

FIRE SUPPRESSION & FIRE BEHAVIOUR

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Lions River Fire Protection Association
By Landowners - For Landowners

Factors that Affect Fire Behaviour

There are three main factors that influence fire behaviour. Fire behaviour and fire spread can alter dramatically depending on changes in: fuel; weather; and topography.

Fuel

Fuel is one of the most important factors that will influence the way fire behaves and travels. Variations in fuel, such as type, size, quantity, arrangement and moisture content will also influence the risk to fire fighter safety and firefighting suppression activities.

Weather

Weather is a major factor that impacts on the spread of fire. The four key elements of weather are: air temperature; relative humidity; wind (speed and direction); and atmospheric stability.

Air temperature: An increase in temperature, and the resulting decrease in relative humidity, will reduce the fuel moisture content and therefore, increase the ease of ignition.

Relative humidity: On humid days fine dead fuels will absorb moisture from the air and will therefore, burn more slowly or may not burn at all. On days of low humidity, the dry air will actually draw moisture out of fuels, they will become drier and therefore, ignite more easily, burn faster and more fiercely.

Wind: Wind is the most critical aspect affecting the shape, forward rate of spread and fire behaviour. Changes in wind direction and increased strength present serious hazards to fire fighters. A wind change can rapidly cause relatively quiet flanks to become active fire fronts – always keep fuel between you and the fire to a minimum.

Wind speed: Wind speed, or strength, is a major cause of rapid changes in fire behaviour. It will affect the intensity of a fire, the speed at which it travels and its shape.

Wind direction: It is critical fire fighters receive information regarding any potential changes in wind direction for planning the attack on a fire, and also to ensure the safety of fire fighters in the event of the fire changing direction

Atmospheric stability: Vertical air movement can affect local wind patterns and can also determine cloud development and therefore, the possibility of thunderstorm development. In stable atmospheric conditions, fire behaviour will generally be predictable.

Topography

The topography of an area will affect the direction and speed at which a fire will travel. The effects can be quite complex as the topography will also affect the local wind speed and direction. The three main concerns that arise in relation to topography are: slope; aspect; and the interaction between terrain and wind.

Slope: Slope will affect the speed, or rate of spread, of a fire. For every 10° of upslope, double the rate of spread.

Aspect: Aspect is the direction that a feature or slope faces.

Terrain and wind: The way the wind interacts with terrain can be quite complex. Under clear skies, local winds can actually be generated by the terrain – upslope during the day and down slope during the night. Winds generated by any of these conditions will create complex fire behaviour that has the potential to threaten fire fighter safety.

10 Standard Fire Orders:

Fight fire aggressively, but provide for safety first.

Initiate all actions based on current and expected fire behaviour.

Recognize current weather conditions and obtain forecast.

Ensure instructions are given clearly and understood.

Obtain current information on fire status.

Remain in communication with crew members, your supervisor, and adjoining teams.

Determine safety zones and escape routes (and make it known).

Establish lookouts in potentially hazardous situations.

Remain in control at all times.

Stay alert, keep calm, think clearly and act decisively.