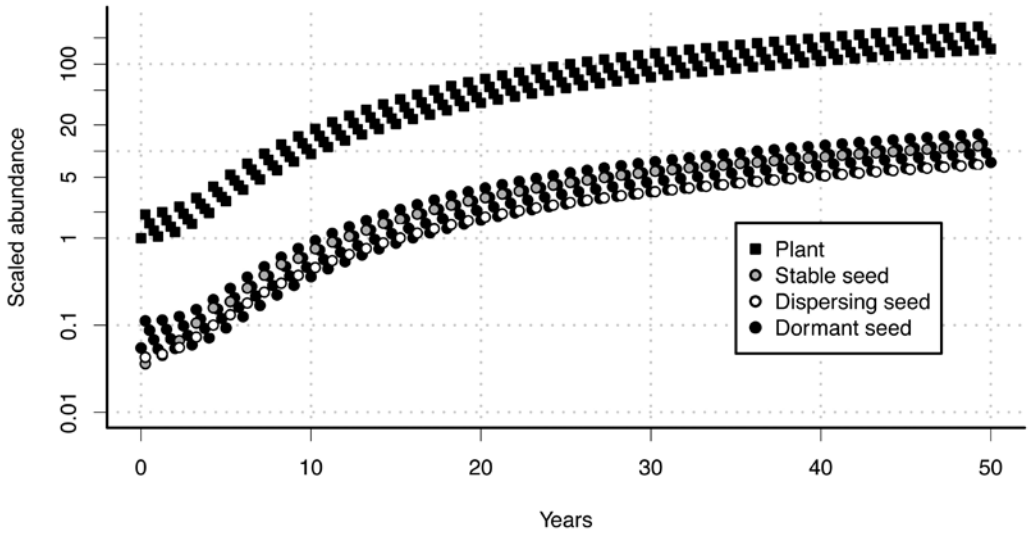

Change in abundance of Orange Hawkweed over 50 year modelled time period, with all numbers scaled by the initial number of plants in the population.

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Wild Native Rose: untangling the causes of population decline

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Introduction

Wild Native Rose (*Diplolaena andrewsii*) is known from around 600 individuals across only two populations 17 km apart on the Darling Scarp near Perth in south-west Western Australia. A small shrub to one metre with densely stellate hairs on the leaves, it is named for its deep red flowers that are produced through winter and spring. The preferred habitat of Wild Native Rose is Wandoo (*Eucalyptus wandoo)* and Marri (*Corymbia calophylla*) woodlands along hillsides among granite outcrops on brown clay loam. The main population occurs in John Forrest National Park while a smaller population can be found on private property northwest of John Forrest. In February 2010 the species was declared Rare Flora under the Western Australian *Wildlife Conservation Act 1950*.

A major threat to both populations of Wild Native Rose is competition from weeds, particularly Watsonia (*Watsonia meriana*). A South African member of the family Iridaceae, Watsonia invades relatively intact vegetation and forms dense stands on clay loam soils along the Darling Scarp including critical habitat of the Wild Native Rose. Fire appears to facilitate invasion of Watsonia with profuse flowering occurring post fire followed by prolific seed set, bulbil production and seedling recruitment in the years following the burn. A floristic survey of the northern Darling Scarp (Markey 1997) reported Watsonia invasion as one of the most significant threats to intact plant communities and native flora in the region.

In spring 2010, as part of a state natural resource management project addressing recovery actions for critically endangered and rare flora, serious weed invasions and fire history across the populations were mapped. The maps formed the basis of a habitat restoration plan for the species (Bettink 2010). One of the recommendations from that work was to set up trials to look at appropriate techniques for managing Watsonia where it was invading critical habitat of Wild Native Rose.

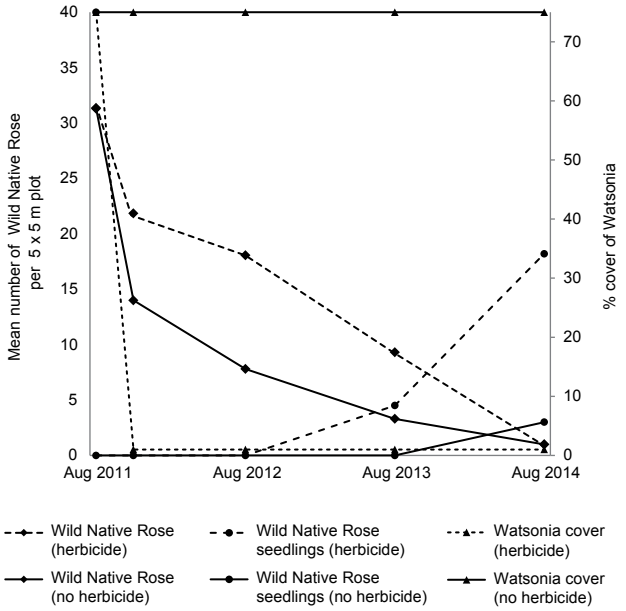
Management trials

Previous work in Banksia Woodlands and seasonal clay-based wetlands indicated Watsonia can be controlled very effectively with the herbicide 2,2-DPA (Dalapon) with little impact on co-occurring native species (Brown & Paczkowska 2013). In August 2011 a series of control and treatment plots were established in John Forrest National Park where a subpopulation of Wild Native Rose occurred among dense infestations of Watsonia. Plants of Wild Native Rose were tagged and numbered and Watsonia treated with 2-2DPA in September just before flowering, on corm exhaustion.

A close-up of a flower and densely-haired leaves of Wild Native Rose, growing in woodland on the Darling Scarp. Photo: Kate Brown.

Population decline

The 2,2-DPA was very effective at controlling Watsonia in the first year of treatment. However over the following three years, across both treatment and controls (no herbicide) there was a dramatic decline in the number of live adult plants of Wild Native Rose. By 2014, the number of live adult plants in control plots had decreased by 97.5 per cent and in the herbicide treatment plots by 96.8 per cent. Given the decline occurred across treatment and controls, it does not appear to be related to the herbicide application. Interestingly there was quite prolific seedling recruitment in 2014. This occurred mainly in the herbicide treatment sites where there was no longer competition from Watsonia.



Mean number of Wild Native Rose adults and seedlings and percentage cover of Watsonia in 5 m × 5 m treatment and control plots (n=4) over three years. Herbicide was applied (to herbicide' plots) in September each year.

Fire History

As a part of the restoration plan for the species, fire history from 1920 to present was mapped across John Forrest. Like many Rutaceae in south-west Australia, Wild Native Rose does not resprout following fire but appears to persist in the soil seed bank, with prolific germination following fire. What is known about the ecology of Rutaceae in southern Australia indicates that some small shrubs in the family may survive for only 10 years after fire (Auld 2001). For Wild Native Rose little is known about seedling survival post fire, time to first flowering or adult survivorship.

Fire history maps indicate that the sites where our trials were established last burnt 10 years ago. The species was first collected in 1920 and then not again until 1960. Over this time there were few fires in the park. In addition three new subpopulations of the John Forrest population have been discovered in an area burnt four years ago. All this indicates decline across the population at our trial site is possibly linked to time since fire. A number of other factors are also likely to influence plant health and survival, including high densities of Watsonia, below average winter rainfall and above average summer temperatures.

Management Implications

To best manage this species and ensure its conservation, we need a greater understanding of the role of fire in the persistence of populations over time. To determine the appropriate fire interval for Wild Native Rose a detailed understanding of time to first flowering, adult survivorship and longevity of the soil seed bank in particular is required. Current knowledge of adult survivorship is based on plants growing among dense Watsonia stands and we need to determine adult survivorship in subpopulations where Watsonia is absent.

While fire may play a role in persistence of the species over time, fire also facilitates recruitment and persistence of Watsonia. Control of Watsonia before fire is integral to preventing spread and establishment of the weed and to ensuring successful post fire recruitment of Wild Native Rose.

Although the ecology of Wild Native Rose is poorly understood and the populations are being impacted by some serious threatening processes, the habitat of the species is protected in one of the oldest national parks in Western Australia. By attempting to understand appropriate management for Wild Native Rose and its critical habitat we may also gain a better understanding of appropriate management of fire and weeds across John Forrest National Park.

Watsonia invading critical habitat at the trial site. Photo: Kate Brown.

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