

PROJECT PHOENIX



SNAP!

A PICTURE OF THE AUSTRALIAN SEED SECTOR IN 2021



PROJECT SUMMARY

JUNE 2021

Across all of our Project Phoenix activities and actions we pay respect to the Traditional Owners and Custodians of the lands and waters on which we work. We honour the resilience and continuing connection to country, culture and community of all Aboriginal and Torres Strait Islander people across Australia. We recognise the decisions we make today will impact the lives of generations to come.

First published 2021
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ISBN: xxx-x-xxxxxx-xx-x (Book)
xxx-x-xxxxxx-xx-x (epub)

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Title: Snap! A picture of the Australian Seed Sector in 2021

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Cover by Kerry O’Flaherty, Design Consultant
Internal design by Kerry O’Flaherty, Design Consultant
Proofread by Puddingburn Publishing Services

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Project Phoenix is supported by the Australian Government’s *Wildlife and Habitat Bushfire Recovery program* and co-ordinated by Greening Australia.



Australian Government



ACKNOWLEDGEMENTS

Greening Australia would like to acknowledge the hard work and dedication of the Project Phoenix Management Team: Samantha Craigie, Patricia Verden, Brian Ramsay, Irene Walker, Courtney Sullivan, Rowan Wood, Paul Della Libera, Kim Philliponi and Ella Campen.



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EXECUTIVE SUMMARY

About the project

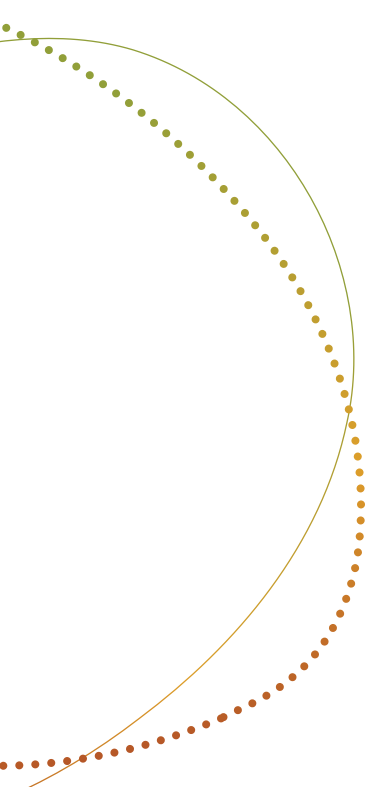
The desktop review of published reports on the Australian seed sector allows for a deeper dive and consolidation of previous reports and papers, identifying recurrent themes and new perspectives on solutions to long-standing issues.¹

Scope

The desktop review identifies recurrent themes and new perspectives on solutions to long-standing issues.

Identifying ongoing issues and themes within the sector will aid in understanding why change within the sector has been difficult. Barriers to scaling up restoration efforts to the scale required for bushfire recovery are also identified.

In addition, the report provides context for the recommendations on future directions, which is an important aspect of the review.



¹ This project contributes to the evidence base for a ten-year strategy to guide the native seed and landscape sector. The document, which is untitled until endorsement in September 2021, is referred to as the Strategy in all Project Phoenix publications.



Introduction

This report provides a review of the published reports on the Australian native seed and plant supply sector. The issues and barriers within the sector are outlined, and suggestions to inform seed-based restoration and conservation are provided.

Issues

Few issues were encountered in the development of this report. However, a couple of limitations to the report are:

- firstly, the short timeline (October–December) precluded any external consultation and
- secondly, this report reviews published reports, however, there may be unpublished information that was not captured during the review.

Comments

Many of the issues presented in this report were raised 10–20 years ago, but yet they are still relevant today. To address these issues and implement change, several key tasks are listed below:

- Coordinated and long-term restoration planning across the whole of Australia.
 - A 10 to 20-year plan for each region will direct ongoing work for seed collectors, lowering their financial risk and allowing them to collect during the good years and store for the future.
 - Regional planning would mean that there would be less onus on individual community groups and landowners to plan restoration and select appropriate species.
- Coordinated seed collection, testing, storage and dissemination at a regional level.
 - Restoration seedbanks may need to be established in key locations to ensure appropriate storage conditions.
 - Regional audits of seed collection capacity and infrastructure would be required, and then strategically improved.
- Coordinated research programs embedded into restoration programs, along with coordinated restoration monitoring and evaluation.
 - This would: (i) determine if goals are met; and (ii) provide information for adaptive management to inform future restoration planning. Research programs could be simple, for instance trialling two seeding rates, or complex, such as assessing provenancing strategies.



To oversee these tasks, a person (i.e. Commissioner/national coordinator) or entity (national industry body) should be appointed, to be an advocate for restoration and the seed industry, as well as providing training and opportunities for networking.

Key output

The key output is a written report reviewing published reports on the Australian seed sector.

Outcomes

This review leads to a better understanding of the issues and barriers in the Australian seed sector. A number of recommendations are made that can be used to underpin a National Seed Strategy.

Findings

This review identifies the following issues in the native seed sector:

- supply and demand
- licensing and permissions
- location of the seed source
- infrastructure for seed processing, storage
- treatment and end use
- seed quality testing and recording
- seed germination
- monitoring reporting and adaptive management
- the cost of seed
- funding
- developing and accessing research and information on seeds and restoration
- education and training
- coordination and communication
- scaling up
- implementing change.

Opportunities for seed use in fire management, such as fire preparedness, Indigenous land management, threatened species, climate change and people are also outlined.



Evidence

The data sources include:

- peer-reviewed literature from journals such as *Restoration Ecology* and *Australian Journal of Botany*
- reports, such as the *Australian Native Seed Sector Survey*, and *National prioritisation of Australian plants affected by the 2019–2020 bushfire season*
- online newspaper articles, such as from ‘The Conversation’
- national guidelines, including the *FloraBank Guidelines*, *Germplasm Guidelines* and *Translocation Guidelines*
- books, such as *Australian seeds — A guide to their collection, identification and biology*
- international strategy documents, such as the United Nations Decade on Ecosystem Restoration Strategy, National Seed Strategy for Rehabilitation and Restoration (USA)
- websites, such as www.landcareaustralia.org.au, www.ser.org, www.seedbankpartnership.org.au



RECOMMENDATIONS

RECOMMENDATIONS

1

Fire response

- Understanding:
 - how different plant species respond to fire (which are killed, and which survive; which are triggered to germinate or flower; which have the capacity to resprout)
 - how fire intensity, interval, severity and season affect plant species and
 - the effect of the interaction between fire and other factors (e.g. drought, disturbance) on plant species

will help inform restoration strategies for each species and in each location.

2

Restoration approaches

- Knowing which approach to restoration is needed in each degraded environment is critical to determining whether or not seed is needed.

3

Seeds in the context of restoration

- Seed supply for restoration needs to be considered within the broader context of restoration, which includes, amongst other items, restoration planning, funding and monitoring. Having a holistic view of not only the supply chain, but other factors that influence it will lead to better on-the-ground outcomes.

4

Stakeholders

- Compiling a comprehensive database of all those involved in the seed sector could help lead to better cohesion and communication.
- There is no one industry body which represents the sector, however, the Australian Seed Bank Partnership is a consortium which represents a number of seedbanks, NGOs and research organisations.



RECOMMENDATIONS

5

Supply and demand

- A strategy is needed to increase the quantity of seed available for restoration, increase the numbers of species available so that restoration can be biodiverse and smooth out demand so that there is less fluctuation, thereby providing ongoing employment for collectors and better price certainty for purchasers.
- Seed production areas (SPAs) are one option for improving seed availability.
- In addition, improving methods of seed-based restoration to increase seedling emergence and survival will increase seed use efficiency and therefore lower seed requirements.

6

Licensing and permissions

- Licensing applications must be clear and straightforward to complete, assessed within a reasonable timeframe and collate aggregated data about collection in each jurisdiction.
- Licensing agencies could implement a short, online assessment to ensure that collectors understand the licensing conditions and their obligations to harvest in a responsible and sustainable manner.
- Purchasers should check to ensure that their seed was obtained legally.
- A regional assessment could be undertaken to identify suitable areas for seed collection and allow restricted access to licensed collectors.

7

Seed sourcing

- Restoration plans must consider where the seeds will come from.
- This is important not only for direct seeding, but also when purchasing plants grown from seed. They must indicate whether seed will be sourced locally or non-locally (or both).
- They must consider whether the source populations are likely to be adapted to current and future environmental conditions. Increasing the genetic diversity of collections may benefit restoration.



RECOMMENDATIONS

8

Infrastructure

- An assessment is needed of current infrastructure capacity (including seed processing facilities, drying facilities, storage facilities, SPAs, nurseries and direct seeding equipment). Also relevant are the location and ownership of such infrastructure.
- In addition, an investigation is required into what infrastructure is needed where and by whom.
- Restoration seedbanks could be established in key areas.

9

Seed quality

- A behavioural change and education program to inform sellers and buyers of the necessity of seed testing, how to perform basic and advanced tests, and which tests to request, needs to be implemented in Australia to ensure buyer confidence and improve restoration success.

10

Seed germination

- Feedback from end users of seed is required to identify species for which research on germination is required. This research can be undertaken using in situ and ex situ trials.
- Seed enhancement technology is an emerging area of research in native seeds and has the potential to improve restoration success.
- A propagation manual of Australian plants listing germination conditions would be of benefit to the industry.

11

Monitoring, reporting, adaptive management

- Monitoring should be performed to determine whether or not the goals, aims and objectives are achieved. Simply reporting what the activities were (e.g. number of hectares seeded, number of trees planted) is not enough. The results need to be monitored, analysed and then reported (e.g., % survival after one and five years, number of species per hectare, average number of plants per square metre).
- Standardised monitoring protocols will enable data to be compared across sites and between years.



RECOMMENDATIONS

12

Cost of seed

- Encouraging purchasers to pay the true cost of seed may rely on other factors such as implementing quality testing and better allocation of funding for seed-based restoration.

13

Funding

- Funding timelines need to be in sync with restoration timelines, particularly given that restoration activities like seed collection, nursery propagation and planting are seasonal.
- Funding should be for more than five years to allow for adequate planning, seed collection and monitoring. It would also allow for more stable seed markets, ensuring support for businesses, workforces, training and improvement of quality (Hancock *et al.* 2020).
- Several decades of investment is required for restoration, which does not match the 3–5 year funding cycles (Broadhurst *et al.* 2015).
- We need an intergenerational view to restore our biodiversity (Broadhurst *et al.* 2015).






14

Research and information

- Ensuring people have access to information by providing good quality publications at low or no cost will improve on-the-ground outcomes.
- A central repository for information may be useful. Providing an annual forum may assist two-way knowledge sharing.
- Conferences and forums need to be low cost, at a convenient time of the year, in an accessible place and inclusive of practitioners. Funding may need to be provided to offset registration costs.
- Identifying knowledge gaps and addressing these through research will be needed for a restoration strategy. Networked and embedded experiments can be used to address knowledge gaps. Several important research questions are listed.



RECOMMENDATIONS

 <p>15</p>	<p>Education and training</p> <ul style="list-style-type: none"> • Provide low-cost, frequent training programs, possibly online. • Encourage training when licences or grants are applied for. • Collate a centralised list of all training opportunities at all levels. • Seed purchasers also require training.
 <p>16</p>	<p>Coordination and communication</p> <ul style="list-style-type: none"> • An industry body to represent the seed sector is now needed. • Opportunities to communicate between different parts of the sector will benefit the whole industry.
 <p>17</p>	<p>Scaling up</p> <ul style="list-style-type: none"> • Plans for seed collection and storage and implementation of seed-based restoration need to be able to be achieved at large-scale. A combination of changes is required to scale up restoration, as there is no single solution.
 <p>18</p>	<p>Implementing change</p> <ul style="list-style-type: none"> • Change needs to be implemented by: forming an industry body; understanding the motivations of and communicating with stakeholders; and changing regulations.
 <p>19</p>	<p>Fire preparedness</p> <ul style="list-style-type: none"> • Use fire forecasting to direct future seed collecting efforts. • Restore ecological communities to slow climate change. • Plan to protect biodiversity assets. • Trial the effectiveness of restoration to prevent, slow the spread or lower the intensity of fires.



RECOMMENDATIONS

20	Indigenous land management <ul style="list-style-type: none">Engage Indigenous people to help heal the land after catastrophic fires.
21	Threatened species <ul style="list-style-type: none">Soil and canopy seedbanks of the most imperilled species need to recover before seed collection is undertaken, except in urgent cases.Ecological restoration may provide additional habitat for threatened plants/animals. The prioritisation list could direct restoration to areas and with plant species which would benefit threatened animals.
22	Climate change <ul style="list-style-type: none">Protection, restoration and assisted migration may be options to enable the persistence of species affected by climate change.
23	People <ul style="list-style-type: none">Sharing resources may assist with the fire recovery efforts.Recovery planning could be undertaken at a national, state and regional level to assist individual landowners.Building strong relationships between stakeholders will be critical for recovery and preparedness for any future fires.



WANT TO KNOW MORE?

For further information read the full report *Snap! A Picture of the Australian Seed Sector in 2021*.

Related projects

- All Project Phoenix reports

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