

## ***Cause determination in bushfire investigation***

The Investigations Unit of the NSW Rural Fire Service (RFS) conducts investigations into the cause and origin of bushfires which have caused damage to property, require significant resources to suppress, or where suspicious or other circumstances warrant an investigation. The following explanation of cause determinations in bushfire investigation will provide a background to forthcoming BushFIRE Arson Bulletins on analyses of RFS investigation data.

Fires investigated by the RFS are assigned a cause determination. Determining the cause of a fire requires a high level of skill and knowledge of environmental conditions that influence fires in outdoor environments. Factors such as fuel load, the type of vegetation fuelling the fire, wind, weather and topography influence a fire's behaviour. Fire suppression activities, such as back burning, can alter the fire's normal path, while the use of water and foam can remove evidence of a fire's cause and origin.

Faced with these variables, trained wildfire investigators take into account evidence such as burn patterns, signs of the fire's path, weather conditions and the presence of human activity to help determine where and how the fire started. In some cases there is clear physical evidence of a cause and source of ignition. A private hazard reduction burn may have escaped, or witnesses may have observed the firesetter in the act of lighting the fire. The fire may have started under power lines that show evidence of arcing in high winds, or from sparks created by a power tool. The fire may have originated in a rugged and inaccessible location affected by electrical storms.

In other cases the evidence is less direct. Where there are other fires burning in the area the investigator might conclude that the fire spotted over from existing fires. This would be based on the size of the other fires, wind conditions and the location of ignition. If the point of ignition is beside a road or vehicle track or in an area used by trail bike riders, there is a possibility that the fire was started by heat or sparks from a vehicle or a discarded cigarette. A point of origin in a rubbish or compost heap, where there is no sign of deliberate lighting, might be a rare case of spontaneous combustion. There may be circumstantial evidence of deliberate lighting, such as witness reports of people or vehicles seen acting suspiciously in the area. Multiple points of ignition strongly suggest deliberate lighting, particularly where this occurs in a discernible pattern, as does evidence of a series of suspicious fires being lit in the same area.

In some cases there will be no causal evidence but the investigator will be able to eliminate natural or accidental causes by taking into account distance from vehicle access, clear weather, absence of power lines and other factors. With all other factors eliminated, an investigator might conclude that the actions of a firesetter provide the only feasible explanation.

For more information:

Corbitt-Dipiero C. *Investigating wildfires*. InterFIRE online. <http://www.interfire.org/features/wildfire.asp>