

Progress Report STP 2018-089 (FY 2018-2019)

**Ecologically tolerable fire regimes for
key *Banksia* woodland plant species**

Fire Science

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Project Team

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Program Leader

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Directorate

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Progress Report

Fire is a dominant disturbance that shapes the structure, composition and function of ecosystems around the world. This process has been occurring in the Australian landscape for millennia and such a long engagement with fire means that plants have developed strategies and adaptations to cope with this disturbance in the landscape. It is important to note that species are built on a tolerance to certain patterns of fire (the fire regime) rather than simply to fire itself. If fire occurs too frequently, too intensely, or otherwise outside of the limits of a species tolerance, then populations are likely to decline or disappear. This project aims to determine the impact of varying fire regimes on the demographics of key *Banksia* woodland plant species. This knowledge will be used to identify potential limits to a species tolerance of fire using a Bayesian network modelling approach.

Using a space-for-time approach, surveys of population size structure, flowering, and canopy seed bank were conducted for six common shrub and tree species along a fire age chronosequence. Population size structures suggest that interfire recruitment may play a large role in the population dynamics of some species, possibly allowing them to persist for longer than expected in the long absence of fire. Juvenile periods ranged from 1.4 – 4.8 years and varied for resprouters vs obligate seeders, canopy- vs soil-stored species, and depending on the previous season of fire. Canopy seed banks did not accumulate over time, consistent with observations that canopy-stored species in *Banksia* woodland are weakly serotinous.

A separate controlled field experiment has shown that the timing of seed planting throughout the year (emulating the timing of fire) influences seedling recruitment, where recruitment is best when seeds are cued for germination immediately prior to winter rainfall. All data collection has been completed, and data analyses and writing are close to completion.