article misspelled the surname of a veterinary student treating injured animals. She is Larissa Pratta Campos, not Larissa Prado Campos.

Ernesto Londoño contributed reporting.

The world's largest wetlands are on fire. That's a disaster for all of us

By [Ivana Kottasová](#), Henrik Pettersson and Krystina Shveda, CNN

Updated 1533 GMT (2333 HKT) November 13, 2020

(CNN) The world watched as [California](#) and the [Amazon](#) went up in flames this year, but the largest tropical wetland on earth has been ablaze for months, largely unnoticed by the outside world. South America's Pantanal region has been hit by the worst wildfires in decades. The blazes have already [consumed about 28%](#) of the vast floodplain that stretches across parts of Brazil, Bolivia and Paraguay. They are still not completely under control.



The Amazon's frontline defenders are under siege. The fires have destroyed [unique habitats](#) and wrecked the livelihoods of many of the Pantanal's diverse indigenous communities. But their damaging impact reaches far beyond the region.

•

Wetlands like the Pantanal are Earth's most effective carbon sinks -- ecosystems that absorb and store more carbon than they release, keeping it away from the atmosphere. At roughly 200,000 square kilometers, the Pantanal comprises about 3% of the globe's wetlands and plays a key role in the carbon cycle.

When these carbon-rich ecosystems burn, vast amounts of heat-trapping gases are released back into the atmosphere, contributing to the greenhouse effect.

"The Pantanal is very important for the planet, it has unique wild areas that are fundamental to life on Earth," said Andre Luiz Siqueira, the CEO of ECOA, an environmental NGO based in the Brazilian state of Mato Grosso do Sul. "It is vital that it [receives] as much attention as the Amazon."

Brazil's [National Institute of Space Research](#) (INPE) has detected more than 21,200 fires in the Pantanal biome so far this year, a figure that is already 69% higher than the full-year record from 2005, when INPE recorded roughly 12,500 fires. There were 8,106 fires in September alone -- more than four times the historic average for the month.

Alberto Setzer, a senior scientist at INPE, said satellite data shows the fires are the worst since records began in 2002, both in terms of the number of individual blazes and the area burnt.

The Pantanal's distinctive habitats rely on what scientists call the "flood pulse." During the wet season between November and March, three quarters of the plain gets flooded, only for much of the water to drain away during the dry months, from April to September. This seasonal flooding makes the Pantanal a unique biome where large swaths of land regularly turn from terrestrial into aquatic habitats and back again.

The area is home to thousands of endangered or unusual species, including jaguars, capybaras, black caimans, giant otters and hyacinth macaws. It's also an important stop on the routes of around 180 species of migratory birds.



An aerial view of fires in the Pantanal, near the Transpantaneira park road which crosses the world's largest tropical wetland, on September 12, 2020. According to the World Wide Fund for Nature (known as the World Wildlife Fund in the US and Canada), the Pantanal boasts the greatest concentration of wildlife in South America -- higher than that of its more famous northern neighbor, the Amazon.

But this year's dry season has been the most severe since the 1970s. "There has been a climate emergency situation, with a great drought, never seen before," Siqueira said.

Occasional wildfires are normal in the Pantanal, so much so that some plants in the region developed resistance to fires -- for example by growing thick bark or covering their seeds with hard shells. But the unusually dry conditions this year have seen the blazes spread further

and faster because there were fewer natural water barriers. Even areas that normally stay wet have turned into tinderboxes.

It's all connected

The fires ripping through the Pantanal are an example of a natural disaster that is exacerbated by climate change while simultaneously making the problem worse.

Extreme weather events, such as drought and floods, are becoming more frequent and more severe around the world, and the Pantanal is no exception. There are indications that the region is getting drier and warmer as the global temperatures rise.



A recently-burned area of the Encontro das Aguas park in the Pantanal wetlands, pictured on September 12, 2020.

This year's record dry season can be traced back to 2019, when the Upper Paraguay Basin experienced unusually low rainfall.

Biologist Debora Calheiros, who has been researching ecosystems in the Pantanal for decades, said official data showed precipitation had been

below the long-term average over the past decade, but in the past two years had dropped further to just 70% of the average.

The region's rain patterns are also changing. While the amount of overall precipitation might not be dramatically different, the rains are becoming more extreme and concentrated over shorter periods of time.

Climate change is just one part of the problem. Large-scale deforestation in the Amazon rainforest to the north and the Cerrado savanna to the east are also having profound effects on the Pantanal.

Ecology and conservation expert Leticia Larcher said deforestation was shortening rainy seasons and making droughts more severe in central and southeastern Brazil. She explained that it was impacting the "flying rivers" phenomenon, a crucial process in which a stream of moisture arising from the forest travels to other areas such as the Pantanal, where the water-filled air becomes colder and turns into rain.

"As the forest decreases and loses its ecological functions, the environmental service it provides is also being lost," Larcher said.

Mostly man-made

While fires ignited by lightning sometimes occur naturally in the Pantanal, Larcher, who works for environmental NGO Instituto Homem Pantaneiro, said this year's fires have mostly been caused by people. This is despite the [Brazilian government's ban on fires for 120 days](#) in the Amazon and the Pantanal that was issued in July.

But Siqueira said the ban wasn't being enforced strictly enough. "There are extensive areas (where) livestock farmers have regularly used fire as a way to clear farm fields," said Siqueira. "This year, even with the governmental ban ... these producers set fire that ended up spreading for thousands of acres due to the great drought."

As the global demand for agricultural products rises, so commercial farmers clear more of the Pantanal's native vegetation for growing and grazing. Brazil is already the world's leading exporter of beef. As the demand for meat rises around the world, so does deforestation in the Amazon.

Sugarcane, cotton and soybeans are other lucrative options. When US President Donald Trump imposed punitive tariffs on Chinese exports in 2018, Beijing retaliated by placing a new 25% tariff on American soybeans, forcing Chinese buyers to look for alternative sources of the protein-rich commodity.

Brazil was ready to step in. The US Department of Agriculture expects the South American country to have record soybean production this year, and the land area used keeps growing. A soy moratorium, in place since 2006, banned deforestation for the crop in the Amazon -- but those protections don't apply in the Pantanal and Cerrado.

Siqueira and many others, including global environmental advocacy groups such as Greenpeace, Wetlands International and the WWF, blame the policies of Brazilian President Jair Bolsonaro and his Environment Minister Ricardo Salles for the devastation.

"It's a direct result of the dismantling of the Brazilian environmental agenda and its institutions under the current government," Siqueira said, pointing to deregulation and funding cuts for monitoring agencies.

"[There are] less actions to prevent fires, dismantling of responsible federal institutions, and omission at federal and state levels," said biologist Debora Calheiros, who has been researching ecosystems in the Pantanal for decades. "Actually, it was the civil society that readily responded to rescue, save, feed and offer water to the surviving animals

and help traditional riverine and indigenous people with food and mineral water," she added.

Addressing the United Nations General Assembly (UNGA) in September, [Bolsonaro refused to accept](#) any blame for the fires, claiming instead that they were an "inevitable consequence of high local temperature, coupled with the accumulation of decaying organic matter."



Out of control forest fire burns the area of the Brazilian Pantanal in rural Mato Grosso.

Bolsonaro, who has repeatedly rejected criticism of his government's stance on the environment and has accused foreign actors of a "brutal disinformation campaign" on the issue, told the UNGA that no other country protected as much wild territory as Brazil.

Speaking to CNN's affiliate CNN Brasil last month, Salles, the environmental minister, doubled down on Bolsonaro's message. He blamed the fires on the drought and said farmers had no interest in burning the land, because they rely on it economically.

The government eventually recognized the Pantanal fires as a federal emergency and sent funding into the area, but for many, this was too little, too late.

The government's policies, Siqueira says, send a "clear message of impunity of environmental crimes."



Staff members treat a wounded jaguar at an animal protection center in Goias State, Brazil, on September 27, 2020.

Parts of the Pantanal have been designated a biosphere conservation area and recognized as a UNESCO World Heritage site, but overall, less than 5% of the region is under formal protection, according to the WWF. More than 90% is privately owned by ranchers, farmers and conservation groups, with 80% of that private land used for cattle farming, according to Brazil's environment ministry.

The fires burned millions of acres of flowering plants, starving pollinators and leaving no food for other animals.



Brazilian court blocks government's decision to revoke key mangrove protections
The blazes are hurting local people too. The Pantanal is home to a number of indigenous and traditional communities, which have settled on the banks of the rivers and make their living from fishing and small-scale agriculture. "Riverside communities, which traditionally survive on artisanal fishing, build their culture there strictly linked to the biome," Larcher said.

Fires are still raging in parts of the Pantanal, but recovery efforts are already underway.

The biome has gone through periods of harsh drought in the past. However, Calheiros said the ecosystems are much more fragile than they were just a few decades ago and their capacity to recover is uncertain. The environmental damage inflicted on the Pantanal is also much greater, she added.

- Siqueira said it could take decades to restore what the blazes took. "This will only be possible if we have a normal rainfall from 2020 to 2021," he said. If there is more drought, he added, the recovery of the plants and animals living in the Pantanal will be much more difficult.

Correction: An earlier version of this article included a photo caption that misidentified a big cat as a leopard. It is a jaguar.

