Concept Plan SP 2021-013

Fine-Scale Burn Mosaics in South West Forests

Fire Science

Project Core Team

Supervising Scientist	Ian Radford
Data Custodian	Ian Radford
Site Custodian	

Project status as of May 12, 2021, 3:46 p.m.

New project, pending concept plan approval

Document endorsements and approvals as of May 12, 2021, 3:46 p.m.

Project Team	required
Program Leader	required
Directorate	required

Fine-Scale Burn Mosaics in South West Forests

Biodiversity and Conservation Science Program

Fire Science

Departmental Service

Service 9: Prescribed Burning and Fire Management

Aims

We aim to address a number of key questions around the implementation of mosaic burning programs. These include:-

- What is the fire regime created by frequent introduction of fire in a forest landscape? Includes spatial complexity, severity and fire return intervals. How does this differ from regular cell prescribed burning?
- What are the patterns of fuel and fire risk resulting from two treatments? Assess bushfire-risk benefits of implementing mosaic. If unplanned ignitions occur, how is fire behaviour and spread affected?
- What are the consequences of PMB for key biodiversity values? This includes for plant species deemed sensitive to short fire intervals, key fire sensitive fauna, vegetation community structure, composition and function and species or resources of cultural value.
- What other costs and benefits may be associated with PMB? Includes smoke production, nectar resources, water quality/production, cost-benefit assessment and Cultural values and engagement

We aim to address these questions in Milyeannup/Hilliger forest areas of the SW region. Prescribed mosaic burning to achieve soft edge mosaics has been partially initiated in some parts of the project area.

Study will focus on fire sensitive groups to test whether outcomes for these species are better under conventional compartment burning compared to fine grained soft edge mosaics. Groups include obligate seeder shrubs with long maturation times post-fire. Threatened critical weight range mammals are included because they require structurally complex, relatively long unburnt vegetation attributes including thickets, high ground cover shrubland, flowering heath and tree hollows and hollow logs for habitat and resources. Ground water dependent and aquatic species have also been identified as threatened ecosystems in a drying and more frequently burnt climate. We will test the hypothesis that frequent patch mosaic burning will promote greater stream flow and greater aquatic diversity compared to conventional burning.

Cover and density of invasive plant species will be recorded to test whether mosaic burning promotes or reduces weed invasion. Activity levels of invasive predators (cats and foxes) will also be recorded to test for greater or lesser impacts of conventional vs mosaic burning.

To test for differences between different types of burning, monitoring sites will be stratified according to on-ground mosaic attributes using remote sensing (SP2018-134). Sites (within 1 km radius) will be classified as either low intensity fine-grained-mosaics (no canopy scorch/mid-storey scorch and significant remnant ground vegetation ca. 10%), low to moderate intensity burns (partial canopy/midstorey scorch, ground layer consumed) or high intensity fire (canopy scorch and/or charring). Vegetation structural attributes will be measured to link threatened species with fire impacts on habitat and fuel hazard as per DEFFM model.

Expected outcome

Knowledge on whether key fire threatened groups (obligate seeder heath species, critical weight range mammal species) or key habitat structures (structural hollow bearing trees, hollow logs) have benefited/improved, are unaffected, or have declined (defined by persistence, reproductive output or recruitment) under soft edge mosaic burning vs landscape cell burning. Knowledge on interactions of threatening processes (e.g. feral predator and herbivore activity, wildfire extent and impact) with fire mosaic treatment, whether they have lessened, remained the same or increased. This will inform management decisions and public debate over implementation of prescribed burning in the SW Region.

Strategic context

DBCA has a legislated responsibility for land and fire management in SW Region and throughout WA. In SW WA there has been a trend of declining rainfall since the 1970s, which along with changed human activities (e.g. clearing) has increased periods of high fire danger. In this situation it is incumbent on DBCA to test mosaic burning for efficacy in reducing risk associated with increasing fuel hazard. Mosaics have theoretical hazard reduction benefits relative to whole compartment fuel management (e.g. reduced total landscape flammability in Patch Mosaics vs conventional compartments where heavy continuous vegetation fuels accumulate over 8-12 years making fire management potentially hazardous). However potential risks to fire sensitive species including obligate seeders and species requiring long unburnt vegetation vegetation, must be addressed to allay fears that these species will decline under mosaic burning. This project will seek to address criticisms from some elements of the public and science communities regarding perceived risks and impacts under both conventional and mosaic burning. This project is a second step in the SW Region in addressing this highly relevant issue for DBCA.

Expected collaborations

Kim Williams and the South West Region, DBCA. Adrian Pinder for aquatic fauna. Adrian Wayne for mammals.
Joe Fontaine, Environmental Science, Murdoch University.
Stephen Van Leeuwen, BHP Curtin Indigenous Chair, Biodiversity and Environmental Science, Curtin University.

Proposed period of the project

July 1, 2021 – Dec. 31, 2030

Staff time allocation

Role	Year 1	Year 2	Year 3
Scientist	1.0	1.0	1.0
Technical	0.5	0.5	0.5
Volunteer			
Collaborator	0.1	0.1	0.1

Indicative operating budget

Source	Year 1	Year 2	Year 3
Consolidated Funds (DBCA)	32,600	32,600	32,600
External Funding	40,000		