ECONOMIC ANALYSIS OF PRESCRIBED BURNING FOR WILDFIRE MANAGEMENT IN THE SOUTH WEST OF WESTERN AUSTRALIA

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THIS THESIS EXPLORES THE APPLICATION OF ECONOMIC ANALYSIS TO WILDFIRE MANAGEMENT AND AIMS TO EVALUATE TRADE-OFFS BETWEEN PRESCRIBED BURNING, WILDFIRE SUPPRESSION AND WILDFIRE DAMAGES.

THE ISSUE

- Wildfire suppression costs have increased substantially and wildfire impacts have become more severe
- As a result, there has been an increased focus on prescribed burning for wildfire risk mitigation
- But little attention has been given to the **economic effects of prescribed burning (PB)** programs and the trade-offs in the allocation of resources between different fire management activities

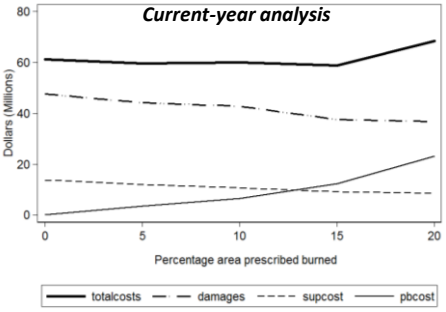
photo: bushfirefront.com.au

PRIMARY RESEARCH QUESTIONS

1. What PB strategy **minimises** the sum of management costs and damages for the current year?
2. Does extending the existing fire economics models to include **long-term dynamics** change the optimal strategy?

WHAT WE DID

- Simulated a large number of fires under varying climatic conditions for different PB strategies using the **AUSTRALIS wildfire simulator**
- Estimated the costs of PB, the costs of suppression and the resulting damages
- Compared the sum of management costs and damages for the strategies tested



RESULTS

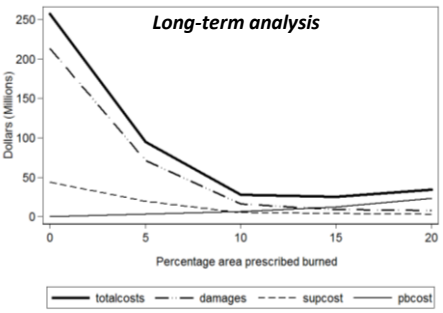
Current-year analysis

- Considering only costs and benefits in the current year, the optimal PB strategy for the **South West forest region** in WA is **15%** of public land
- However, there is not much difference in the results for different levels of PB (see Figure above)
- The results are very sensitive to PB costs and the relationship between fire intensity and damages

Long-term analysis

- When accounting for the impact of current PB on ***future*** fuel loads, the optimal PB strategy is between **10 and 15%** (see Figure below)
- Low levels of prescribed burning result in significantly larger damages in the long run due to fuel load build-up

These results suggest extremely high levels of prescribed burning, that might not be feasible due to the small window of suitable climatic conditions to apply the treatments



IMPLICATIONS

- An analysis considering only the current year does **not** provide a **clear-cut answer** (there is a wide range of near-optimal strategies)
- Economic models need to reflect the **long-term dynamics of fuel accumulation**, short-term analyses are not suitable for the evaluation of PB
- Annual PB budgets need to reflect **long-term planning**, otherwise they can lead to high future costs
- Given the context of the south-west of WA, where areas of highly flammable vegetation are intermingled with human assets, it is important to maintain a **minimum level of prescribed burning** that keeps a mosaic of fuel levels in the landscape

photo: learnline.cdu.edu.au

OTHER QUESTIONS EXPLORED IN THE THESIS

- If the spatial distribution of the treatments is intensified around the wildland-urban interface, would the optimal strategy change, and if so how?
- How does the variability of expected damages (rather than the average) differ under different PB strategies?
- How will climate change affect PB strategies?

PROJECT INFORMATION

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