



# Wildland Fire on Guam

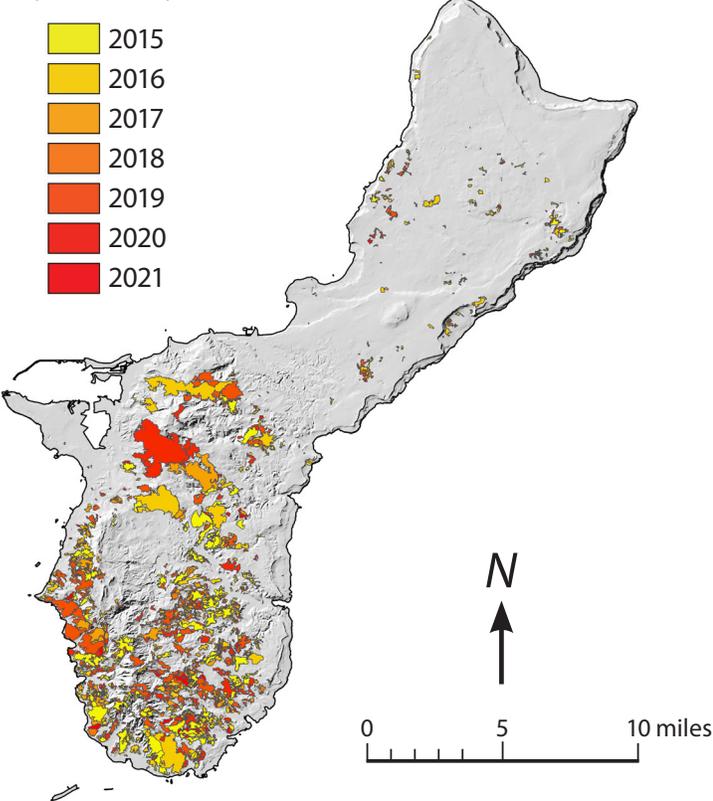
*100% of wildland fires on Guam are human-caused*

## Fire Occurrence

Wildland fire is a significant and on-going threat to Guam’s communities and natural resources. Wildland fire records indicate that in some years the proportion of total land area burned annually on the Island exceeds that of the Western United States<sup>1</sup>. Between 2015 and 2021, a total of 2,227 different fires occurred on the Island (Figure 1), collectively burning approximately 126 km<sup>2</sup> (23%) of Guam’s land surface<sup>2</sup>. Fire occurrence in Guam relative to total land area is the highest in the U.S.

Prior to the arrival of humans, Guam seldom, if ever, experienced wildland fire<sup>3</sup>. Paleocological evidence suggests that since human arrival (~4,000 years ago), savanna landscapes have expanded and have been tied to human fire use for land clearing and agriculture. Today however, the flammability of the landscape in Guam has increased dramatically over time

## Fire Extent (2015–2021)



**Figure 1:** Historical Fire in Guam<sup>2</sup>.

due to the introduction and rapid spread of both native and nonnative (e.g. *Miscanthus floridulus*) fire-prone grasses and shrubs. The increase in the availability of these fine fuels, combined dry conditions that occur seasonally, and the abundance of human caused ignitions, has created conditions for frequent, and sometimes year-round occurrence of wildland fire across the island<sup>1</sup>. Fires are also more common following Peak El Niño years (e.g. 2016 and 2019) which cause drier than normal conditions, favorable for the ignition and spread of wildland fire (Figure 2). It’s important to note that while savanna landscapes are ancient on this island and tied to human burning, the socio-economic contexts under which fires occur have changed.

It’s a startling fact that humans cause all wildland fires on Guam most of which are intentionally set. Local poachers use fire to clear sightlines and draw deer and pigs into the open. Roadside burning is also common, farmers will sometimes burn fields to clear them, and homeowners will sometimes burn their yard waste<sup>4</sup>. Whether intentionally set or not, fires set under the wrong conditions can escape and spread into adjacent areas causing impacts to Guam’s communities and environment.

## Fire Impacts

Native plants and animals on Guam are poorly adapted to frequent burning. The introduction of fire to the island has caused much of Guam’s native forest to be replaced with grasslands that can promote repeat burnings, thus out-competing native vegetation. Fires can also remove vegetation altogether, leaving bare ground that is susceptible to erosion when it rains. The topsoil layer, which has taken tens of thousands of years

Year	Frequency (# of Fires)	Area Burned (km <sup>2</sup> )	(%)
2015	344	18.6	3.4
2016	504	23.2	4.2
2017	457	16.3	3.0
2018	99	3.6	0.7
2019	396	38.1	6.9
2020	250	26.1	4.8
2021	177	14.7	2.7

**Figure 2:** Number of fires in Guam per year (2015–2021 and total area of Guam burned (km<sup>2</sup>) and percent of total area (%)<sup>2</sup>.

to form, can be entirely lost with as few as 15–20 burn events<sup>4</sup>. Eroding topsoil can also be transported to the ocean where it can settle on and kill corals — ultimately degrading near-shore ecosystems. Because reef fish are an important protein source in local diets, the destruction of suitable habitats has important implications for food security.

Ongoing reforestation efforts are tailored to take back territory invaded by fire prone species, reduce and where possible stop the spread of wildland fire, and minimize erosion.

## Fire Perceptions

Between 2019 to 2021, 189 participants responded to a survey designed to better understand how residents of Guam perceived fire. This survey was complemented with one-on-one interviews with a cultural practitioner and local fire expert<sup>5</sup>. Results of the survey were surprising. Only 30% of the respondents knew that 100% of the fires were caused by humans, with 70% believing that some wildland fires were caused naturally. Age and education were not identified as factors contributing to perceptions. When grouped by geographic location, 38% of residents from the southern part of the island where fires are most prevalent understood that fires were 100% caused by humans compared with 22% in the North where fire occurs infrequently.

Over half of the respondents (62%) acknowledged that fire was bad for the soil health, but many believed that fire had positive effects (23%), with a small percentage (14%) being unsure of how wildland fire affected Guam’s upland ecosystems.

Most of the respondents (81%) acknowledged that fire was bad for coral reefs, though again 14% were unsure of impacts to marine ecosystems. Again, age and education were not determining factors in these environmental perceptions.

*“Guam wildfires are a community threat that require our combined efforts to prevent. Wildland fires have been linked to intentional sets by arsonists, unpermitted backyard burning, and unauthorized agricultural burning for land clearing — to name a few. Wildfires are preventable on Guam. Don’t let your decision to burn be the reason our families, community and first responders are injured.”*

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## Acknowledgements

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**Figure 3: Guam Department of Agriculture's Forestry Division Team, Jan. 2023 (Left to Right): PJ San Nicolas, UCF Community Coordinator; Christine Fejeran, Forestry Division Chief; Ruddy Estoy, Forester, Forest Stewardship Manager; Johnny San Nicolas, Forestry Aide Crew Leader; Sean Scroggs (right in the middle), Forestry Aide; Albert Lujan, Forestry Aide; Bruno Cases, Forestry Aide; Carlo Medina (wearing shades), Forestry Aide; Odyessa San Nicolas, Program Coordinator; Matthew Terlaje, Forestry Aide; and Denise Crisostomo, UCF Community Coordinator.**

<sup>1</sup> Trauernicht et al. (2018) Assessing Fire Management Needs in the Pacific Islands: A Collaborative Approach <https://www.fs.usda.gov/treesearch/pubs/58599>

<sup>2</sup> Guam Wildfires 2015–2021 <https://www.arcgis.com/home/webmap/viewer.html?webmap=9551f742c919485093235011f2a92a55&extent=144.3405,13.1419,145.3547,13.7136>

<sup>3</sup> Minton et al., (2006) Fire, Erosion, and Sedimentation in the ASAN-PITI Watershed and Ware in the Pacific NHP.

<sup>4</sup> War in the Pacific (2022) Fire and Guam. [https://www.nps.gov/parkhistory/online\\_books/npswapa/Park/Natural/fire/fireguam.htm#:~:text=Fire%20is%20maintaining%20Guam%27s%20savannas,and%20onto%20Guam%27s%20coral%20reefs](https://www.nps.gov/parkhistory/online_books/npswapa/Park/Natural/fire/fireguam.htm#:~:text=Fire%20is%20maintaining%20Guam%27s%20savannas,and%20onto%20Guam%27s%20coral%20reefs)

<sup>5</sup> Tajjeron (2021) Perceptions of Wildfire and Wildfire Management on Guam. Unpublished undergraduate thesis.

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