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Project Title: Investigating the effect of Soil Moisture, Temperature and Precipitation Extremes on Fire Risk and Intensity in Australia

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Understanding the mechanisms behind forest fires and quantifying their risk are essential for mitigating their potential socioeconomic damage. Yet in Australia, fire risk is not universally defined across the various fire related agencies. This study is addressing this issue. Using the relationship between moisture deficits and resulting temperature anomalies, fire outbreak and intensity (through fire radiative power; FRP) is being explored in relation to fire preconditions. In doing so fire risk estimation will be improved upon through the introduction of the likely fire intensity. This will provide a scale of significance for a fire event similar to which is currently used for cyclones and other meteorological events.

A previous collaboration with DELWP (formerly DEPI) and the BNHCRC involved a Monash University led working group to review fire severity mapping and provide an analysis of RapidEye imagery to map fire severity and ground truthing techniques. This provided ancillary information to this project. The work involved statistically analysing burn severity ground truthing methods to determine whether current ground truthing procedure could be simplified and to minimise associated costs and increase sampling efficiency. The overall accuracy and the minimum random and transect sampling rate was then determined.

In the past year, I have completed an initial analysis that has indicated a strong link between the three-month prior moisture deficit and temperature extremes exceeding the 90th percent over the climatology. In temperate climates such as South Eastern Australia, there is significant correlation to fire events and the increased in intensity can be attributed to an increase in the moisture deficit. Following these initial results, the relationship between the conditions leading to fire and fire intensity will be further investigated. This will produce fire risk maps in order to explore how the risk of forest fires changes in response to climate change.