

**Concept Plan SP 2023-004**

# **Quantifying fuel dynamics in southwest WA forests**

**BCS Fire Science**

## **Project Core Team**

X X **Supervising Scientist** Jennifer Hollis  
**Data Custodian** Jennifer Hollis

**Project status as of July 19, 2023, 10 a.m.**

X X New project, pending concept plan approval

**Document endorsements and approvals as of July 19, 2023, 10 a.m.**

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



# Quantifying fuel dynamics in southwest WA forests

## Program

BCS Fire Science

## Departmental Service

Service 9: Prescribed Burning and Fire Management

## Background

Quantifying and understanding fuel dynamics is an essential part of forest management and fire management planning. Fuel characteristics are a primary predictor of fire spread and behaviour but are also paramount to forecasting fire danger, smoke plume development, emissions and fire effects. Spatial maps of fuel characteristics are increasingly being relied upon to support national fire management tools (e.g. AFDRS, SPARK, AQF<sub>x</sub>) as well as for government carbon accounting (e.g. FullCAM). DBCA Fire Management Services rely heavily on accurate fuel characteristic data for managing fuel hazard across southwest forests as well as being responsible for providing the data to support the national systems.

## Aims

The aims of this project are specific to the forests of southwest WA, including:

1. Establish improved accumulation models for fuel strata in southwest jarrah forests against time since fire, fire severity and jarrah forest type;
2. Assess fuel treatment effectiveness of current mitigation methods using new methods, tools and knowledge
3. Determine effectiveness of fine-scale burn mosaic (Soft Edge Mosaic) application to reduce fuel hazard (see SP 2021-013);
4. Improve field-based assessment methods for fuel characterisation based on Version 1 of Vesta Field Guide;
5. Develop and determine accuracy of lidar/satellite/point cloud based methods for assessment of fuel characteristics (SP with BCS Remote Sensing & Spatial Analysis);
6. Improve understanding of key drivers of woody fuel consumption and the linkages with carbon accounting, smoke plume development and emissions;
7. Improve spatial mapping of fuel characteristics and classification through application of the Bushfire Fuel Classification; and
8. Develop a Digital Fire Behaviour Database to represent recent and historical case studies to learn from, inform and evaluate predictive tools.

## Expected outcome

Improved understanding of fuel dynamics in the southwest forests of WA will increase accuracy for better bushfire spread and behaviour prediction, prescribed burn planning, and fire danger and hazard determination. In addition, enhanced fuel data will improve outputs of the national and departmental fire management tools and systems that rely on it. The various objectives and components of this project are also expected to provide and support a solid scientific foundation for any current debate relating to the effectiveness of the DBCA prescribed burn program in southwest forests of WA.

## Strategic context

This project will support integrated fire management to protect communities and natural values, informed by the best available scientific information and knowledge of fire dynamics (Project 1, Discover 1 and Project 2). Through this project BC&S will be able to better support Fire Management Services by providing the best scientific information and evidence-based guidance on fire risk and fire management effectiveness. It will also ensure scientific information is available for development of a carbon economy (Project 1, Discover 4).

## Expected collaborations

### Internal:

1. DBCA Fire Management Services Branch: *Murray Mitchel, Stefan de Haan, Tony Smith, Ryan Butler, Chris Rumenos*
2. BC&S Remote Sensing & Spatial Analysis: *Paul Rampant*

3. BC&S Fire Science: *Val Densmore, Ben Miller, Ian Radford, Al Wills, Steph Sampson, TO*
4. Forest Management Branch: *Martin Rayner*

**External:**

1. CSIRO Marine and Atmosphere: *Fabienne Reisen*
2. Bureau of Meteorology: *Michelle Strack, Paul Fox-Hughes*
3. UNSW: *Ryan Tangney (ARC Grant, DBCA industry partner).*
4. CSIRO Bushfire Dynamic and Applications/ Data 61: *Miguel Cruz, Richard Hurley*
5. AFAC/ CFS: *Simeon Telfer*
6. Volunteer: *Lachie McCaw, Jim Gould*
7. DFES: *Agnes Kristina, Jackson Parker, Shaun Malloy*

**Proposed period of the project**

Feb. 16, 2023 – Feb. 16, 2033

**Staff time allocation**

to	X	X	X	X
Role	Year 1	Year 2	Year 3	
Scientist	0.45	0.45	0.45	
Technical	2.25	1.25	0.85	
Volunteer	0.1	0.1	0.1	
Collaborator	1.85	1.85	1.85	

**Indicative operating budget**

to	X	X	X	X
Source	Year 1	Year 2	Year 3	
Consolidated Funds (DBCA)	21,700	27,300	23,600	
External Funding	204,679(DRF)	95,417 (DRF)	50,499(DRF)	