PHOENIX RapidFire

OPERATIONAL TECHNICAL NOTE 3

Relates to PHOENIX RapidFire Version: 4.2
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RELEASE OF VERSION 4.2.0 TO APPLY A WIND REDUCTION FACTOR TO GRASS FUEL TYPES

Fire Prediction Services

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Introduction

The wind reduction factor for a cell containing grass fuel types is now applied to the wind speed used in the grass rate of spread calculations. This modification was requested by the PHOENIX Technical Reference Group (**TRG**) and implemented by Stock Software. It has been released as PHOENIX Rapidfire Version 4.2.0.

Background

In 2019 the TRG considered additional functionality that was included in the non-operational versions of PHOENIX for potential inclusion in an upgraded operational version. From the set of possible functions, the TRG endorsed investigating the inclusion of a wind reduction factor applied to grass fuels.

Stock Software investigated how requested addition could be implemented and what effect it may have on outputs. Stock Software produced a candidate Version 4.2.0 and tested it against previous versions and found that the new release was working as anticipated.

Technical Notes

Due to the way that PHOENIX averages the wind reduction factor across all fuel types for each cell and averages the rate of spread for each fuel type in the cell, this change to the software has an effect on any cell which contains any amount of grass. Note that 'grass' fuels are those which have 0 for all 'elevated' and 'bark' values in the fuel_types.xml.

The code change was very simple. The wind speed is divided by the cell wind reduction factor prior to any further use during the spread calculation for PHOENIX'S grass model:

```
Windspeed = Windspeed / Cell.WindReductionFactor
```

Note that the Cell.WindReductionFactor is the average for all fuel types in the cell, both grass and forest. Thus when applying the wind reduction factor to the grass wind speed, it is also using a value that incorporates the wind reduction effects of the forest component.

In a cell containing multiple fuel types, even if the grass component of the wind reduction factor is 1, the Forest component is likely to be > 1, thus resulting in a decrease in wind speed.

The expected change is that almost every simulation will have slightly more benign fire behaviour. The only cells this will have no effect on are those which contain no fuel type for which the non-surface fuel is 0.

Determinations

The TRG considered the new version and testing outputs provided by Stock Software and endorsed the release of version 4.2.0 incorporating the application of a wind reduction factor to grass fuels.

Further Information

For further information please contact Fire Prediction Services on firepredictions@afac.com.au. PHOENIX versions are available through your PHOENIX licensee.