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Wildfires are a worldwide phenomenon that can cause significant damage to ecosystems, life and property. Every year in Australia, the United States (US), and in many other parts of the world, large uncontrolled fires burn in a variety of landscapes destroying economic, environmental and social assets. In recent years, the frequency and severity of large wildfires have increased in most vegetated landscapes around the world and as a consequence, the costs of wildfire management, and in particular the costs of wildfire suppression, have increased substantially. With more severe wildfire impacts and suppression expenditures at record highs, policy makers and fire managers are looking for better ways to use the tools available to them for fire management.

In order to identify the most efficient allocation of resources and the strategies that generate the highest benefits to society and the environment, fire managers need more information about the implications of different uses of these resources. They need to know the returns on investment of different strategies and the trade-offs between available options. However, this information is rarely available to them. For instance, national enquiries and government reports that recommend changes in prescribed burning levels (e.g. the 2009 Victorian Bushfires Royal Commission and the Keelty Report in 2012) do not include economic analyses that assess the potential economic impacts of such changes. In the scientific literature, despite abundant theoretical research on the economics of fire management, and a number of studies that evaluate one single management action, empirical studies that look at fire management programs as a whole and attempt to quantify the trade-offs between different management activities are still scarce.

This study aims to fill this gap in research and provide a framework through which the trade-offs between prescribed burning, wildfire suppression and wildfire damages can be brought to light and interpreted. My main goal is to appraise the impacts of changing the prescribed burning strategy under different scenarios. This analysis can be of interest to fire managers and policy makers and provide them with useful information for making decisions regarding

the allocation of resources for wildfire management. It can also be relevant to fire scientists working on the economic or ecological aspects of fire management.

The application of economics to fire management has been illustrated through a case study in the south-west of Western Australia (WA), an area located within a biodiversity hotspot where large forested areas are intermingled with agricultural landscapes and the wildland-urban interface. We used an economic model in conjunction with a wildfire simulator to test different prescribed burning strategies (varying the amount and the location of the burns) and identify the strategy that yields the highest returns to society under different scenarios. We found that for a single-year analysis, there is not a significant difference in the economic results when the level of prescribed burning is varied over a wide range of values, using the current spatial strategy. However, these results change when the prescribed burns are located close to towns to protect high-value human assets. The problem with a single-year analysis is that it does not take into account the future benefits of fuel reduction strategies. A preliminary investigation of the dynamics between fire management and fuel loads show the importance of maintaining a minimum level of prescribed burning that keeps a mosaic of fuel levels in the landscape.