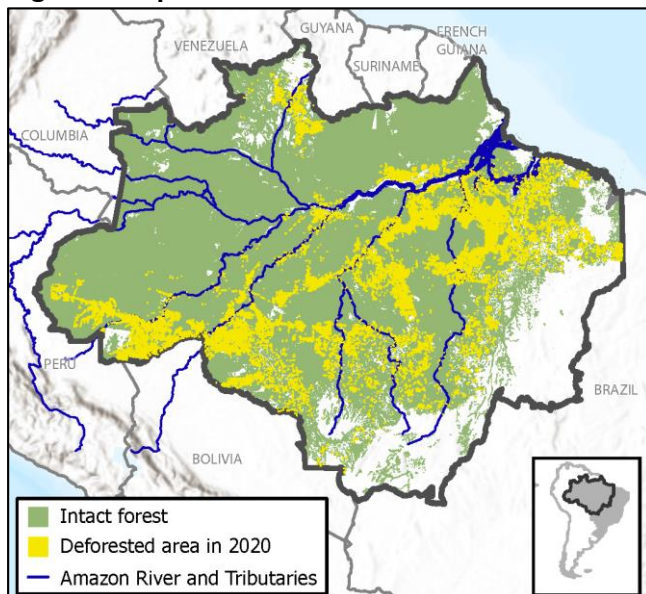


Updated January 5, 2021

Fire and Deforestation in the Brazilian Amazon

Fires in the Brazilian Amazon forest have received widespread media attention in recent years and have raised congressional concern. This is due to an increase in fire events and deforestation rates in the region compared with most years in the past decade, as well as to statements made by Brazilian President Jair Bolsonaro indicating his intent to pursue development in the region. In particular, much attention was given to the fires in late 2019, when the observed number of fire hotspots was higher than in six of the previous nine years. The 2020 fire season appears to have continued along this trend; the numbers of observed hotspots in September and October 2020 were higher than during the same months in 2019. Deforestation rates in the region continue to rise, and 2020 saw the highest rates since 2008. See **Figure 1** for locations of deforested areas.

Figure 1. Map of the Brazilian Amazon



Source: CRS, using compiled satellite data provided by the Instituto Nacional de Pesquisas Espaciais (INPE), December 2020.

Notes: The *Legal Brazilian Amazon* is a defined area under Brazilian law that comprises nine states that contain the Amazon forest.

The fate of the Amazon forest is a concern for many stakeholders, including some Members of Congress, because of the forest's biodiversity, role in the global carbon cycle, and effect on regional climate. The Amazon forest extends through several countries in South America, including Peru, Bolivia, and Colombia, with approximately 62% of the Amazon located in Brazil. It comprises approximately 40% of all remaining tropical rainforests and is estimated to contain one-half of all global terrestrial carbon in tropical forests, according to scientific studies. Some scientists claim that 20%–25% deforestation in the

Amazon could shift it to a non-forest ecosystem, thus endangering the current ecological services it provides.

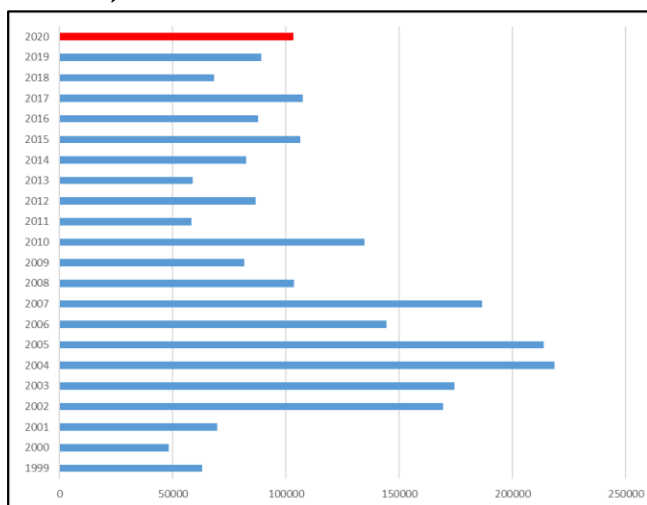
Fire in the Brazilian Amazon

Humans intentionally set the majority of fires in the Brazilian Amazon. Most of the fires are set every year from July to October to burn recently cleared trees and woody debris, crop residue, overgrown pastures, and roadside vegetation. This is done to prepare land for pastures and crops and typically is referred to as *slash-and-burn agriculture*. Burning vegetation transfers nutrients to poor tropical soils and facilitates land clearing.

These intentionally set fires can spread beyond their intended perimeters into neighboring forests and fields. Fires in the Amazon are largely low-lying, and they mainly affect the bark of larger trees and consume understory saplings and seedlings. These types of fires can cause tree damage or mortality. Excess tree mortality creates gaps in the forest, which can alter the ecosystem by increasing woody fuels and dryness. This alteration increases the forest's susceptibility to more severe fires in the future. The extent and spread of fires in the Brazilian Amazon also can be exacerbated by droughts or long-term reductions in precipitation and moisture. For example, an *El Niño* event (i.e., typically less precipitation) can increase the susceptibility, severity, and extent of some fires.

The number of fire hotspots in the Brazilian Amazon—burning activity detected by satellite—has increased in recent years. The number of hotspots in the Legal Brazilian Amazon in 2020 was nearly 16% higher than in 2019.

Figure 2 shows a general upward trend in the number of hotspots since 2011, though recent years have not reached the peaks seen in 2002–2007.

Figure 2. Annual Fire Hotspots in the Legal Brazilian Amazon, 1999-2020

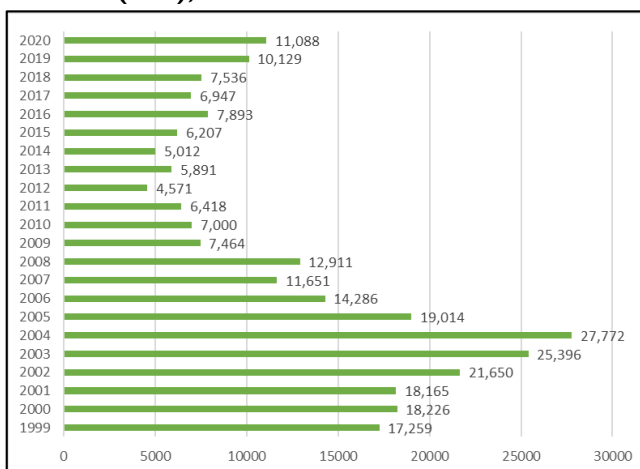
Source: CRS, using data from INPE, January 2021.

Fire hotspots in the Brazilian Amazon are calculated from satellite data, which cannot determine the size of individual fires; detect fires under the tree canopy; or distinguish if burning is on pastures, cropland, or cleared forests. However, scientists assert that most fires are burning in previously cleared areas and not in intact forests.

Deforestation in the Brazilian Amazon

Incidences and the extent of fires in the Brazilian Amazon are linked to drought and deforestation, according to scientists. Studies attribute the high incidences of fire in the Brazilian Amazon in 2007 and 2010 to droughts. Annual deforestation rates have increased in recent years from a low in 2012 (**Figure 3**). Nearly 11,100 square kilometers (km²) of the Brazilian Amazon was deforested in the annual monitoring period that ended in July 2020. Although that figure is well below Brazil's deforestation rates from 1999-2006, it is the highest rate since 2008 and nearly three times higher than the 3,925 km² target for 2020 that the Brazilian government set in 2010 under its national policy on climate change. The Brazilian government reports that deforestation declined in the last few months of 2020 compared with the same months in 2019; however, it is unclear if this decline represents a trend change.

Cattle ranching, logging, and large-scale agriculture are the main drivers of deforestation in the Brazilian Amazon. Some economists have linked changes in deforestation rates to international demand for Brazilian agricultural commodities. Other researchers contend that government policies explain some variation in deforestation rates; they note that a decline in the Brazilian Amazon's deforestation rate after 2005 corresponded with an expansion of protected areas, increased monitoring, and more rigorous enforcement of environmental laws. As the current Brazilian administration has backed away from some of those efforts and commodity prices have risen for Brazilian products, deforestation has increased. Further, some observers argue President Bolsonaro's statements regarding increased development in the Amazon encouraged illegal land occupations and deforestation.

Figure 3. Annual Deforestation in the Legal Brazilian Amazon (km²), 1999-2020

Source: CRS, using PRODES data from INPE, December 2020.

International Response

Some governments, businesses, and investors have expressed alarm over the situation in the Brazilian Amazon and pressed the Brazilian government to take action. France and several other European governments indicated they would not ratify a free-trade agreement between the European Union and the Southern Common Market, which includes Brazil, until the Brazilian government reduced deforestation. Norway and Germany suspended their contributions to Brazil's Amazon Fund, which finances conservation and sustainable development efforts, due to the Bolsonaro administration's policies. Some international businesses and investors threatened to halt purchases of Brazilian products and divest from Brazilian companies unless Brazil mitigates the reputational and financial risks posed by continued deforestation.

The Brazilian government rejects the notion that the Amazon is a global public good. It stresses Brazil's sovereignty over the Brazilian Amazon and Brazil's right to develop the region in accordance with its national interests. President Bolsonaro dismissed international concerns over deforestation and fires, asserting that Brazil is the victim of a "disinformation campaign." Nevertheless, the international pressure appears to have spurred the Brazilian government to deploy troops to the Brazilian Amazon and impose moratoriums on burning. Critics contend these measures are ineffective and claim Brazil is reducing overall environmental enforcement efforts.

The Trump Administration has refrained from criticizing Brazil's environmental policies and continues to provide assistance to Brazil for conservation efforts, primarily through the U.S. Agency for International Development and the U.S. Forest Service. Congress appropriated \$15 million for environmental programs in the Brazilian Amazon, including \$5 million to address fires in the region, in FY2020 (P.L. 116-94) and \$17 million for programs in the Brazilian Amazon in FY2021 (P.L. 116-260). This funding is being used to help Brazil manage protected areas, encourage the private sector to improve sustainable livelihoods for Amazonian communities, and provide science and technology to improve conservation practices, among other activities.

Issues for Congress

Some Members of Congress have expressed interest in legislation to protect the Brazilian Amazon. For example, H.R. 4263, introduced in the 116th Congress, would have provided the Administration with authority to restrict Brazilian imports and prohibit some security cooperation and trade negotiations with Brazil in response to the Bolsonaro administration's environmental policies.

Congress also could consider whether to expand funding for forest conservation and restoration programs—including

programs aimed at combatting poverty and supporting indigenous communities; incentivizing supply chain transparency; and funding projects to incentivize forest conservation through direct payments (REDD+ projects).

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