

Dryness and available fuel forecasted fire in 2021

Keeping the Amazon rainforest standing is critical to limiting the atmospheric build-up of greenhouse gasses driving climate change. Fires, largely driven by illegal deforestation, are a major source of emissions from the Amazon. Fires set to clear forests for use as pasture or cropland can spread easily through weakened and dried out forest edges, damaging the uncut forests beyond.

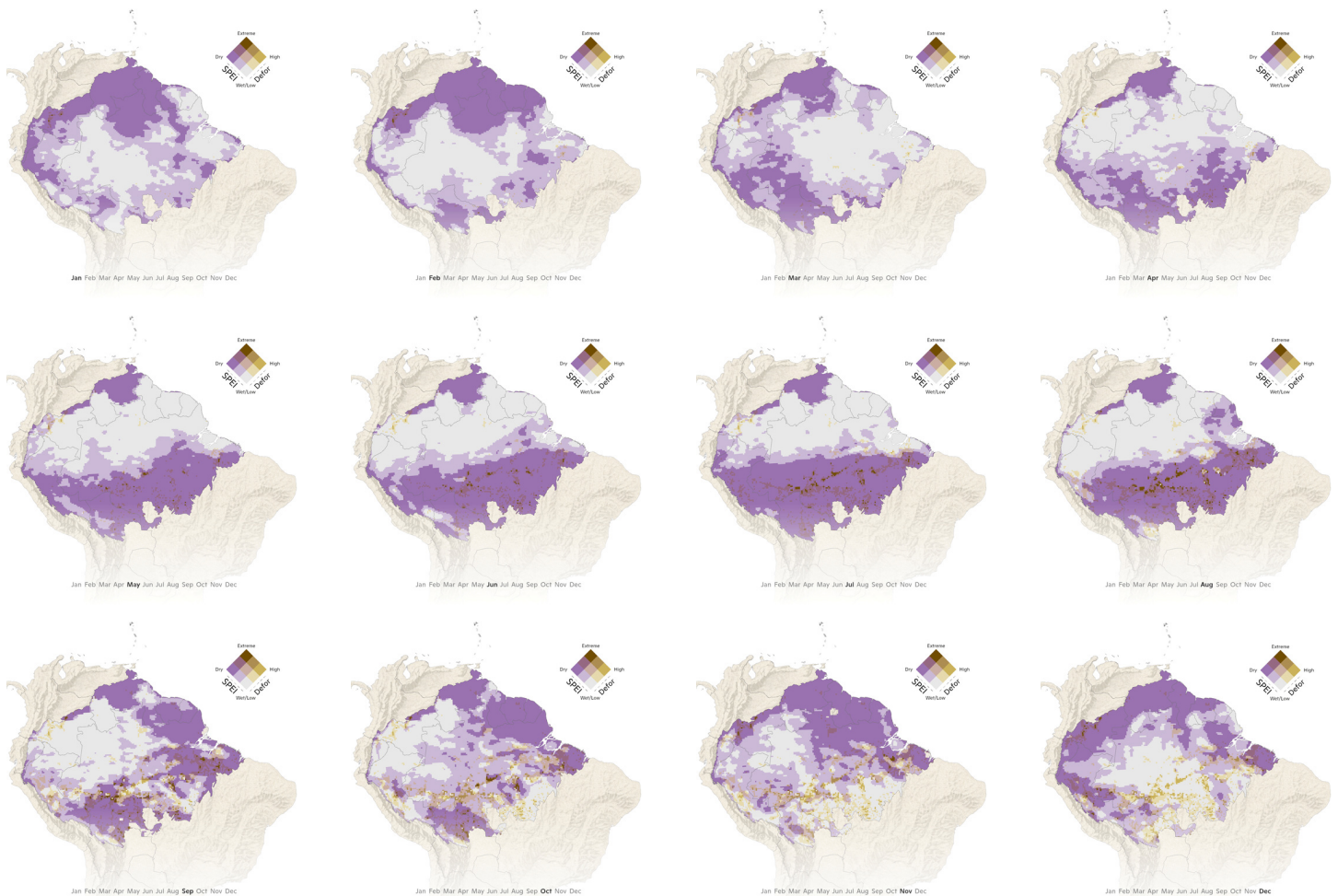
Last year, Woodwell examined the intersection between drought conditions and deforestation to identify the areas most vulnerable to burning in the Amazon. Fire is an intrinsic part of the deforestation process, which means that deforestation data can serve as a good indicator of where ignitions might happen. Fires in the Amazon are always human-caused, but exceptionally hot and dry conditions during droughts result in more intense fires that last longer and spread farther.

Drought conditions and areas of deforestation that had not yet been burned combined to create high fire risk particularly in northwestern portions of Mato Grosso, Rondonia, and eastern Acre.

Fires in 2021 strongly overlap with areas of deforestation. Deforestation is a major driver of fire in the Amazon because fire is an intrinsic part of the deforestation process, usually set to clear the forest for use as pasture or cropland. Drought fans those flames, producing the right conditions for more intense fires that last longer and spread farther.



All maps by Greg Fiske



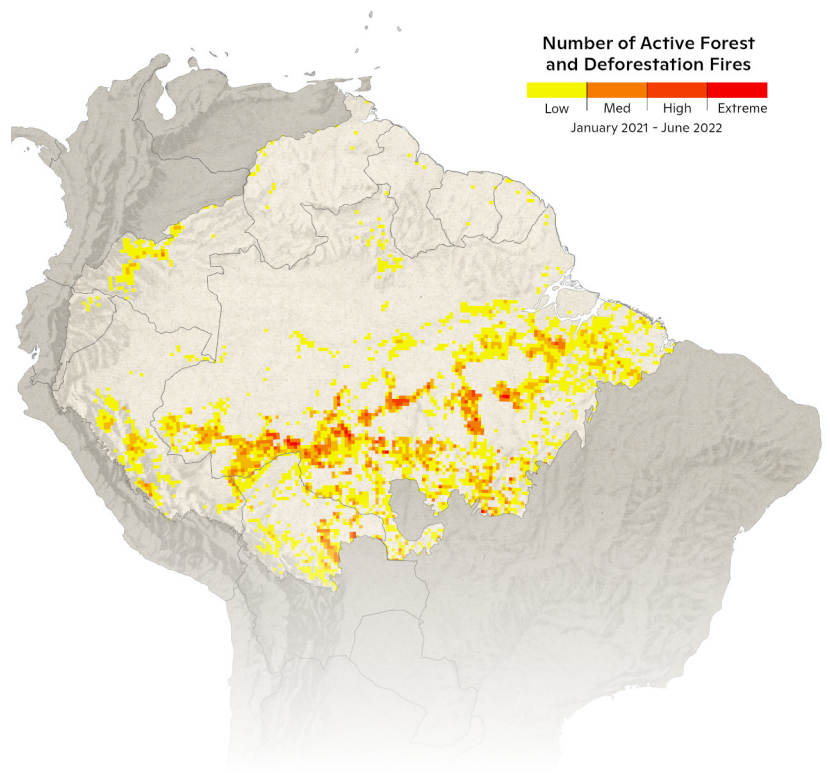
Monthly drought (Standardized Precipitation-Evapotranspiration Index (SPEI), purples) and fuel (deforestation, yellows) in 2021. Where they overlap, risk of fire is greatest.



Fires in 2021 strongly overlap with areas of deforestation. Deforestation is a major driver of fire in the Amazon because fire is an intrinsic part of the deforestation process, usually set to clear the forest for use as pasture or cropland. Drought fans those flames, producing the right conditions for more intense fires that last longer and spread farther.

As a result of deforestation in 2021, 75 million tons of carbon were committed to being released from the Amazon. Because cut forest is also burned, most of the carbon enters the atmosphere in an instant, rather than the longer release that comes from decay.

In June of 2021, we identified a dangerous and flammable combination of cut, unburned wood and drought conditions in the municipality of Lábrea, leading us to conclude that it was at extreme risk of burning. The data at the end of December of 2021 confirmed our prediction; observed fire count numbers from NASA show Lábrea led all other municipalities in fires last year.



Cumulative deforestation and forest fires from January 2021 to June 2022 (fire count of active fires).

| Top 10 municipalities for forest and deforestation FIRES in 2021 | | | |
|--|--------------------|-------------|------------|
| | Municipality | State | Fire Count |
| 1 | Lábrea | Amazonas | 48784 |
| 2 | Altamira | Pará | 41942 |
| 3 | Porto Velho | Rondônia | 38573 |
| 4 | Apuí | Amazonas | 27458 |
| 5 | Novo Progresso | Pará | 26436 |
| 6 | São Felix do Xingu | Pará | 22007 |
| 7 | Colniza | Mato Grosso | 18999 |
| 8 | Aripuanã | Mato Grosso | 15267 |
| 9 | Candeias do Jamari | Rondônia | 13414 |
| 10 | Novo Aripuanã | Amazonas | 13351 |

Early Start to 2022 Fire Season Could Get Worse as Fuel Builds up and Drought Continues

With the goal of assisting fire prevention and firefighting efforts, Woodwell combined the past 18 months of deforestation data with the latest drought index information to identify the most fire prone areas for the upcoming fire season.

Once again, Lábrea tops the list of municipalities with high fuel based on deforestation, though Porto Velho, Novo Aripuana, and Apuí—municipalities in the southwestern area of the Amazon—concentrate both fuel and drought conditions, placing them at higher risk of burning.

According to SPEI data, which takes into account precipitation and air temperature, Jan-June 2022 were the driest months on record for the region, exacerbating fire risk across the region. The burning season in the Brazilian Amazon could be showing signs of an early start this year, with much higher numbers of fires than expected for the months of May and June compared to the past 18 and 15 years, respectively.

WOODWELL CLIMATE RESEARCH CENTER

("Woodwell") conducts science for solutions at the nexus of climate, people and nature. We partner with leaders and communities for just, meaningful impact to address the climate crisis.

woodwellclimate.org

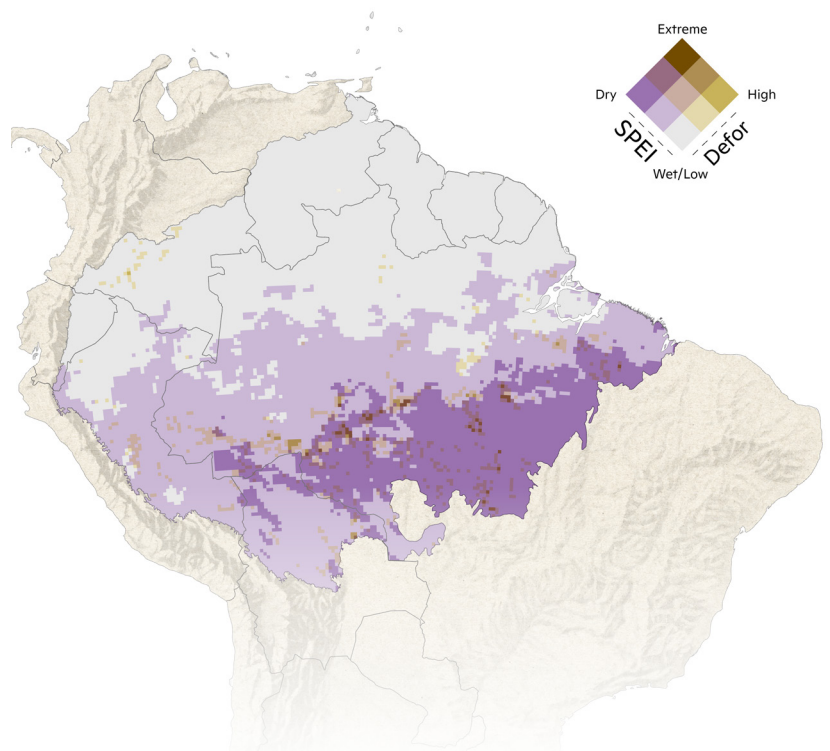
2022 Amazon Deforestation and Fire Outlook

JULY



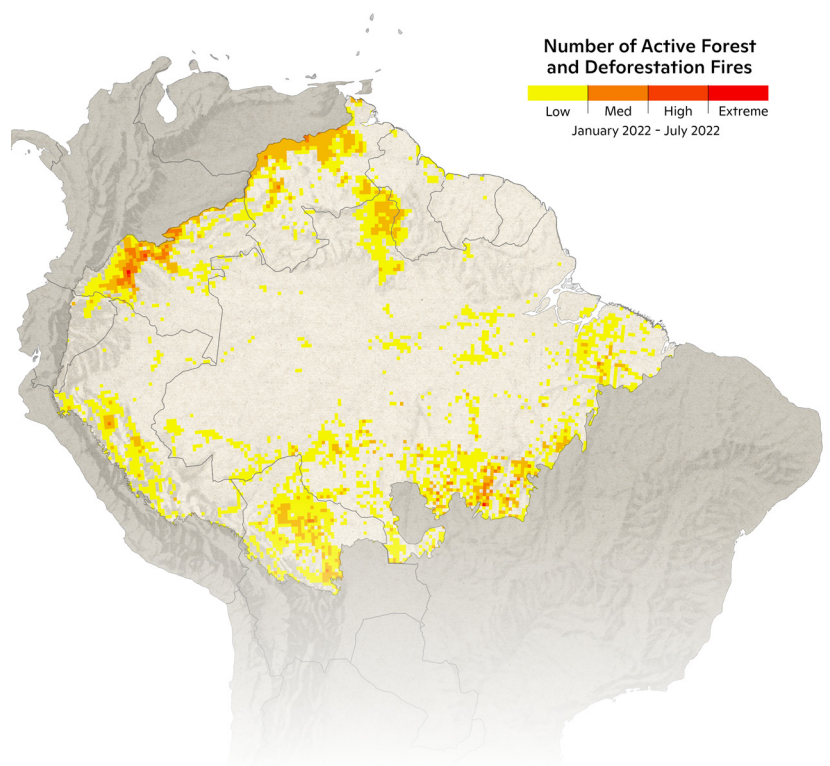
Already, deforestation in 2022 has released 4.5 million metric tons of carbon, equivalent to driving 35 million gas-powered cars for a year. So far the top 10 municipalities experiencing fires are all located in Mato Grosso state.

Municipalities in the top ten should be on high alert for runaway fires this season. Existing fire prevention strategies enacted by the current administration over the past 3 years have been insufficient to truly curb burning in the Amazon. Firefighting crews are not sufficiently supported to continue their work in regions like Lábrea that are actively hostile to fire prevention and environmental protections. If deforestation has occurred, fire will follow. To ensure the safety of both the people and the forests in these high risk municipalities, the root causes of deforestation must be addressed with stronger policy.



Above: Accumulated deforestation from January 2021 until June 2022 in yellow and areas of drought (light purple) and extreme drought (dark purple) according to SPEI. Data sources: GLAD alerts for deforestation and SPEI for drought. Below: Fire in 2022. Data: active fires from VIIRS 375m NOAA 20

| Top 10 municipalities for deforestation from Jan 2021 to Jul 2022 (18 months) | | | |
|---|--------------------|-------------|------------|
| | Municipality | State | Area (km2) |
| 1 | Lábrea | Amazonas | 624.0 |
| 2 | Porto Velho | Rondônia | 506.7 |
| 3 | Altamira | Pará | 423.4 |
| 4 | Apuí | Amazonas | 385.7 |
| 5 | Novo Progresso | Pará | 262.6 |
| 6 | Colniza | Mato Grosso | 241.1 |
| 7 | Novo Aripuanã | Amazonas | 232.1 |
| 8 | Itaituba | Pará | 200.6 |
| 9 | São Felix do Xingu | Pará | 199.0 |
| 10 | Humaitá | Amazonas | 173.7 |



| Top 10 municipalities for FIRE in 2022 (Jan – Jul) | | | |
|--|-----------------------|-------------|------------|
| | Municipality | State | Fire count |
| 1 | Nova Ubiratã | Mato Grosso | 4240 |
| 2 | Feliz Natal | Mato Grosso | 3155 |
| 3 | União do Sul | Mato Grosso | 2600 |
| 4 | Marcelândia | Mato Grosso | 1877 |
| 5 | Nova Maringá | Mato Grosso | 1778 |
| 6 | Querência | Mato Grosso | 1306 |
| 7 | Confresa | Mato Grosso | 1279 |
| 8 | Juara | Mato Grosso | 1214 |
| 9 | Tabaporã | Mato Grosso | 1213 |
| 10 | São Felix do Araguaia | Mato Grosso | 1113 |