PROJECT SUMMARY

Identifying and defining landscape dryness thresholds for fires

Natural Hazards Research Australia

RESEARCH TEAM

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SUPPORTING ORGANISATIONS

Country Fire Authority
ACT Parks and Conservation Service
Department of Parks and Emergency Service
NSW Rural Fire Service
AFAC Predictive Services Group

Project duration: 2 years.

Background

Landscape dryness (or moisture) is a key driver of bushfires. It influences when fires will ignite, how intensely they will burn, how easily they are suppressed and the amount of smoke they emit. Fire agencies across Australia need accurate information about landscape dryness to make decisions about how to manage fires.

Scientists have developed many different ways to measure landscape dryness. These are broadly termed 'moisture metrics' and include measures of soil moisture, atmospheric moisture, and fuel (vegetation) moisture. However, further research is needed to determine how useful they are for fire decision-making across a range of scales in space and time. For example, research is needed to identify moisture thresholds for critical levels of fire activity.

Project description

This research seeks to determine which moisture metrics are most useful to fire agencies for making decisions about how to manage fires.

Fire managers will be consulted to better understand the characteristics of an ideal moisture metric for different types of decisions. Their opinions will be used to develop a set of criteria for qualitatively evaluating a range of existing moisture metrics, including metrics already used in decision-making and some not currently used. This qualitative evaluation will identify a subset of metrics for more detailed analysis.

Fire and moisture datasets will be compiled and used to explore relationships between the subset of moisture metrics (identified above) and fire activity at different spatial (burn-scale vs. statewide) and temporal scales (e.g. seasonal vs. daily). This analysis will identify the most informative metrics for predicting fire activity at different spatial and temporal scales, and therefore which moisture metrics are likely to best inform fire decision making.

Intended outcomes

This research has the potential to transform the capacity of fire agencies to incorporate moisture metrics into their decision making. The project will achieve this through:

- Clear articulation of the types of information needed for decision making, which will help scientists better design future moisture metrics.
- Evaluation of existing moisture metrics to determine their potential usefulness for making fire management decisions.
- Quantification of correlations between the moisture metrics to help determine which metrics (if any) are redundant.
- Identification of moisture metrics that are fit-for-purpose for different types of fire management decisions, according to criteria developed in consultation with fire agencies.
- Identification of moisture thresholds for different levels of fire activity to help fire managers more easily relate different moisture metrics to fire.

Translation and implementation potential

This research will be shared with fire agencies and the broader community through presentations, reports and scientific publications. Close consultation with fire agencies throughout the project will help ensure the research outputs align with operational requirements and can be more easily adopted.

Fit-for-purpose moisture metrics could be used directly by fire agencies for fire decision-making or incorporated into fire prediction systems such as the Spark fire simulator or the National Fire Danger Rating System.

Further information

For full project details head to: https://www.naturalhazards.com.au/research/research-projects/identifying-and-defining-landscape-dryness-thresholds-fires

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