



Illawarra socketwood

Daphnandra johnsonii
Endangered

Target: secure the species through management of key threats and innovative research

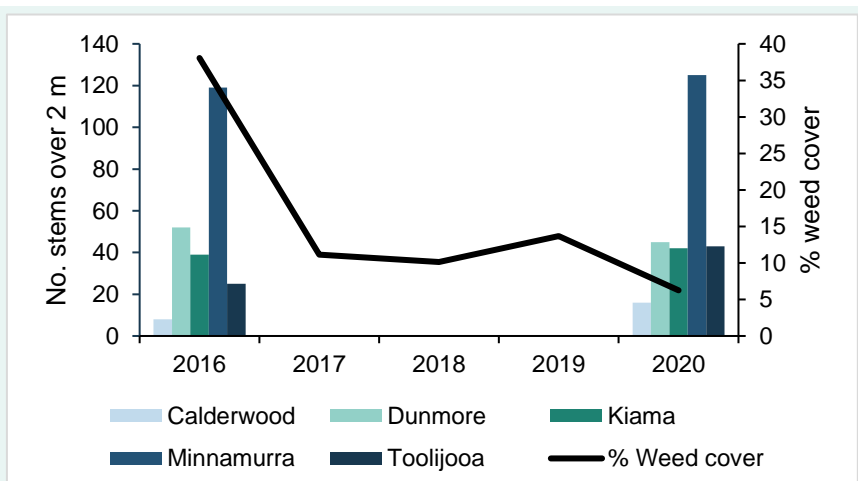
Over the past five years, *Saving our Species* (SoS) has increased our knowledge of the population genetics of the Illawarra socketwood (*Daphnandra johnsonii*), and reduced the impacts of weeds and grazers on this endangered species. Habitat for this range-restricted species is limited and highly fragmented, with land clearing and urban development posing a potential future threat to remaining populations.

Weed control and fencing mitigate key threats to the Illawarra socketwood, largely competition from exotic weeds and habitat disturbance by feral animals and stock. Genomics research has broadened our understanding of the extent of clonality within and across populations, and the likely population size of genetically distinct plants. Through this project, we have also improved the condition of Illawarra Subtropical Rainforest, recognised nationally as a critically endangered ecological community in which the Illawarra socketwood lives. So far, this project has achieved the following:

- **Weed cover** has **significantly decreased** thanks to our management actions.
- The number of socketwood stems has **increased** at three of our five management sites.
- We discovered **10 new populations** of socketwood.

Trajectory: stable

Monitoring data from four management sites shows a significant downwards trend in mean weed cover thanks to our management actions, and the number of mature socketwood stems (i.e. greater than 2 metres tall) has increased at three out of five management sites.



Partners

The project is led by the SoS program. As most socketwood populations occur on private land, collaboration with landholders has been pivotal to the project's success; allowing access for on-ground management at project sites, surveys and genomics (tissue) collections across 24 properties and contributing to on-ground conservation works. This also represented a good educational opportunity to support landholders by providing advice on managing and identifying the conservation values on their land.

Research collaborators were key in making new discoveries, with support from significant partners including the Royal Botanic Gardens, University of Wollongong, Wollongong Botanic Gardens and entomologist Dr Peter Kolesik.

Illawarra Landcare provided in-kind contributions toward plants for planting buffers to enhance habitat that was fenced off and protected during the project and helped promote the project.

Other organisations that made in-kind contributions to support our on-ground works included Kiama Council, Boral quarries and NSW National Parks and Wildlife Service.

What did we find?

Through on-ground management actions we have directly reduced weed threats to the Illawarra socketwood and have increased the number of socketwood stems occurring across management sites. This project highlights the impact novel and innovative research can have on informing threatened species conservation, with many groundbreaking discoveries made as part of this project.

The genomics work significantly enhanced our understanding of the genetic diversity and extent of clones for this species. We now know that socketwood can produce multiple clonal trees over large distances (up to 940 metres). Based on our genetic samples of 23 populations, we can also estimate that the actual population size of genetically distinct plants is much smaller than expected, at around 212 plants. Approximately 52% of our sampled socketwood

populations are comprised of only one or two genetically distinct plants (i.e. genets).

We have not found seedlings at any of the management sites (likely due to the combined impacts of low genetic diversity and gall midge disrupting seed production). However, we have been able to propagate seedlings when the gall midge is absent; and at least two genetically distinct plants are present.



A stand of Illawarra socketwood clonal suckers.
Photo: Alex Pike/DPIE

The discovery of a new species

- In our pursuit to understand the seed production limitations of the socketwood, we uncovered what we thought were 'pseudo-fruits' are in fact insect galls.
- The gall midge responsible is a new species, *Asphondylia daphnandrae*, named after Illawarra socketwood.
- Gall midges are typically host-specific, so it's likely this species only feeds on the Illawarra socketwood, or it may feed on other species of *Daphnandra*.



Asphondylia daphnandrae, discovered as part of the socketwood project. Photo: Nathan Butterworth/DPIE

Saving our Species is a NSW Government flagship program delivered by the Environment, Energy and Science group of DPIE. To find out more about threatened species in New South Wales and the *Saving our Species* program, visit the [Saving our Species Program webpage](#).