

Concept Plan SP 2022-032

# Using Burn Severity mapping to inform ecological and fire behaviour processes and outcomes

BCS Fire Science

## Project Core Team

X X **Supervising Scientist** Valerie S Densmore  
**Data Custodian** Valerie S Densmore

**Project status as of June 6, 2023, 7:45 p.m.**

X X New project, pending concept plan approval

**Document endorsements and approvals as of June 6, 2023, 7:45 p.m.**

X X  
**Project Team** granted  
**Program Leader** required  
**Directorate** required



# Using Burn Severity mapping to inform ecological and fire behaviour processes and outcomes

## Program

BCS Fire Science

## Departmental Service

Service 9: Prescribed Burning and Fire Management

## Background

The department undertakes fire management activities to promote conservation of species and communities and to reduce risk arising from uncontrolled, intense bushfire. While these goals are not mutually exclusive, there is growing scrutiny and public concern whether planned burning is incompatible with species and ecosystem health.

Comprehensive prescribed fire plans are prepared for each burn specifying environmental and fire behaviour parameters that are informed by scientific research. However, significant knowledge gaps exist, particularly around how burn implementation methods relate to subsequent fauna habitats and the regeneration of both flora and flammable structures. A fire science project, SP 2018-134, has recently developed a standardised burn severity mapping tool that links satellite imagery to field data, including biomass consumed and retention of key habitat features. This tool provides an opportunity to investigate empirical relationships between fire management practices and both fuel accumulation and conservation outcomes.

## Aims

Understanding how fire severity, including nil severity / unburnt areas, affects vegetation structure, and the factors that modulate landscape severity patterns are fundamental to develop policies and practices that balance the effective mitigation of bushfire risk and conservation priorities in a drying climate and impending changes to forest management. This project will use severity maps and fire-exclusion reference areas (FERAs) to establish statistical links between management decisions, environmental factors (e.g., weather and biogeography), fire behaviour, long-term fuel development and ecological outcomes that affect conservation and future flammability. Over the next decade, the project aims to: determine the minimum severity necessary to mitigate bushfire risk to an acceptable standard; compare how severity affects key fire behaviour drivers (i.e., fuel moisture and wind profiles); identify the severity patterns that support healthy populations of priority species and communities; characterise the ignition, topographical and weather patterns that jointly produce desired severity profiles; develop severity models for heath-type vegetation types; quantify the differences in severity patterns between planned and unplanned fire.

## Expected outcome

Understanding how management practices, including fire exclusion, jointly affect conservation and fire mitigation targets will support efficient decision-making and realistic expectations of the extent to which prescribed burning or fire exclusion can balance biodiversity and bushfire risk management. The flow-on effects would improve statutory reporting, adaptive management, practical recovery plans, and communication based on shared terminology. Improved reporting will help refine the prescribed fire planning process including objectives that are measurable, achievable and relevant to particular land management values. This research is expected to produce one or more fire management guidelines, several journal and conference papers and foster collaborations with external scientists.

## Strategic context

Corporate risks arising from the lack of systematic evidence linking planned burning practices to environmental outcomes include: inability to provide timely and comprehensive information to service the needs of inquiries, reviews and government accountability processes; insufficient feedback on outcomes to support a genuine adaptive management approach; unverified assumptions regarding the risks and consequences of reignitions; foregone opportunity to have effective communication and cooperative activities between branches dedicated to fire management and biodiversity conservation.

## Expected collaborations

Subject matter experts from Remote Sensing & Spatial Analysis, Ecosystem Science, Animal Science, and Species & Communities programs; Liaison with Regional & Fire Management Services branch and fire

practitioners; Liaison with Wildlife Protection branch; opportunities for student projects and external academic collaborations

### Proposed period of the project

July 11, 2022 – July 1, 2032

### Staff time allocation

to	X	X	X	X
Role	Year 1	Year 2	Year 3	
Scientist	0.5	0.5	0.5	
Technical	0.1	0.1	0.1	
Volunteer				
Collaborator				

### Indicative operating budget

to	X	X	X	X
Source	Year 1	Year 2	Year 3	
Consolidated Funds (DBCA)	5000	5000	5000	
External Funding	9400	8400	5200	