Red Flag

The adoption of the Red Flag Watch and Red Flag Warning nomenclature in AWCC fire weather forecasts

Background



The safety of wildfire suppression personnel is of paramount importance in wildfire operations. Extensive documentation and analysis of fireline injuries and fatalities has clearly identified weather and weather/topography interactions as primary causal factors in such events.

A key role of the fire weather meteorologist is to identify the development of critical fire weather conditions that can result in extreme fire danger and subsequently lead to extreme and dangerous fire behavior. Communication of such developments is critical for the situational awareness and safety of wildfire suppression personnel. In several wildfire fatality incidents, the failure to adequately communicate fire weather or fire behavior warnings was cited as a contributing factor that led to the fatalities (eg. Storm King Mountain, CO 1994).

The Alberta Fire Weather Section has provided guidance for the potential development and occurrence of extreme fire danger/behavior to wildfire management personnel through the use of a "Fire Weather Advisory" and an associated risk of "blow up" fire potential within standard incorporated operational provincial fire weather forecasts. (The weather and fuel moisture conditions that would be associated with the issuance of a Fire Weather Advisory and a high risk of blow up fire are discussed in an article available on the Wildfire Management Branch website.) The Advisory was distinguished by visually distinctive graphics in both the web published version and online briefings as a method to enhance the impact of the Advisory through its communication and messaging.

For several years the Alberta Fire Weather Section has advocated at the national level for the adoption of a standardized terminology and messaging to be utilized by all provincial agencies to provide fire weather warnings in wildfire operations. This would facilitate a common messaging of the potential for extreme and dangerous fire behavior for fireline personnel exported to all provinces and territories.

An escalation approach to fire danger and behaviour

Red Flag Watch and Red Flag Warning

In order to move this important issue forward, the Alberta Fire Weather Section is adopting the recognized Red Flag concept established by the National Weather Service in the United States.

Alberta

Fire weather / danger conditions associated with a Red Flag Watch or Warning

In determining the potential for extreme fire behavior, the fire weather meteorologist must recognize the development of critical fire weather patterns that lead to the two paths to extreme fire behavior, namely wind-driven versus convective fires or their combination. This analysis must consider a composite of several factors rather than the value of a single weather element or moisture code.

The Red Flag Watch is intended to provide situational awareness messaging for wildfire personnel and the public that a hazardous fire environment is developing and reinforce the need for heightened vigilance. Circumstances which would lead to a Red Flag Watch would include:

- Recognition of a critical fire weather pattern developing during the next 3-5 burning periods.
- Extended periods of extreme BUI/FFMC values over a large area for the fire regime (eg.values exceeding 90 in boreal areas and 130 in alpine areas). In such cases a Red Flag Watch maybe in effect for several burning periods.
- Anticipation of significant changes in wind speed or direction during ongoing campaign fire operations.

The Red Flag Warning would be targeted at fire weather and danger conditions potentially leading to blow-up fire behavior that would pose a critical degree of danger to fire line personnel and the public. The Red Flag Warning would be issued at least 24 hours before an expected event.

Blow-up fire events in Alberta have been strongly correlated with:

 In the boreal forest, FFMC values of 92 or higher generally linked to temperature /humidity crossover conditions and sustained wind speeds exceeding 30 km/h, particularly in spring. These scenarios may occur under relatively low BUI, DC and temperature conditions.

- Wind speeds exceeding 50 km/h under crossover conditions and BUI values over 130 in alpine fuels. Chinook downslope winds are strongly associated with these conditions.
- In the boreal forest, BUI values exceeding 80 over large areas subjected to drought with crossover or near crossover conditions rendering fuels highly responsive to minor changes in wind speed. Situations when BUI values have exceeded 120 in the boreal forest have generally led to large wildfires and extreme fire behavior incidents.
- Development of critical fire weather patterns characterized by rapidly moving frontal systems, low level jets, extremely low humidity values or high wind speeds.

A Red Flag Watch may be escalated to a Red Flag Warning if expected weather and fuel conditions warrant, however, an extended period of increasing or elevated BUI/FFMC values with low ISI values could result in a Red Flag Watch remaining in effect for several burning periods. Such a scenario has most often affected the southern Rocky Mountain fire regime.

The Red Flag Watch also provides a mechanism to maintain an elevated state of awareness in the wake of a Red Flag Warning weather event that does not provide sufficient reductions in BUI or FFMC values (eg. chinook wind conditions that trigger a Red Flag Warning diminish but leave extreme BUI/FFMC values in place).

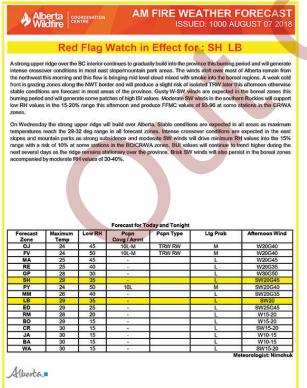
The published fire weather forecasts and online briefing presentations will be visually distinct when a Red Flag Watch or Warning is in effect for any forecast zone in the province. Under a Red Flag Watch, yellow highlighting will be utilized while the Red Flag Warning will have red highlighting.

Alberta

Example of the Red Flag Warning provincial forecast format:

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Example of the Red Flag Watch provincial forecast format:



Example of the Red Flag Watch/Warning provincial forecast format:

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Example of the Red Flag Watch and Warning briefing introduction slides:

RED FLAG WARNING SalPc IN EFFECT SFC For: CR / BO / RM SG0 For: CR / BO / RM SG0 AM AWCC Weather Briefing

RED FLAG WATCH IN EFFECT FOR: OJ MA RE ZONES

AWCC Fire Weather AM Briefing

3_SFC FWI

Jul 12 2019

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