CHARLES
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Research Institute for
the Environment and
Livelihoods

Revising the Grassland Fire Danger Index (GFDI) for Northern Territory conditions

Sofia Oliveira

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DCBR
Darwin Centre for Bushfire Research
Research Institute for Environment and Livelihoods

Objectives

- Literature review of the current GFDI methodology, its limitations and applications

- Workshop with key individuals from institutions that play an important role in deriving and broadcasting the GFDI (July 2018)

- Identify the main challenges of the current GFDI methodology

- A structured program for progressing a revised GFDI methodology for the NT that will lead to more accurate forecasting of GFDI, fire danger and safer fire management activities.

Purton's modified version of the McArthur Mk 4 GFDI (1982)

$$\text{GFDI} = 10^{(P1 + P2 + P3 + P4)}$$

where   P1 = -0.6615 + 1.027 $\log_{10}$ FUEL

P2 = - 0.004096 $(100 - \text{CURING})^{1.536}$

P3 = 0.01201 TEMP + 0.02789 $\sqrt{WIND}$

P4 = - 0.9577 $\sqrt{RH}$

and   FUEL is fuel load (t/ha)

CURING is degree of curing (0–100%)

TEMP is air temperature (degrees Celsius)

WIND is wind speed (km h^{-1})

RH is relative humidity (%)

Limitations

- Outdated

- Designed for use in native grasslands with fuel loads between 2 and 6 t/ha

- Incomplete fuel information

- Based on the erroneous assumption that fuel load directly affects rate of spread and suppression difficulty

- Treats all grass types the same

- Does not take into account all of the weather conditions that are known to impact fire behaviour

- Extremely sensitive to wind and relative humidity at the upper end of the scale

- Sensitive to the temporal and spatial resolution of the input data

Tasks for progressing a revised GFDI methodology

- Comparative assessment of the two GFDI's to assess its potential as an alternate rating system

- A survey of senior Bushfires NT volunteers with practical knowledge on fire line operations (fire danger around back burning, spotting, minimum fire break distance, radiant heat flux, fire rate of spread) to inform in the development of a field guide for safe operations

- Continue testing of new National Fire Danger Rating System against GFDI

- Developing more accurate and continuous fuel surface maps

- DCBR and Landgate will continue developing remotely sensed curing rates and fuel loads

- Burning trails in gamba grass to assess rate of spread, intensity, spotting distances, and minimum fire break distances

Thank you