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INVESTING IN PRESCRIBED BURNING: HOW MUCH SHOULD WE SPEND?

ABOUT THIS PROJECT

This research was part of a PhD study, *Economic analysis of prescribed burning in the south west of Western Australia*, which was part of the Bushfire and Natural Hazards CRC project *Economics of natural hazards*.

AUTHOR

Dr Veronique Florec, University of Western Australia. Dr Florec completed her CRC PhD in 2016.
Contact veronique.florec@uwa.edu.au

SUMMARY

This study explored the impacts of changing the level of investment in prescribed burning in the south west of Western Australia. To achieve this, an economic model was developed that was used in conjunction with the AUSTRALIS bushfire simulator to evaluate the impacts of increasing and decreasing the area subjected to prescribed burning annually. This new model builds on the existing Cost Plus Net Value Change model, and introduces new explanatory variables, among other improvements. By combining the new model with the bushfire simulator, this research has identified



▲ Above: THIS RESEARCH INVESTIGATED THE OPTIMAL AMOUNT OF MONEY TO SPEND ON PRESCRIBED BURNING TO ACHIEVE THE BEST POSSIBLE MITIGATION OF BUSHFIRE RISK. PHOTO: VERONIQUE FLOREC.

the threshold point for maximising the benefits of prescribed burning. Broadly, the study found that in the long-term, not conducting any prescribed burning for several years can be very costly, leading to large increases in damages and suppression expenditures. Specifically, the results identify a threshold point – 10%

of land managed by the Department of Biodiversity, Conservation and Attractions (DBCA) – up to which substantial benefits may be gained from increasing the area subjected to prescribed burning annually. But beyond this threshold, prescribed burning generates little additional economic benefits.

CONTEXT

The increased frequency and severity of large bushfires in recent years has led to substantially higher expenditures on suppression, with this trend expected to continue. However, increasing suppression capacity alone will not solve the bushfire problem, and there is a risk that Australia will continue to increase its firefighting capacity and expenditures without improving its bushfire management.

Over the past two decades, the use of prescribed burning to manage bushfire risk has been debated in the scientific community. Much of this debate revolves around its efficacy in reducing bushfire

extent and severity, rather than the economic impacts of prescribed burning programs and trade offs in the allocation of resources between different fire management activities. This PhD research aimed to fill these research gaps and provide a framework for identifying and evaluating the trade-offs between prescribed burning, bushfire suppression and bushfire damages.

BACKGROUND

National inquiries and government reports that recommend changes in prescribed burning levels (such as the Royal Commission on the 2009 bushfires in Victoria) do not analyse their potential economic impacts. In the scientific

literature, research into whole fire management programs or the trade-offs between different management activities is still scarce.

BUSHFIRE AND NATURAL HAZARDS CRC RESEARCH

Using a combination of economic techniques and the AUSTRALIS bushfire simulator, this research evaluated the economic impacts of changing the prescribed burning strategy in the south west of WA under different scenarios and timeframes. The study developed a new economic model that estimates the amount of area subjected to prescribed burning which minimises the sum of prescribed burning costs, suppression costs and bushfire damages, for

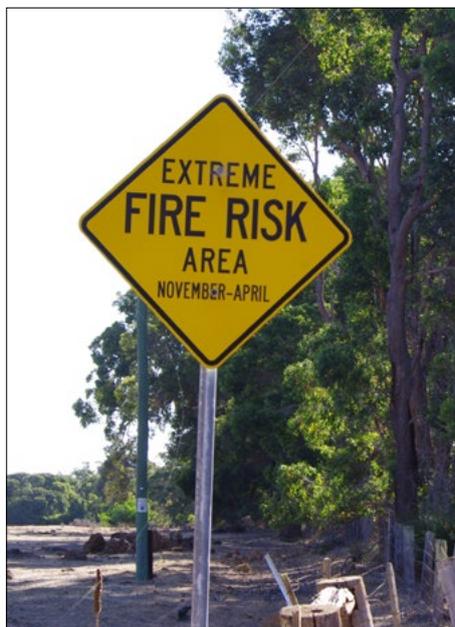
a given arrangement of the treatments in the landscape (in terms of proximity to towns and size of the treatments). In other words, it estimates the amount of area that maximises the economic benefits for a particular burn arrangement.

The new model developed is a key contribution because it integrates factors that have not been incorporated in previous integrated economic assessments of prescribed burning. These include the variation in value between different types of assets in the landscape and the change in prescribed burning costs with the location and size of the treatments. This model takes into account previous researcher findings that: (1) prescribed burning costs change with the size and location of treatments; (2) varying the size and the location of the treatments can strongly affect their efficiency; and (3) the assets protected differ in nature and value.

RESEARCH FINDINGS

If investments in prescribed burning are evaluated in the short-term (that is, on an annual basis), there is no significant difference in the economic results when the level of prescribed burning is varied over a wide range of values. However, a long-term analysis reveals that not conducting any prescribed burning for several years (that is, 15+ years) can be very costly for the south west forest region, resulting in large increases in damages and in suppression expenditures. This indicates that decisions about the strategic optimal rate of prescribed burning for the region or the funds required in any given year for the application of the treatment must be derived from a long term analysis. The bushfire management problem should not be approached from an annual budgeting perspective nor influenced by state electoral cycles.

The improved economic model has shown that substantial benefits may be gained from increasing the area subjected annually to prescribed burns in DBCA-managed land. The model suggests that in the case study area, a rate of 10% of DBCA-managed land treated



▲ Above: SOUTH WEST WESTERN AUSTRALIA IS AN EXTREMELY FIRE PRONE AREA. PHOTO: NATHAN MADDOCK, BUSHFIRE AND NATURAL HAZARDS CRC.

per year would optimise savings on prescribed burning costs, suppression costs and damages. Beyond 10%, the additional benefits for every dollar invested would be minimal.

In addition, the long-term simulation model shows that prescribed burning reduces the probability of large areas being burned by bushfires in the region and the recurrence times of catastrophic and major fire seasons. Minimising prescribed burning considerably increases the likelihood of exceedingly costly fire seasons. In contrast, at high levels of prescribed burning, catastrophic fire seasons are much less likely. Thus, there are important trade-offs to be considered between the amount of area treated with prescribed burning (and the possible resulting costs) and the expected recurrence of different levels of damage.

HOW THIS RESEARCH COULD BE USED?

This analysis clarifies the implications of changing the level of investment in prescribed burning in the south west of WA and can assist fire and land managers in making decisions about resource allocation.

END-USER STATEMENT

Building a body of scientific and economic research is essential to guide government policy decisions and resource allocation. It is not just a matter of doing more with less, but better with less. For Western Australia, this research will be a component of the foundation of knowledge underpinning the bushfire reform underway.

– **Tim McNaught, Executive Manager, Office of Bushfire Risk Management, WA**

FURTHER READING

Florec, V (2016), *Economic analysis of prescribed burning in the south-west of Western Australia*, PhD thesis, University of Western Australia

It can also help fire agencies communicate to the community the impacts of different levels of investments in prescribed burning. The research quantified the extent to which more investment in prescribed burning can reduce the chances of economically catastrophic fire seasons occurring in WA's south west.

FUTURE DIRECTIONS

This study has contributed significantly towards developing models that can inform fire and land managers about how to optimise their returns on investment when deciding where to deploy resources and which management options to use. More research is needed to help identify the trade-offs between asset protection (such as protecting environmental assets versus houses) and fire management investment, which could range from education campaigns to firefighting capacity. Currently, the researcher is working on estimating the differences in costs and benefits from changing the spatial arrangement of the prescribed burning treatments in the long-term and improving the model by including the value of other assets in the analysis.

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