BUSHFIRE RISK ASSESSMENT – AN INTEGRATED APPROACH USING GIS

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ABSTRACT

Risk is defined as “the chance of something happening that will impact on objectives” and measured in terms of consequences and likelihood. Applying this to bushfires, the likelihood component is the probability of a fire start (ignition) and spread (growth) and the consequence component is the impact of this fire starting and spreading. Shields & Tolhurst (2003) introduced a contemporary integrated approach to bushfire risk analysis, incorporating the dynamic effects of bushfires. This study develops a method of practically implementing this approach using currently available data. A worked example for the greater Hobart area is provided using ignition, fire behaviour and fire propagation models along with climate, fuel, terrain, historical ignition and asset data in a Geographical Information System (GIS) environment.

An ignition model was produced based on the historical occurrence of bushfires and human accessibility. This model was validated using independent data and was found to be a reasonable predictor of likely ignition sources. A risk specific bushfire simulation system was used to model the spread from ignition points to the urban interface for seven representative fire weather conditions. The final risk map was developed based on the linked probabilities of ignition, fire weather, spread, and urban penetration.