



Index Forestry team with Greening Australia staff, replanting at Pine Plains in 2026.

Lessons from the Field: Restoring Critically Endangered Semi-arid Woodland

Since 2022, Greening Australia has been working with Barengi Gadjin Land Council and Parks Victoria to restore 560 hectares of critically endangered semi-arid woodland at Pine Plains in Wyperfeld National Park.

The project is helping to rebuild habitat for nationally threatened species, including Buloke (*Allocasuarina luehmannii*) and Pink Cockatoo (*Cacatua leadbeateri*), while strengthening the resilience of one of Victoria's most significant semi-arid ecosystems.

The scale and complexity of restoration at Pine Plains has created valuable opportunities for innovation, research and adaptive management. By sharing lessons from the field, the project partners hope to contribute to improved restoration outcomes across Australia's semi-arid landscapes.

LOCATION: Pine Plains, Wyperfeld National Park, Victoria

PROJECT SIZE: 560 hectares

KEY NATURAL ASSETS: Critically endangered Buloke, *Allocasuarina luehmannii*.
Critically endangered Pink Cockatoo, *Cacatua leadbeateri*.

PROJECT FEATURES:

- Partnership with Barengi Gadjin Land Council and Parks Victoria ensuring cultural heritage protection and that the project is included in fire plans and complemented by total grazing pressure control.
- Embedded research trials.
- Machinery modification and innovation leading to increased species diversity.
- Observational learning post-fire.

The Semi-arid Woodland of Pine Plains

Pine Plains is part of the internationally significant Mallee landscape of north-west Victoria. Once characterised by scattered Buloke (*Allocasuarina luehmannii*) and Slender Cypress-Pine (*Callitris gracilis*) woodlands above a diverse understorey of chenopod shrubs and daisies, the area has experienced decades of disturbance from historical land clearing, grazing, rabbits and wildfire.

Despite these challenges, the landscape retains significant biodiversity and cultural values. The area provides important habitat for threatened wildlife and contains places of deep cultural significance for Traditional Owners represented by Barengi Gadjin Land Council (BGLC).

Restoring these woodlands will help reconnect habitat, improve ecosystem resilience and support the recovery of species that depend on these unique environments.

Partnerships and Long-term Stewardship

The success of the Pine Plains restoration project has been built on strong partnerships between BGLC, Parks Victoria and Greening Australia.

As co-managers of Wyperfeld National Park, BGLC and Parks Victoria play a critical role in protecting cultural heritage values, managing total grazing pressure, planning for fire and supporting long-term ecosystem recovery. Parks Victoria's stewardship of the national park also provides the long-term landscape management framework necessary for restoration success.

Through ongoing collaboration, the project has been able to align revegetation activities with conservation priorities, cultural heritage protection and future land management planning.

This partnership demonstrates the importance of combining Traditional Owner knowledge, public land management expertise and restoration science to achieve meaningful outcomes at scale.

Lessons from the Field

Embedded Research Trials

Throughout the project Greening Australia, as an industry partner, has co-supervised the successful completion of two honours projects with Federation University.

Andrew Cox completed his honors thesis in June 2025, titled 'Understanding the seed ecology of *Callitris gracilis* and species response from direct seeding to inform restoration approaches in semi-arid environments'. His research highlighted high variability in seed viability across different provenances of seeds tested, showing the need for vigilance in seed collection and storage practices for this species. Significantly, field trials demonstrated that cold stratification of *Callitris gracilis* at 2.5 degrees Celsius for 2.5 weeks resulted in greater early germination and growth. Early germination and growth is considered to be an important factor linked to seedling survival.

Callum Measham-Pywell completed his honors thesis in July 2026, titled 'Dormancy mechanisms and germination ecology of five arid zone species: implications for ecological restoration in Australia'. In summary, his research found that *Atriplex lindleyi* subsp. *inflata*, *Chenopodium nutans*, and *Olearia pimeleoides* are suitable for direct seeding in autumn to coincide with mild temperatures and reliable rainfall. *Pittosporum angustifolium* is better suited to nursery propagation given its inability to germinate under osmotic stress and its requirement for reliable moisture availability.

Learning from Wildfire

On 9 January 2026, a major bushfire burned through more than 50,000 hectares of Wyperfeld National Park, including parts of the Pine Plains project area.

While the fire impacted both remnant vegetation and recently restored sites, it also provided an opportunity to better understand ecosystem resilience and recovery responses. Monitoring has shown that some remnant vegetation is regenerating through epicormic growth and basal resprouting, while the oldest restoration areas established in 2022 are showing encouraging signs of natural recovery.

The younger areas sown in 2024 and 2025 were most impacted by the fire.

Drawing on seed stocks retained for project resilience, Greening Australia re-sowed 117 hectares in May 2026 and continues to plan future restoration efforts in collaboration with project partners.

The fire reinforced the importance of protecting large, mature trees and supporting young revegetation during its most vulnerable establishment phase. These lessons will help guide future restoration and land management efforts across semi-arid landscapes.



A four-year old Senna resprouting from the base after the fires.



Pine Plains post-fire, January 2026.



Machinery Modification to Increase Species Diversity via Direct Seeding

Many of the Semi-arid Woodland species are suitable for revegetation via mechanical direct seeding, but have traditionally not been included in direct seeding mixes because of the difficulties they present in moving smoothly through the seeding tubes.

These seeds can be fluffy, sticky or prickly, which are great traits for germination and natural movement through the landscape, but present a challenge for traditional mechanical delivery systems.

Out of necessity, this project has led to Greening Australia modifying our Burford tree seeders with the addition of a third seed hopper modelled off a gypsum spreader. It uses a belt delivery mechanism, which then allows seeds to flow through a larger diameter hose (no blockages), stopping the lighter fluffy seed from blowing away in the wind before being pressed into the soil with a heavy press wheel. These modifications have allowed us to significantly increase the diversity of direct seeding mixes with a particular focus on the understorey shrub and herb layers.

Adding dash cameras to each hopper delivery point on the seeders has also been an affordable way to give oversight and confidence that all the different types of seeds are being sown into the direct seeding trench.

Looking Ahead

Restoring semi-arid woodland is a long-term commitment that requires persistence, innovation and strong partnerships.

The Pine Plains project demonstrates how Traditional Owners, public land managers and restoration practitioners can work together to address large-scale environmental challenges while building knowledge for the wider restoration sector.

Greening Australia, Barengi Gadjin Land Council and Parks Victoria remain committed to restoring this important landscape and applying the lessons learned to improve restoration outcomes across Victoria's semi-arid environments.

Together, we are helping ensure that future generations inherit healthier, more resilient woodlands and the biodiversity they support.



Protecting and restoring semi-arid woodland is vital for many species including the endangered Pink Cockatoo (pictured).
Photo credit Ron Knight CC BY 2.0.

A Buloke sapling resprouting after the fire. The very young and the very old trees were the most vulnerable, while younger adults like this were more resilient.

For more information, contact Greening Australia | 1300 886 589 | greeningaustralia.org.au/contact

The Strategic Restoration of Semi-arid Woodland in Wyperfeld National Park from 2022 to 2026 has been delivered in partnership with One Tree Planted for the AstraZeneca Forest Initiative and with Reforest for Flight Centre's 'Planted with Purpose' program, and supported by the Victorian Government through the Nature Fund.