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R&D Update

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Wildfire Ignition Probability Predictor (WIPP)

by Bruce Lawson, Brad Armitage, and George Dalrymple

Canadian Forest Service fire researchers, Bruce Lawson, Brad Armitage, and George Dalrymple have linked two separate fire research products together into a personal computer-based application called **WIPP** (Wildfire Ignition Probability Predictor). WIPP enables fire managers to predict, on an hourly or daily basis, the probability of wildfires igniting from typical people-caused firebrands, such as matches and campfires, in three "benchmark" forest fuel complexes typical of many interior B.C. forests.

Who would use WIPP and why?

The application will be of use to fire managers using the Canadian Forest Fire Danger Rating System to classify daily fire danger, based on weather data from representative fire weather stations.

Probabilities of sustained flaming ignition in dry and moist lodgepole pine and in mature spruce-subalpine fir forests can be predicted by inputting representative values of specified components of the Canadian Fire Weather Index (FWI) System. The ignition probability models are described in detail in Lawson et al. 1994a. The benchmark fuel types from which the models were derived are illustrated on an available wall poster (Lawson et al. 1994b).

The second new research product utilized in this computer application is a diurnal Fine Fuel Moisture Code (FFMC) calculator program (Lawson et al. 1996). This tool enables the user to estimate ignition probability for any hour around the clock, assuming a calculation of standard daily FFMC and a measurement, estimate or forecast of 10-metre open wind speed are available.

Probability of ignition is output to the nearest percent, and is given a class desination, where 0-50% is low, 50-75% is medium, and 75-100% is high.

WIPP outputs could be used by fire managers to refine their daily initial attack crew positioning and hourly readiness in response to differences in wildfire ignition probabilities among benchmark forest fuel types, and with time of day. Maximumreadiness is normally geared toward the mid-afternoon peak of fine fuel drying and wind speed. **WIPP** shows the manager quantitatively how the probability of a fire starting changes hour by hour, and perhaps less well known, the importance of day-to-day slow drying of forest floor fuels to ignition probability in many of our forests. Of the three benchmark fuel types currently covered by **WIPP,** only "dry" lodgepole pine forests exhibit ignition probability that is independent of forest floor moisture, while "moist" lodgepole pine and spruce-subalpine fir forests require the input of Buildup Index (BUI) and Drought Code (DC) respectively, to account for day-to-day drying of the forest floor.

Additional potential applications of **WIPP** include the prediction of spot fire ignition probability from fire brands associated with going wildfires or prescribed burns, and potential ignition difficulty of planned prescribed burns or wildfire burnout operations.

This program is available on request from George Dalrymple at the Pacific Forestry Centre, for computers running the Windows operating system.

References

Lawson, B.D., O.B. Armitage and G.N. Dalrymple. 1994a. Ignition probabilities for simulated people-caused fires in B.C.'s lodgepole pine and white spruce-subalpine fir forests. P. 493-505 in: Proc. 12th Conf. on Fire & Forest Meteorology. Oct. 26-28, 1993, Jekyll Is. GA. Soc. Am. Foresters. Bethesda, MD.

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Lawson, B.D., O.B. Armitage, and W.D. Hoskins. 1996. Diurnal Variation in the Fine Fuel Moisture Code: tables and computer source code. Can/B.C. Partnership Agreement on Forest Resource Development: FRDA II. FRDA Rep. 245. Can. For. Serv./B.C. Min. of For., Victoria, BC.

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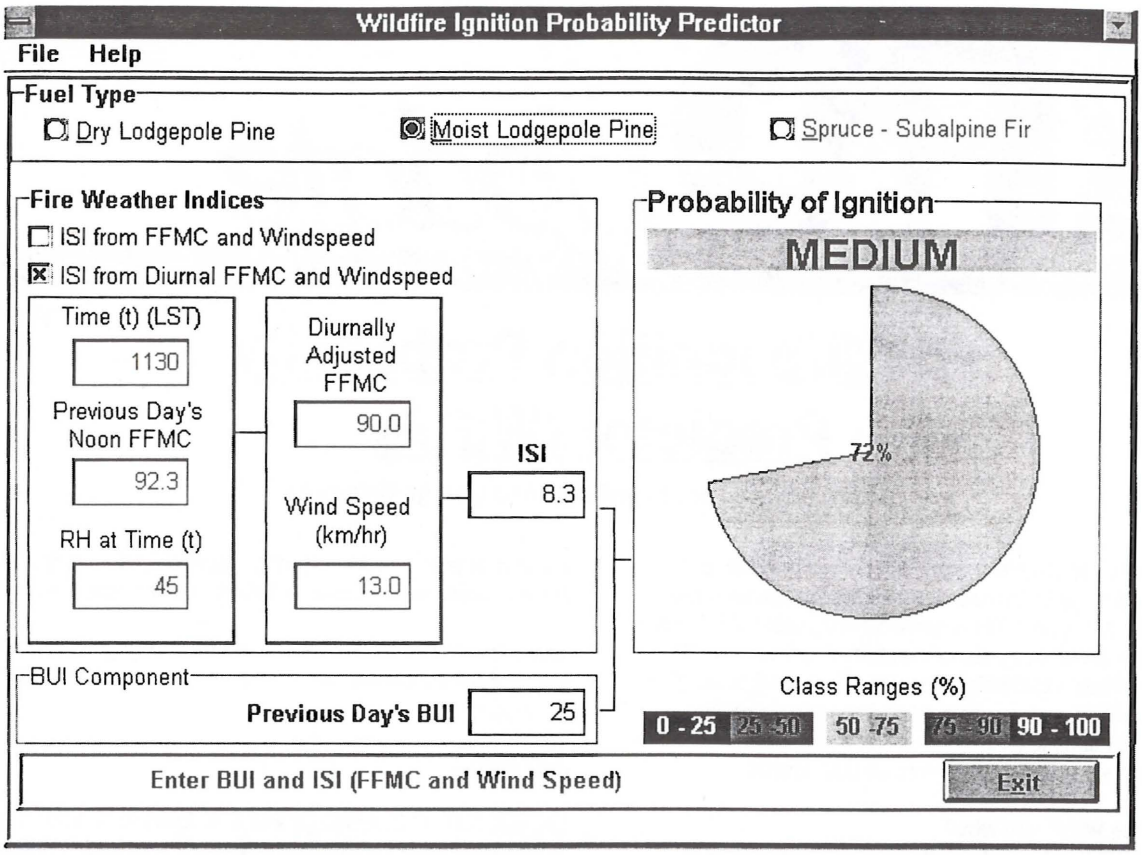
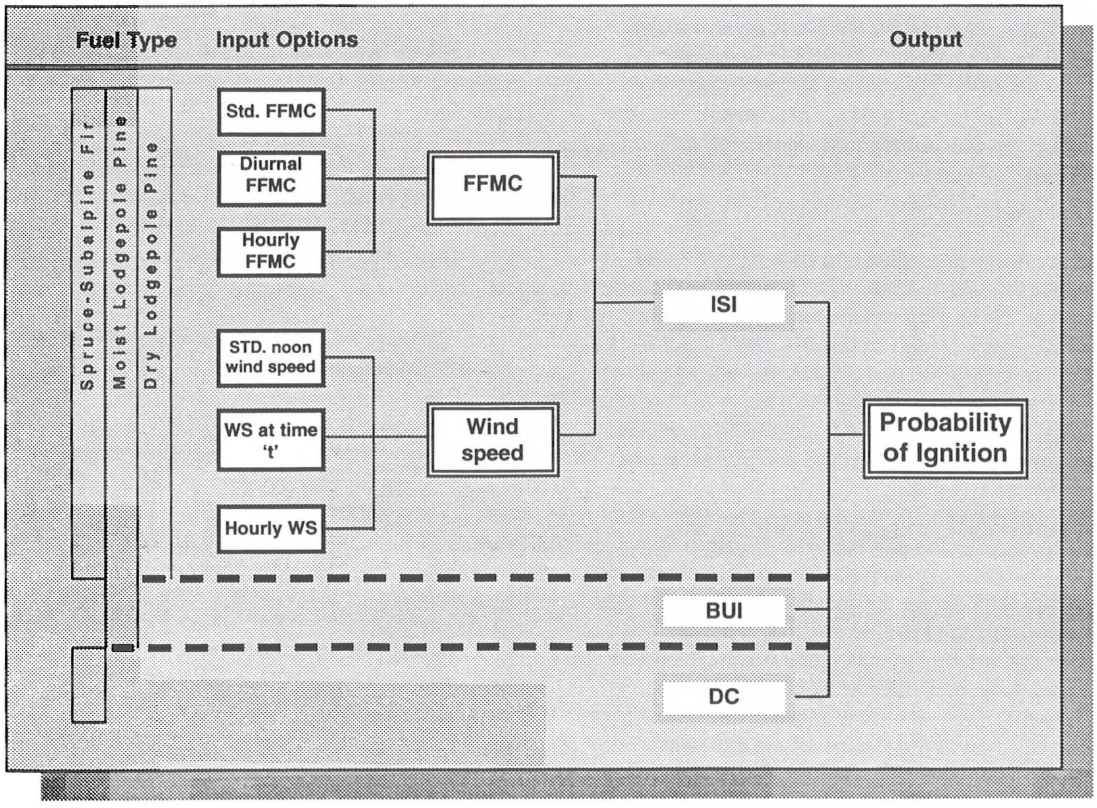

Wildfire Ignition Probability Predictor
File Help
Fuel Type
Dry Lodgepole Pine
Moist Lodgepole Pine
Spruce - Subalpine Fir
Fire Weather Indices
ISI from FFMC and Windspeed
ISI from Diurnal FFMC and Windspeed
Time (t) (LST)
1130
Previous Day's Noon FFMC
92.3
RH at Time (t)
45
Diurnally Adjusted FFMC
90.0
Wind Speed (km/hr)
13.0
ISI
8.3
Probability of Ignition
MEDIUM
72%
BUI Component
Previous Day's BUI
25
Class Ranges (%)
0 - 25
25 - 50
50 - 75
75 - 90
90 - 100
Enter BUI and ISI (FFMC and Wind Speed)
Exit


Fuel Type
Input Options
Output
Spruce-Subalpine Fir
Moist Lodgepole Pine
Dry Lodgepole Pine
Std. FFMC
Diurnal FFMC
Hourly FFMC
FFMC
ISI
STD. noon wind speed
WS at time 't'
Hourly WS
Wind speed
Probability of Ignition
BUI
DC

Canada