
UNDERSTANDING FOREST FIRES

Each year fire burns between 6 and 14 million hectares of forest. The resulting amount of forest loss and degradation is roughly of the same order as that caused by destructive logging and conversion to agriculture. In recent years the devastating impacts of forest fires on people and the environment have been graphically shown on television and in the print media. Often the messages conveyed to decision-makers and the public presents a very simple picture of a complex situation. Examples of misleading messages include:

- ◆ Forest fires are caused by the weather (not necessarily true);
- ◆ All forest fires are harmful (not true);
- ◆ Forest fires are important only when they happen (definitely not true).

Overly simplistic explanations of forest fires tend to encourage decision-makers to support the view that fire fighting is the main solution to harmful forest fires. To date, inadequate attention has been paid to addressing the underlying causes of forest fires and, once an area has burnt, to preventing a downward spiral of recurrent fire and forest degradation.

The effect of forest fires

The immediate impacts of fires can be devastating to human communities and forest ecosystems. In the longer term, they can adversely affect the supply of environmental services necessary for the well-being of local communities, threaten the survival of endangered species, simplify the structure and composition of biologically important forest, and provide conditions suitable for entry of invasive species.

However it is also important to understand that the role of fire varies between different types of forest. For example, in tropical dry forest, boreal forests and some types of conifer forests, a certain amount of fire is an essential factor for the maintenance of the forests and their associated plants and animals. Conversely, in tropical moist forest, fire is usually always detrimental

The impact of fires on the forest depends on the scale (the area burnt), frequency, distribution (or patchiness), intensity and seasonality (the season in which fires occur) of the fires. These elements combine to produce what is known as a *fire regime*. A change in any one of these elements, or the balance between them, will impact on a forest's structure and species composition and its capacity to maintain its full complement of biodiversity and ecological services. For example, increasing the frequency of fires often favours plant species which can quickly regenerate at the expense of slower growing species, thus gradually changing the species composition of the forest and in-turn affecting the animal species which rely on certain plants for food or shelter. In areas that are very regularly burnt, some plant species may never reach sufficient age to produce seed, and will thus eventually become locally extinct. Conversely, decreasing the frequency of fires can result in loss of species that rely on fire to regenerate. Decreasing the frequency of fires also often results in the build-up of more fuel in the forest and thus eventually results in more severe fires, which are more difficult to control and can have serious negative impacts on fire sensitive plant and animal species as well as being a threat to human life and property.

Fire regimes can and do change over time, either through natural causes or as a result of human intervention. In many forest areas the fire regime has been altered substantially by hundreds, and in some cases thousands, of years of human use. For example, aboriginal fire regimes in Australia over thousands of years have had a major influence on the "natural" extent and distribution of eucalyptus forests, dry woodlands and rainforests. Failure to understand the ecological relationship between the forest and its fire regime leads to ill-conceived forest and fire management practices that may result in permanent changes to a forest's structure and species composition. It is for this reason that understanding a fire regime for any given forest is essential to the development of sound forest and fire management strategies.

Direct causes of forest fires

All forest fires have a direct cause (an ignition source) – either natural (e.g. lightning) or human. Although the proportion of natural fires compared to human-caused fires varies widely between regions and types of forest, overall the vast majority of forest fires can be attributed to the deliberate or accidental actions of people.

People light forest fires for many reasons. Some fires are started for practical and beneficial reasons, some are accidental, others are deliberately lit to cause damage. All of these fires have the potential to be harmful to the forest ecosystem or human communities, depending on both the condition of the forest at the time and how they are managed once they are burning.

Just how harmful a forest fire can be is strongly influenced by the amount and condition of fuel available for the fire (leaf litter, bark, leaves and branches). In most cases forest management practices help shape these factors. For example:

- For many years United States forest managers allowed the accumulation of large amounts of fuel in mid-western forests by attempting to totally exclude fire – eventually this created conditions for very destructive wildfires that proved impossible to contain.
- In some tropical forests conventional logging practices have encouraged harmful dry season fires through facilitating the rapid accumulation of large amounts of logging waste and the drying of the forest floor caused by large canopy openings. There is strong evidence that reduced impact logging can minimise the opportunities for this sort of fire.

Thus, humans are often directly responsible for causing forest fires and influencing their destructive potential by: changing the forest conditions, altering the natural fire regime, providing the ignition source of the fire itself and, finally through the management of the fire once it is burning.

Underlying causes of forest fires

In many cases, harmful forest fires are a symptom of the same underlying causes that drive forest loss and degradation, such as: perverse economic incentives; ill-defined or inequitable land tenure; failure to enforce laws and regulations; failure to recognise and respect customary law; lack of economic opportunities for rural dwellers living in and around protected areas, and weak or under-resourced government institutions. These factors play a major role in determining how forests are exploited and managed, thus influencing both the likelihood of harmful wildfires to occur and their ultimate destructive potential. Unfortunately few governments have shown the willingness to address these underlying causes of forest fire, degradation and loss.

Making fire management work – Prevention, Response and Restoration

Given that forest fires are shaped by a complex mix of physical, social, political and economic factors it may appear self-evident that effective and efficient fire management strategies must be developed on a case-by-case basis. However, many governments continue to pursue a "one size fits all" strategy that places undue emphasis on fighting forest fires, fails to take into consideration the role of fire regimes and promotes advanced fire-fighting technologies that can only be afforded by the world's richest nations. At the same time, failure to address underlying causes leads to the repeated occurrence of harmful forest fires, and escalating expenditure on fire fighting without reducing long term risks.

WWF and IUCN believe that in order for a fire management strategy to be effective it must address 3 essential elements:

- ◆ **Prevention** – many forest fires need not occur, however they will continue to ignite and degrade forests as long as governments fail to focus on both the direct and underlying causes of forest fires. In practice this means that governments must develop and implement programmes that influence people to modify the way they use fire, for example through enacting and enforcing laws that focus on prevention of fires and through focussed efforts on changing attitudes towards the use of fire. They must also ensure that laws and policies are fair (e.g. result in equitable sharing of costs and benefits and recognition of community-use rights), and seek out and remove perverse incentives that encourage people to start harmful fires. Governments, industry and other land managers must also invest in fire management before the event, equipping forest managers with the skills and resources to gain a sound understanding of the role of fire in forest ecosystems and to develop capacity to manage forests and forest fires in an effective manner. It is equally important that protected area managers strive to incorporate locals into planning and management to ensure that those individuals most affected by conservation activities and fires can participate and offer their input into prevention strategies.
- ◆ **Response** – being sufficiently prepared and ensuring an appropriate response to forest fires when they occur are key factors in effective and efficient fire management. To achieve this it is essential to have plans and resources in place prior to the fires occurring. Responsible authorities need to have a range of options available, know which fires to suppress and which to allow to burn, have mechanisms for monitoring fire danger and identifying fires which require action, and have clear responsibilities and coordination mechanisms in place. Firefighting resources need to be readily available and appropriate to the local situation, and there should be an ability to scale-up responses to deal with abnormal forest fires. Resources and procedures are also needed for monitoring the extent and impact of fires and using this information to plan for future fire management and control activities.
- ◆ **Restoration** – after forest fires have been extinguished there still remains the need to prevent a spiral of recurrent fire and further degradation in the short-term, and to help re-establish the forest's original structure, biodiversity and productivity, over the long term. Failure to consider appropriate restoration strategies results in vulnerable people living in ever more precarious situations. Nevertheless, the reality is that post-fire restoration is given scarcely any attention by the media, national governments or international organisations.

TIME TO ACT ON FOREST FIRES

There can be no blueprint to managing harmful forest fires. Each situation has its own ecological, social, economic and political circumstances that need to be taken into account when developing strategies to reduce the adverse effects of forest fires on people and ecosystems. Effective and efficient fire management requires the engagement of a wide variety of concerned stakeholders (governmental, non-governmental, community and private sectors) in the planning and implementation of a strategy.

IUCN and WWF call on governments and international organisations to place greater emphasis on dealing with the underlying causes of forest fires and take the following 10 positive steps to address the impacts of harmful forest fires:

1. Support **research and analysis that improves the understanding of forest fires** and their associated costs and benefits. Resources must be allocated towards an improved understanding of the country-specific, underlying and direct causes of forest fires as well as the costs of their ecological and socio-economic impacts.
2. **Build awareness** among policy makers, the public and the media as to the underlying causes of forest fires, their associated societal and economic costs and the importance of addressing these in a systematic fashion.
3. Mandate and equip forest managers to **prepare and implement integrated fire management plans** that promote a balance between fire prevention, response and restoration, and discourage strategies that rely too heavily on fire-fighting as the primary means to deal with forest fire;
4. **Involve key stakeholders** (especially local communities and land managers) in forest and fire management planning and, where appropriate, implementation. If necessary, assist these stakeholders to obtain the knowledge, skills and resources they need to participate effectively.
5. Develop and enforce **compatible and mutually reinforcing land-use laws** that provide a legal basis for the sensible use of fire but discourage reckless use, and that take account of social equity, community welfare and human rights issues. The review of laws and economic incentives that directly result in harmful forest fires is an important step.
6. **Discourage inappropriate forest management practices that predispose forests to harmful forest fires;**
7. Promote fire management strategies that **mimic natural fire regimes** as far as practicable and avoid manipulating natural or well-established fire regimes as a means of meeting international climate change obligations;
8. Put in place **reliable fire monitoring and recording systems** that provide early warning of high fire danger and the occurrence of fires, and include evaluation of the ecological and human impacts of fire (and report annually in an internationally consistent manner);
9. **Prevent further forest loss and degradation from recurrent fires** through investing in ecologically appropriate restoration of affected areas; and
10. **Analyse and integrate fire management considerations when planning to maximise forest resilience and adaptability to climate change**, and include these measures in National Strategies for Sustainable Development.