Fire Behaviour Forecast preparation guide

Fire Behaviour Forecast No: **PREDICTION for** **(shift)**

Fire Name: **Prediction For:** **(time period)**

Area:

Time & Date Forecast Issued:

Prepared by: _____ **Fire Behaviour Officer**

Weather Summary:

General description of weather for period of forecast, including a brief overview of the synoptic situation. Provide summary of maximum temperature, minimum RH, wind direction and speed, and trend over the forecast periods.

If beneficial, describe weather situation and trends for different prediction periods, based on significant weather changes or operational periods.

Fire Behaviour General:

General description of expected fire behaviour (what is expected, rates of spread, intensity, spotting, etc.). List potential maximum or range of rates of spread, head fire intensity and flame lengths for forecast period in the relevant fuel types.

If applicable, provide FWI values for day of prediction, together with interpretation of values regarding potential fire behaviour and suppression implications.

Fire Behaviour Specific:

Detailed discussion of fire behaviour expected. Provide specific indications of expected rates of fire spread, intensities and flame lengths for different prediction periods or sectors of the fire. (Note that these estimates are for free-burning head fires, and flank and back fires will exhibit lesser fire behaviour).

Specifically mention and emphasise characteristics such as the potential for flare-ups, new ignitions, increased fire intensity, and effect of fuel characteristics (e.g., crown fuels, cured grasses, etc.).

Safety Considerations:

Make specific mention of fire behaviour aspects as they relate to safety. Do not recommend suppression strategy, just highlight fire behaviour/environment impacts on safety of suppression operations. This could include:

- *Potential for flare-ups, crowning or spotting*
- *Whether any significant properties or other values will be at risk (based on prediction)*
- *Wind changes, with potential for flanks to become head fire (check weather forecasts for fronts)*
- *Thunderstorms and associated downdrafts*
- *Strong winds and effects on aerial operations*
- *Visibility problems if upper air mixing is poor (check Ventilation Index)*
- *Topographical effects - thermal belts, burning material rolling downslope, valley winds, eddying over ridges, foehn winds (with high temps, low RH and reversal of diurnal trends)*
- *Where relevant, reference importance of implementing elements of LACES (i.e., **L**ookouts, **A**wareness/**A**nchor Points, **C**ommunication, **E**scape Routes, **S**afety Zones*

Fire Behaviour Forecast worked example

Fire Behaviour Forecast No: 1

Prediction For: Afternoon shift, 8/02/03
1300 to 1800 NZDT

Fire Name: Worked Example

Area: Canterbury Plains

Time & Date Forecast Issued: 1315 NZDT, 8/02/03

Prepared by: Grant Pearce, Fire Behaviour Officer

Weather Summary:
Fine and clear during the early afternoon, with high temperatures (27-28 °C) and moderate relative humidities (40%-60%). Winds generally nor'westerly at 10-20 km/h, increasing to 50-60 km/h and becoming more westerly ahead of a cold front passage. **The frontal change is expected at around 1500 NZDT**. Following the frontal passage, winds turn to the south or southwest, and decrease to 20-30 km/h. Temperatures will also decrease (15-17 °C) and humidities increase (60-80%) following the frontal passage. No significant rain is expected. An overnight low of 12 °C is expected.

Fire Behaviour General:
Predictions indicate severe fire weather and extreme fire behaviour are likely throughout the afternoon. Fire behaviour in all fuel types will increase ahead of the cold front passage, before decreasing in the late afternoon and early evening under southwesterly conditions. Rate of fire spread, flame lengths and head fire intensity increase during the afternoon, due to the combined influences of strong, gusty pre-frontal winds, slope and change in fuel type (from grass to pine plantation and gorse scrub). Crown fire activity, with short- to medium-range spotting, is also likely in plantation fuels.

Fire Behaviour Specific:
1300-1500 NZDT: Head fire rates of spread, flame lengths and fire intensities are expected to increase dramatically as the fire spreads upslope from grass fuels into pine plantation under the influence of pre-frontal westerly winds. Direct head fire attack should not be attempted in pine plantation fuels, due to very rapid fire spread (1000 m/h), extreme fire intensity (8000 kW/m, flame lengths 4-5 m) and crown fire activity with short- to medium-range spotting (<500 m). Extreme care should also be taken along the left flank, which is likely to become the head following the expected S/SW wind change.

1500-1800 NZDT: In spite of milder weather conditions (decreasing temp. and wind speeds, increasing RH), head fire intensities and flame lengths are expected to increase further as the fire spreads from pine plantation fuels into gorse scrub. Rates of spread of 3000 m/h, with head fire intensities and flame lengths in excess of 40,000 kW/m and 10 m, respectively, can be expected in this gorse fuel with some short-range spotting (<100 m) possible. Direct head fire attack should not be attempted.

Safety Considerations:
- Extreme caution should be exhibited along the left flank due to the forecasted S/SW wind change associated with the cold front passage. The timing of arrival of this frontal system may vary, and flame lengths should be monitored as an indicator of increasing fire activity.
- Wind speeds will increase dramatically ahead of the cold front passage, resulting in extreme fire behaviour. Slope will also significantly increase upslope rate of fire spread and intensity.
- Fire behaviour along uncontrolled sections of the left flank will increase significantly, and the potential for breakaways is high. Any breakaways are rapidly expected to form active headfires with high rates of spread and intensities.
- Extreme fire behaviour potential exists in all fuel types, with gorse scrub fuels in particular exhibiting very high fire intensity. Crown fires, with short- to medium range spotting (<500 m), are also likely in mature pine plantation fuels.
- Direct head fire attack should not be attempted on actively spreading sectors due to the extreme fire intensities in all fuel types. All ground action must be done from anchor points.
- Strong, gusty winds and terrain-induced turbulence will make aerial operations difficult and aerial operations may need to be suspended for a time.
- **L**ookouts, **A**wareness and Anchor points, **C**ommunications, **E**scape routes, **S**afety Zones.