

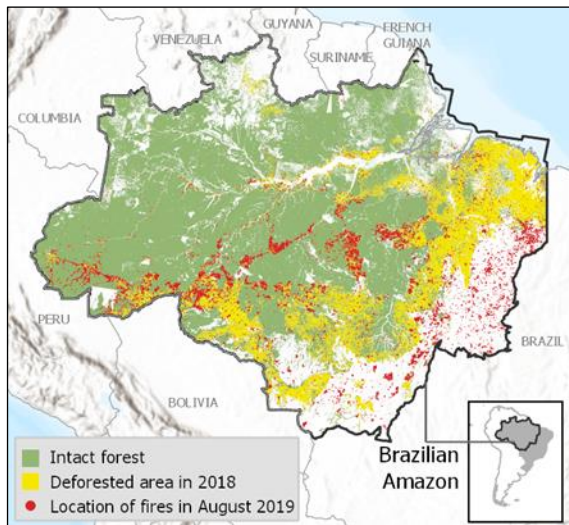


September 9, 2019

Fire and Deforestation in the Brazilian Amazon

Media coverage of fires in the Brazilian Amazon forest is widespread. According to stakeholders, this media coverage is largely due to an increase in fire events and deforestation rates in the region this year compared to the past years, as well as statements made by Brazilian President Jair Bolsonaro indicating his intent to pursue development in the region.

Figure 1. Map of the Legal Brazilian Amazon



Source: Compiled from satellite data provided by the Instituto Nacional de Pesquisas Espaciais (INPE) by CRS, September 2019.

Notes: Dots are locations of hotspots and do not indicate size of fires. The Legal Brazilian Amazon is a defined area under Brazilian law that comprises nine states that contain the Amazon forest.

The Amazon forest (Amazon) extends through several countries in South America, including Peru, Bolivia, and Colombia, with approximately 62% of the Amazon located in Brazil (**Figure 1**). The Amazon is estimated to contain one-half of all global terrestrial carbon in tropical forests and consists of approximately 40% of all remaining tropical rainforests, according to scientific studies. The fate of the Amazon is a concern for many because of the biodiversity it hosts, its role in the global carbon cycle, and its effect on regional climate. Some scientists claim that 20%-25% deforestation in the Amazon can cause it to shift to a nonforest ecosystem, exacerbating the concerns above.

Fire in the Amazon

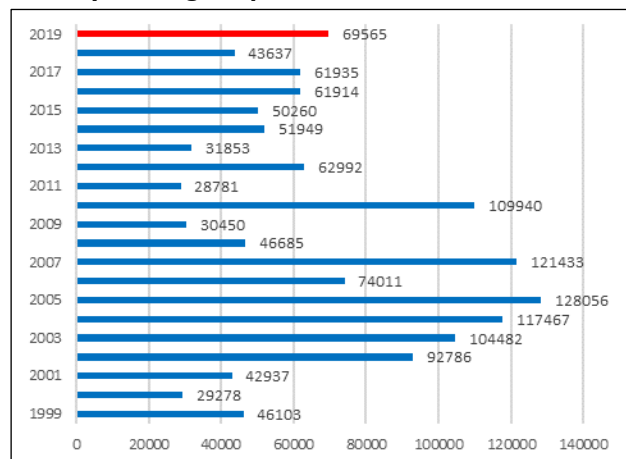
Humans intentionally set the majority of fires in the Amazon, largely for agricultural purposes. Most of the fires in the Brazilian Amazon are set every year from approximately July to October to burn recently cleared trees and woody debris, crop residue, overgrown pastures, and roadside vegetation. This is done to prepare land for pastures and crops and is typically referred to as slash and

burn agriculture. Burning plant and woody debris transfers nutrients to poor tropical soils and facilitates land clearing.

These intentionally set fires can spread beyond their intended perimeters into virgin forests and neighboring fields. Fires in pristine forests are largely low-lying, and they mainly affect the cambium layer of the bark of larger trees and consumes understory saplings and seedlings. These types of fires can cause tree damage or mortality in rainforest ecosystems. Excess tree mortality creates gaps in the forest, which can alter the ecosystem and increase the susceptibility of forests to more severe future fires. The extent and spread of fires in the Amazon can also 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.

Many observers are concerned about fires in the Brazilian Amazon this year because the number of fire hotspots—burning activity detected by satellite—in the Brazilian Amazon are higher than they were at this time in the last several years (**Figure 2**). The number of hotspots in the Legal Brazilian Amazon in 2019 through September 6 is approximately 60% more than in 2018, according to satellite data. However, over the past 20 years (1999-2018), the number of hotspots in the Brazilian Amazon observed through September 6 are approximately equal to the average of 66,847 hotspots during the same period and approximately half of the peak number of hotspots in that period in 2005. August is early in the burning season, the number of fires has historically risen through September and October in the Brazilian Amazon.

Figure 2. Fire Hotspots in the Legal Brazilian Amazon Annually Through September 6 of Each Year



Source: Data from INPE, September 2019.

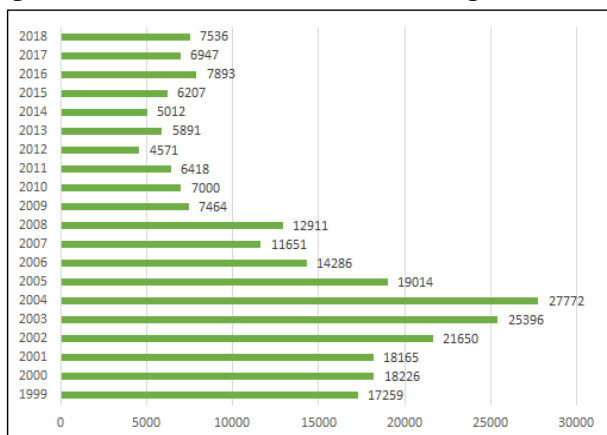
Fire hotspots in the Amazon are calculated from satellite data, which cannot determine the size of individual fires; detect fires under the tree canopy; or distinguish if burning is on pastures, cropland, or cleared forests. However, scientists assert that most fires are burning in previously cleared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

Deforestation in the Amazon

Incidences and extent of fire in the Brazilian Amazon is linked to drought and deforestation, according to scientists. Studies attribute droughts to high incidences of fire in the Brazilian Amazon in 2007 and 2010. In recent years, rates of deforestation have been fairly steady (**Figure 1**), although from July to August 2019, approximately 13,000 km² of the Brazilian Amazon was deforested, which is higher than the total amount of deforestation in the last several years. This has led several observers to assert that the amount of deforestation in 2019 could be one of the highest annual amounts in several years.

Cattle ranching, logging, and large-scale agriculture are the main drivers of deforestation in the 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 rate of deforestation in the Brazilian Amazon after 2005 corresponded with an expansion of protected areas, increased monitoring, and more rigorous enforcement of environmental laws.

Figure 3. Annual Deforestation in the Legal Amazon



Source: PRODES data from INPE, accessed August 30, 2019. In km². As the current Brazilian Administration has backed away from some of those efforts and commodity prices have risen for Brazilian products, deforestation is increasing in 2019, according to some observers. Further, some observers also speculated that Bolsonaro's statements about increasing development in the Amazon is encouraging deforestation activities.

International Response

Some governments have expressed alarm over the fires in the Amazon. French President Emmanuel Macron declared the situation "an international crisis," and incorporated it into the agenda of the August 2019 Group of Seven (G7) summit. Several G7 governments ultimately pledged \$20 million to combat the fires. The United States, which offered assistance to Brazil separately, did not support the

initiative because President Bolsonaro had not been consulted.

Brazilian governments have long rejected the notion that the Amazon is a global public good. They have stressed Brazil's sovereignty over the Brazilian Amazon and the country's right to develop the region in accordance with its national interests. President Bolsonaro initially dismissed concerns about the fires, and he asserted that President Macron's decision to discuss the situation at the G7 evoked "a colonialist mentality." Bolsonaro also initially rejected the G7's assistance. Nevertheless, international pressure appears to have spurred Bolsonaro to action; he has deployed 40,000 Brazilian troops to the Amazon to combat the fires, decreed a 60-day ban on burning, and accepted some international assistance.

The United States provides development assistance to Brazil for conservation efforts, primarily through the U.S. Agency for International Development (USAID) and U.S. Forest Service. In FY2019, Congress appropriated \$11 million for Brazilian Amazon environmental programs, which is available for conservation projects; encouraging the private sector to improve sustainable livelihoods for the Amazon communities; and using science and technology to improve conservation practices, among other activities. The United States also conducted a debt-for-nature swap with Brazil under the authority of the Tropical Forest Conservation Act (22 U.S.C. §§2431, et seq.), which generated an estimated \$21 million in conservation funds from 2010 to 2015.

Some European governments have suspended assistance to Brazil due to concerns about the Bolsonaro Administration's lack of commitment to reducing deforestation and fires. In August 2019, for example, Germany and Norway announced the suspension of \$72 million intended for Brazil's Amazon Fund, which finances conservation and sustainable development efforts.

Several governments are also considering using trade policy to exert pressure on Brazil. Finland, for example, raised the possibility of the European Union (EU) banning imports of Brazilian beef while other countries threatened to block a proposed trade agreement between the EU and the Southern Common Market (Mercosur), which includes Brazil, Argentina, Paraguay, and Uruguay. Some Members of Congress have expressed interest in legislation that would ban certain imports from Brazil, freeze targeted aid to Brazil, and prevent a free trade agreement with Brazil until the country addresses environmental concerns.

Private companies are also facing pressure to address deforestation. In 2006, most major soybean traders signed an agreement not to purchase soybeans grown on Amazon lands deforested after 2006. Some companies have responded to the fires in a similar fashion, halting purchases of leather and other products from Brazil while they attempt to verify that their supply chains do not contribute to deforestation.

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