

ENVIRONMENT

# The anatomy of a bushfire

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**T**HE death and destruction from the recent bushfires in Victoria, Australia captured worldwide media attention.

In Trinidad and Tobago, bushfires are currently the furthest things from our minds since even though we are technically two months into the dry season; we are experiencing quite rainy weather. But rather than complaining about the smoke and the soot and just look at them burning the hills thinking that they do not affect us because they are so far away, I suggest getting to know more about them. Therefore, I would like to use this opportunity to dissect a bushfire, looking at the causes, conditions necessary for them to start and

spread as well how they affect the environment both positively and negatively.

We must first define a bushfire, which is basically a phenomenon where bush or forested areas combust either naturally or accidentally however, when they are intentionally started this is referred to as arson. Natural sources of ignition may occur as a result of a lightning strike or the sun heating up a piece of glass from a broken bottle which acts to concentrate its rays in a point of vegetation causing a flame. Whereas accidental ignition can be caused, for instance, by tossing a partially extinguished cigarette into the bush as you walk or drive by.

Now to the fuel that actually drives this phenomenon. A popular misconception is that the dryness of the vegetation is the main factor is the progression of a bushfire; however, it is just one of many.

The oils produced as a by-product of photosynthesis and stored in the leaves, act as fuel for these fires. This factor accounts for the severity of Australian bushfires which feed on the oil in the Eucalyptus tree leaves, which also makes them burn very hot and fast. In other countries like Trinidad and Tobago the presence of man-made features like oil and gas pipelines many of which pass through forested areas provide a ready source of fuel to bushfires.

High winds fuel the progression of bushfires by injecting them with extra oxygen. These in turn cause low humidity and raise the temperature if the air which has the effect of heating up the already dry vegetation. The amount of vegetation present in the area



also has a role in the life of the bushfire.

The topography of the area also influences the speed and severity of the fire. Generally bushfires readily spreads uphill fuelled by the heated surrounding air which rises and rushes forward. This hot air heats up and dries the vegetation priming it for ignition. Conversely fires that burn downhill move slowly and low but on reaching flat terrain flames can convert from one metre to heights depending on the conditions as well as the type and height of the vegetation present.

Vegetation can also function as a ladder to allow fires to reach the canopies. This ladder vegetation need not be very tall and can range from 30 cm to two metres in height. When it reaches the canopy the burning embers are carried in the wind to untouched areas of vegetation and houses some distance away causing what is termed spot fires.

Of course the negative effects to the environment are all too well known. The large volumes of smoke and ash created soil peoples' homes as well as cause or aggravate respiratory ailments in those that suffer from them. However, the smoke created is not confined to that area or country, as the smoke caused from fires in Northern Australia may reach Indonesia and vice versa.

Bushfires account for up to 40% of annual global greenhouse gas emissions and contributes to climate change. Fires also destroy trees which act as carbon dioxide sinks absorbing much of which would be free in the atmosphere and contribute to the greenhouse effect. Bushfires also bring about changes in the weather indirectly as they alter the temperature thus causing the rainy season in another part of the world to increase or decrease.

When it comes to the biodiversity, bushfires do destroy much of the fauna in an area or region. However, we might think that much of the fauna as they are mobile species and would retreat in response to the heat and smoke generated by the fire. But not all species are fast enough to escape the flames in particular animals, such as lizards and ants to name a few. Also for those who do escape most of their habitat and the prey species they depend on for survival is destroyed, therefore their demise is only delayed.

The lost of vegetation cover especially on the hillsides leads to increased surface runoff and siltation of rivers and streams. This has the effect of reducing the volume of water they can transport, so that during the rainy season they may burst their banks and flood the surrounding areas. Besides the damage to property and habitat, as well as loss of biodiversity

and human life floods are capable of, their effects last long after the waters have subsided. This takes the form of ruined crops as most farmers locate their fields close to rivers for easier irrigation; this in turn translates to scarce supplies and higher food prices when we visit the market.

But despite their destructive nature bushfires are important to the existence of some ecosystems, for instance, the seeds of some plant species require smoke to induce germination. Bushfires also prepare the soil for other plant species, for example Caribbean Pine (*Pinus caribaea*).

They also encourage new growth in some ecosystems in two ways; the first by exposing the mineral substrate and secondly by removing the canopy so that the seedlings do not have to compete with existing vegetation for sunlight, space, nutrients and water. A local example of such an ecosystem is the Erin Savannas found in the Southwest of Trinidad.

Bushfires are a natural phenomenon and although they are vital to the existence of some ecosystems and the destroyer of others their presence is inevitable.

But lack of knowledge of the factors that start and fuel these fires we are powerless to curb their destruction to the environment and the biodiversity and humans that call it home.

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