Calinfernoia

04 Nov 2003

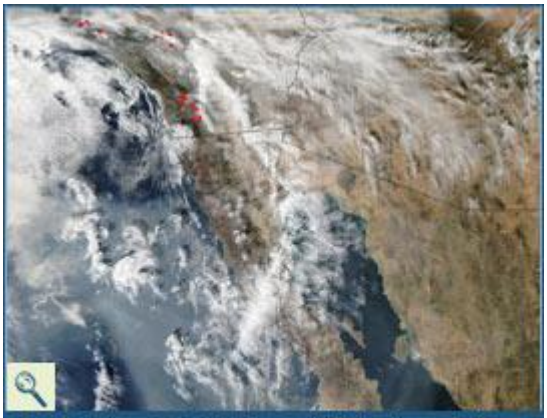
Fire burning through dead and dying timber ©Peter Thomas

The devastating wildfires this autumn in California follow a year where many parts of the world have had tremendous forest and bush fire problems.

In California, the 10 major fires in October 2003 consumed over 300,000 ha (twice the area of Greater London), more than 3,500 homes, using more than 15,000 fire fighters and costing over $2 billion in fire fighting costs and property damage. *Are such devastating fires inevitable? And are they really devastating or just what the countryside needs*?

What are the causes?

The starting point is that in the Mediterranean-type vegetation of California (mainly evergreen shrubs making up the chaparral) and associated forests, fire is natural and has been burning through these plants for millions of years. These fires would originally have been started by lightning (there are around 8 million lightning strikes on the earth each day) but now humans have taken the lead as the main cause. In California there have been over 4,000 fires in 2003 and over 90% were started by people. But fires would still burn even without people to start them.



On October 29, 2003, a shift in the winds sent smoke from the California wildfires north, east and southwards ©MODIS

What made the recent Californian fires so large and difficult to control was the culmination of a number of factors. The summer was very dry, on top of 5 years drought, and coincided with high temperatures and low humidity in October - all these together created very dry and flammable vegetation in continuous sweeps across the landscape. Extra 'fuel' has also accumulated from past suppression of fire (the aim of past fire management has been to try and eliminate fire because of its danger to people and the resources we want) and extensive dead or dying forest caused by infestations of bark beetles, especially in the San Bernardino mountains. The fire hazard became acute when the fast moving Santa Anna winds started blowing. The hot dry air from the deserts to the east, together with abundant tinder-dry fuel created an explosive mixture. The steep topography was also against the fire fighters; fires burn quicker uphill because the flames more effectively preheat the nearby fuel making it ignite more quickly when the flames reach it. The winds also ensured that the speed downhill was still fast. Finally, when the Santa Anna winds lost some of their speed they were replaced by strong onshore winds that set the fires off in new directions. Such fires are remarkably difficult to put out, even with aerial bombing of water, and were only brought under control when a cool, moist weather front moved in.

What are the effects?

The social and economic consequences of these fires were obviously horrific. People lost their lives, their homes, and power line losses, closure of railroads and roads caused far-reaching economic disruption. In the longer-term there are economic problems of loss of tourist resorts, loss of timber resources, cost of rebuilding, and socially the disruption and even loss of whole communities.

Ecologically, these fires are less of a problem because the plants and animals are adapted to recurring fire (if they weren't they would have disappeared long before). The vegetation will recover by sprouting from roots protected in the soil and from seed, and animal populations will generally recover rapidly. Indeed, many of the plants require fire to dominate and reproduce so fire is essential for their long-term survival. There are, however, two major potential problems after these fires. Firstly, most fires create a mosaic of burnt and unburnt areas but large weather-driven fires are usually more uniform producing a larger-scale mosaic. These larger patterns can more easily kill-out small populations (such as created by habitat fragmentation) and make the distance to the next nearest population too large for quick and easy re-colonisation. Secondly, more intense fires caused by fuel build-up from fire suppression can expose species to fires to which they are not adapted (for example, intense fires that used to be quite rare endanger the California spotted owl).

Physically and chemically, the soil is well used to fire so there should be no long-term problem except for some tenacious short-term erosion before the vegetation cover recovers. However, larger fires give more scope for more extensive, longer-lived erosion channels, and even potentially dangerous mudslides.

What are the solutions?

Extreme fires driven by the weather are largely independent of fuel. A firebreak burnt to reduce fuel loads has little effect on such a fire. But less extreme fires can be controlled by manipulating the fuel, either mechanically (such as felling or thinning dead trees) or by prescribed burning (deliberate fires set at a time of year or under mild enough conditions such that they can be controlled). Prescribed fires are the cheapest and most effective solution but meet with a good deal of opposition from land owners (what happens if the fire escapes?) and environmental groups who see the short-term damage as too great, even though an extreme fire is likely to be far more damaging. Such fires will often also breach clean air regulations even though a wildfire would be collectively worse.

There is a good deal of advice in the public domain about protecting properties from fire and yet this often goes ignored.

Regardless of what we do to manage fuels, fires seem to continue to get worse - more intense and difficult to control, covering a larger area and producing conditions beyond that which the biota is adapted. Extreme weather conditions, attached to prolonged drought, have been linked to an increasing number of fires. The Californian fires have been claimed to be the worst in living memory. The bush fires of Australia in 2002/3 burnt 1.1 million ha - the greatest expanse of Victoria burnt since the Black Friday fires of 1939. Is this climate change? If so, it will undoubtedly get worse.