Causes of wildfires

Wildfires can be ignited by natural causes or they can involve human factors.

The vast majority of fires that threaten life and residential areas are the result of human actions, including discarded cigarettes and poorly controlled campfires. The most prone areas are in the so-called 'wildland-urban interfaces' – woodland that is close to large urban areas such as Sydney and Los Angeles.

Heat transfer processes (essentially radiation, conduction and convection) preheat vegetation ahead of the flames, preparing them for ignition and rapid spread of the fire (Figure **5**). These processes are most effective in preheating material that is above the fire (hot air rises!), thereby causing advance of the fire front vertically. This is why fires tend to advance more rapidly up a slope than on level ground. Experiments in Australia have shown that fires on a 20-degree slope advance at up to four times the rate of fires on level ground.

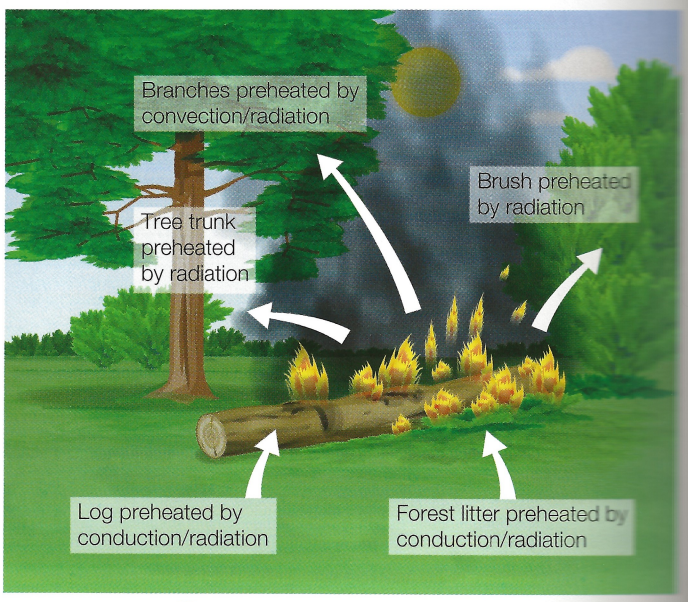

Figure 5 *Heat transfer processes*

Burning fragments of vegetation (called *firebrands*) can be carried ahead of the fire front by convection currents and strong winds igniting isolated spot fires, their very randomness presenting a significant hazard. Gravity is also responsible for spot fires – firebrands can roll downslope and start fires some distance from the fire front.

Impacts of wildfires

Figure 6 *Primary (immediate and short-term) and secondary (long-term) impacts of wildfires*

	Primary impacts	Secondary impacts
Environmental	• Destruction of habitats and ecosystems • Death and injury of animals, which impacts on food chains and food webs • Short-term surge of carbon dioxide due to the burning of carbon stores (trees) • Atmospheric pollution resulting from smoke and water pollution as toxic ash gets washed into water courses	• Lack of trees and vegetation causes depletion of nutrient stores, increased leaching and increased risk of flooding • Increased carbon emissions impact on the greenhouse effect and climate change • Effects on ecosystem development – secondary succession
Social	• Loss of life and injury • Displacement – people being forced to temporarily live elsewhere • Disruption to power supplies if power lines damaged by strong winds • Damage to mobile phone stations and telephone exchanges affecting communications	• Possible need for new employment and income stream • Behavioural adaptations based on wildfire experience – people may have to abide by new rules and regulations
Economic	• Damage/destruction of structures (homes, public buildings such as schools, fences and field boundaries) • Financial loss (loss of earnings, damage costs) • Destruction of businesses • Loss of crops and livestock	• Costs of rebuilding or possible relocation • Replacement of farm infrastructure, crops, fruit trees, livestock • Cost of future preparedness and mitigation strategies
Political	• Actions of emergency services • Responses of local and national government ('state of emergency' status etc.) • Pressure on local authorities and emergency services to coordinate and prioritise responses in the immediate aftermath	• Develop strategies for preparedness and mitigation • Decisions about replanting forests, compensation, future regulations, etc. • Review laws/advice regarding use of countryside for leisure.