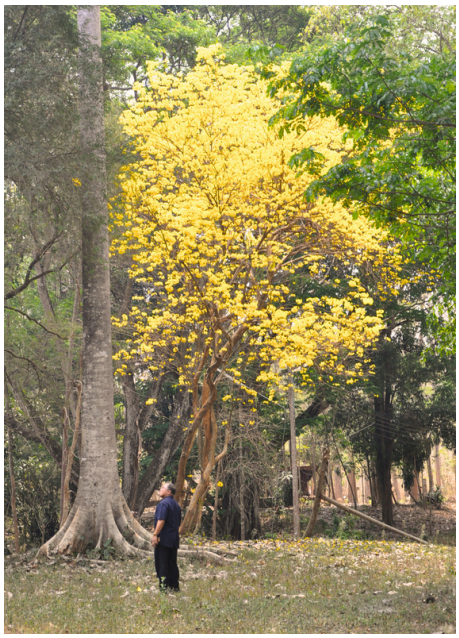
Model Forests and Wildfires



Globally, wildfires are emerging as a leading threat to forests. As climate change continues to further alter weather patterns and disturbance regimes, the severity and frequency of wildfires are predicted to worsen. Subsequently, there is an urgent need to implement integrated fire management into forest stewardship strategies. Model Forests provide valuable lessons and case studies on how to successfully execute wildfire management strategies that are centred around Nature-based Solutions, community engagement, and knowledge sharing.

What is the Issue?

In many ecosystems, fire plays a crucial role in maintaining ecosystem function and biodiversity. In these fire-adapted regions, regular fires are introduced either naturally, though lightning strikes, or through human action, like Indigenous cultural burning practices or prescribed burns. Regular fires in these ecosystems support nutrient cycling, regeneration and germination of fire dependent species, and control fuel loads, thereby reducing future fire risk. However, changes in these fire regimes, coupled with frequent and extreme droughts exacerbated by climate change are now leading to increasingly frequent and severe wildfires; most notably in ecosystems which are not well-adapted to fire. This subsequently reduces biodiversity and ecosystem integrity and functionality.

In 2024, at least 13.5 million hectares of forest were burned, surpassing the previous record of 11.9 million hectares recorded in 2023 (Patopov et al., 2025).

In fact, forest fires today burn more than twice as much tree cover each year than they did 20 years ago (Tyukavina et al., 2022). While fires can start naturally, the majority of wildfires today are started by humans—through arson, accidental ignitions, or agricultural clearing. Research shows that these anthropogenic fires are larger, more dangerous, and more likely to occur in non-fire-adapted ecosystems, like the Amazon, disrupting ecosystems, destroying species habitats, releasing CO2, and altering microclimates. As climate change intensifies, forest fires are predicted to further worsen. Rising temperatures and disturbed weather patterns will continue to create dryer landscapes, higher wind speeds, and altered rainy seasons, giving way to increased and unprecedented fires, unless we identify mechanisms to mitigate climate change and manage wildfires effectively while adhering to the principles of Integrated Fire Management (IFM)((FAO, 2024).

Why is this Important?

Wildfires can have devastating consequences for both human and non-human populations.

Fires pose a massive risk to health and safety. For every 1000 forest fire events that occur in heavily forested areas like the Amazon, there are an average of 22 hospital admissions for respiratory diseases (Ribeiro et al., 2024). Wildfire smoke is estimated to cause over 1.5 million human deaths each year (Xu et al., 2024), in addition to countless consequences for biodiversity. Local communities, Indigenous peoples, and women and children, are at especially high risk due to the impacts of increasing wildfires. For example, in the Amazon region, for every 1 hectare of forest area burned, 54 new respiratory infections are reported in Indigenous populations (Prist et al., 2023, 2025). Furthermore, these disasters cause billions of dollars in infrastructure damage—destroying homes and habitats.

Fires are also emerging as one of the top drivers of forest loss. In 2024, they accounted for 44% of all tree cover loss (WRI, 2025). The loss of these precious ecosystems at the hands of fires means the destruction of habitat and resources, such as fuel, food, medicine, water filtration, and building material, for the nearly 1.6 billion people and 80% of terrestrial species that rely on forests.

Finally, the presence of wildfires increases the chance that areas will burn again (Tortorelli, Latimer and Young, 2024). This creates a positive feedback cycle where as more forests become degraded, they become more susceptible they are to future burning. This loop exacerbates existing crises, especially climate change and biodiversity loss. Boreal regions, in particular, have been subject to extreme wildfires in recent years, releasing record amounts of stored carbon into the atmosphere (Bryne et al., 2024). Tropical regions are similarly suffering as wildfires reduce species ranges and available habitat, contributing to acute extinction risk for already endangered and endemic species (Feng, et al., 2021).

What Can Be Done?

IUCN and the International Model Forest Network (IMFN) are working together to advance community-based, integrated wildfire forest management approaches. Together, IUCN, IMFN, and partners are working towards a vision for sustainable, long-term forest management strategies that combat climate change while conserving biodiversity, providing socioeconomic benefits to local communities, and advancing gender equality.
The IMFN is a voluntary global community of practice whose members and supporters work toward the sustainable management of forest-based landscapes and natural resources through the Model Forest approach.

A Model Forest is a fully working mosaic landscape of forests, farms, protected areas, rivers, and towns that combines the social, environmental, and economic means of local communities with long-term sustainability to conserve forest landscapes. Through commitment to six core sustainability principles, these community-managed landscapes are prime locations to incubate and test new strategies for integrated wildfire management and response.

By implementing solutions like community-organised fire patrols Model Forests have successfully developed wildfire management and response strategies in the following ways:

- Establishing RESTAURacción, a large-scale Forest Landscape Restoration (FLR) and wildfire response initiative intended to support post-fire recovery across Latin America.
- Supporting diverse and inclusive leadership structures and trainings into ecosystem restoration, decision-making, and community wildfire management, such as through women-led fire response networks.
- Implementing FLR plans that are backed by research, monitoring, and public awareness campaigns to enhance post-fire recovery in affected Model Forests.
- Contributing to capacity building centred around community priorities and practical solutions
- Establishing innovative community-based fire patrols and response frameworks, ensuring locals are educated about fire response and equipped to prevent wildfires from spreading uncontrollably.
- Instituting sustainable wildfire prevention methods that simultaneously support integrated water management, local biodiversity, and Model Forest value chains.

As countries, communities, civil society, and the private work to address wildfires, it is essential to carry forward these lessons from Model Forests, translating them across contexts and scales. Model Forests have demonstrated successful wildfire response and IFM across regions, and their experiences prove that uncontrolled wildfires do not need to be inevitable—they can be proactively planned for, responded to, and recovered from through community-based approaches.

Case Study: Thailand's Ngao Model Forest

Covering more than 175,159 hectares, including a watershed forest in Ban Kun Heng and a community forest in Ban Pong, Thailand's Ngao Model Forest encompasses the entire Ngao district in the Lampang Province of Thailand. Since joining the IMFN in 2000, local stakeholders, ranging from national and subnational government agencies, universities, NGOs, and private sector voices, have been working under the Model Forest framework to protect the forest's ecosystem.

Historically, wildfires have been a major issue in the area, threatening local communities and contributing to forest loss. In 2007, Ban Pong village came together to establish a forest fire group focused on implementing response protocols and nature-based preventative measures. The women-led group has been highly effective, taking a multi-pronged approach which involves enhancing post-fire recovery through assisted natural regeneration and FLR, establishing innovative rapid response protocols, selectively building check dams to restore soil health and groundwater, and providing trainings for surrounding communities.

Resources

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To learn more about IUCN and Model Forests:
International Model Forest Network
IUCN Forest Programme
IMFN RESTAURacción Project
Ngao Model Forest: Women-led patrols and fire prevention restore forests in northern Thailand

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