PROJECT PHOENIX

WHAT ARE CONSERVATION SEED BANKS AND WHAT DO THEY DO?

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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.

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EXECUTIVE SUMMARY

Scope

The scope of the project is to undertake a review of the conservation seed sector to articulate national seed and plant restoration capacity (in combination with commercial capacity). The aim is to identify entities associated with native seed management including their location and number of non-commercial (conservation and community) native seedbanks, threated species seed production areas (SPAs), seed storage and native plant production capacity nationally. This review aims to understand efforts across Australia in terms of the number of taxa represented in conservation seedbanks, research capacity, training capacity, native plant production capacity, storage capacity and investment to meet Australia's restoration capacity now and in the future.

Introduction

This project assists in identifying what information is available on the conservation sector to establish its restoration capacity.

In the context of native seeds, the conservation and restoration sectors are closely linked. The seedbanks, seed production areas (SPAs) and nurseries within the conservation sector assist in the provision of seed for restoration purposes. There are 'pure' conservation entities such as botanic gardens that act as repositories for seeds and have capacity in research and development. There are community-based conservation groups which hold stores of seeds with the purpose of improving or restoring the local environment. Some community-based seedbanks sell seed to the restoration (and other) sectors. In addition there are several commercial organisations that have been identified that have specific capacity in conservation and provide environmental services and seed for restoration purposes.

Issues

Several issues were identified during the gathering and preparation of data for this project:

- Although a short online survey was developed (see Appendix A) and circulated to the conservation sector via the Australian Network for Plant Conservation and Council of Heads of Australian Botanic Gardens, only three surveys were completed. This led to a pivot in approach to a desktop review of the conservation sector augmented with some stakeholder consultation.
  - Low survey responses may be due to a number of different survey instruments running concurrently throughout Project Phoenix (although not specific to the conservation sector) that may have led to survey fatigue.
- Although a large number of organisations were identified, some have more publicly available information than others. This means the data available is highly variable and there are considerable gaps, particularly in relation to capacity.
  - Specifically there is no information on financial capacity or threatened species production areas.

- Although effort was taken to ensure all relevant organisations were identified, this report details a sub-set of entities whose data was publicly available on the internet.[1] It is not a complete nor comprehensive audit of the native seed conservation capacity.

Key outputs

The key output from this activity is:

- This report.
- The number of conservation seedbanks = 17.[2]
  - conservation seedbanks have the objective of providing a repository for Australian (and other)[3] flora. These repositories are generally for the purpose of conserving biodiversity, scientific research, display and education.
  - conservation seedbanks account for 94 per cent of the taxa (species) identified.
- The number of community seedbanks = 21.[4]
  - Community-based seedbanks are for the purpose of improving the local environment but are also repositories. Many of them are not-for-profit organisations. Some of them sell seed to the public and some retain seed only for their own community use.[5]
  - Community-based seedbanks account for 6 per cent of the taxa identified.
- Government-funded seedbanks = 17.
- Non-government funded seedbanks = 22.[6]
- The approximate number of taxa represented nationally in these seedbanks = 26,291 native species.[7]

See **Table 1** for a breakdown of seedbanks and taxa by organisation and jurisdiction.

[1] 100 per cent of the listings in the database (97 entities) have some information available in the public domain (online).
[2] Seedbanks hold native species but may not be entirely native seedbanks.
[3] Some seedbanks include non-native species. Many seedbanks report their taxa and also the proportion of native seeds. The numbers presented here correspond where possible to the number of native seed species.
[4] Some of these community seedbanks sell seed but they are generally run by not-for-profit entities. In addition, there is one commercial seedbank that is not a conservation or community-based seedbank (BioBankSeed).
[5] Murray Local Land Services seedbank is an exception as it is government-funded.
[6] This includes the commercially operated BioBankSeed seedbank.
[7] These are not unique species. Some have been estimated from the stated proportion of native seeds held in a seedbank.

TABLE 1. ENTITIES WITH SEEDBANKS BY JURISDICTION (TAXA PROVIDED WHERE AVAILABLE)

SEEDBANK		LOCATION (STATE)	TAXA (SPECIES)*	GOVERNANCE
COMMUNITY				
1.	Apace Aid Inc (Swan Regional Seedbank)	Western Australia	—	Not-for-profit
2.	Australian Native Plant Society Canberra	ACT	600	Not-for-profit
3.	Ballarat Region Seedbank	Victoria	203	Not-for-profit
4.	Broken Hill Landcare Seedbank	NSW	—	Not-for-profit
5.	Cardinia Environment Coalition Indigenous Seedbank	Victoria	—	Not-for-profit
6.	Far South Coast Landcare Seedbank	NSW	—	Not-for-profit
7.	Goulburn Broken Indigenous Seedbank	Victoria	—	Not-for-profit
8.	Hindmarsh Island Landcare Group Seedbank	South Australia	—	Not-for-profit
9.	Murray Local Land Services Seedbank	NSW	—	Not-for-profit
10.	Murray Mallee Seedbank	Victoria	193	Government agency
11.	Native Plants Queensland Seedbank	Queensland	—	Not-for-profit
12.	South Australian Plant Society Seedbank	South Australia	—	Not-for-profit
13.	South Gippsland Seedbank	Victoria	80	Not-for-profit
14.	Upper Hunter Landcare Seedbank	NSW	—	Not-for-profit
15.	West Gippsland Seedbank	Victoria	—	Not-for-profit
16.	Wildflower Society of Western Australia	Western Australia	—	Not-for-profit
17.	Williamstown and Lyndoch Landcare Seedbank	South Australia	—	Not-for-profit
18.	Wimmera Region Seedbank	Victoria	96	Not-for-profit
19.	Wonthaggi Seed Bank & Nursery	Victoria	—	Not-for-profit
20.	Wynyard Community Seed Bank	Tasmania	—	Not-for-profit
21.	Yarram Yarram Landcare Network	Victoria	100	Not-for-profit
Sub-total			**1,272****	
CONSERVATION				
22.	Australian Arid Lands Botanic Garden	South Australia	—	Government agency
23.	Australian Botanic Gardens	NSW	5,000	Government agency
24.	Australian National Botanic Gardens	NSW	4,000	Government agency
25.	Botanic Gardens and Parks Authority	Western Australia	—	Government agency
26.	Brisbane Botanic Gardens Conservation Seedbank	Queensland	2,791	Government agency
27.	Genetic Resources Section, Plant Industry, CSIRO Seedbank	ACT	—	Government agency
28.	George Brown Darwin Botanic Gardens	Northern Territory	—	Government agency

SEEDBANK	LOCATION (STATE)	TAXA (SPECIES)*	GOVERNANCE
29. Myall Park Botanic Garden Seedbank	Queensland	—	Not-for-profit
30. National Arboretum	ACT	—	Government agency
31. North Coast Regional Botanic Garden	NSW	—	Government agency
32. Northern Territory Seedbank	Northern Territory	700	Government agency
33. Royal Botanic Garden Sydney	NSW	5,184	Government agency
34. Royal Botanic Gardens Victoria	Victoria		Government agency
35. Tasmanian Seed Conservation Centre (TSCC)	Tasmania	945	Government agency
36. Threatened Flora Seed Centre – Western Australia	Western Australia	2,000	Government agency
37. Western Australia Seed Technology Centre (WASTC) — Kings Park and Botanic Garden	Western Australia	3,500	Government agency
38. Wollongong Botanic Gardens	NSW	699	Government agency
Sub-total		**24,819****	
COMMERCIAL			
39. BioBankSeed	NSW	200	Company
TOTAL		**26,291****	

Note:

* Although care has been taken to ensure that only native species have been accounted for it is possible that some non—native species have been captured in these figures so the taxa may be considered an overestimate.

** These are not unique species – many seedbanks may hold the same species.

Outcomes

The outcomes of this project are:

- a database of entities in the conservation sector
- information on each entity in terms of name, location and purpose and additional capacity-related information where available.
- maps of conservation organisations, seedbanks, SPAs and nurseries.

Findings

The conservation sector, not unlike the native seed sector as a whole, is comprised of multiple players, some big and many small. As a result, it is no surprise that there is limited coordination within and across the sector and that capacity is highly variable.

Most botanic gardens are government-funded and dependent on budgets as well as top up funding from grants or donations. The community-based conservation sector in the large part operates as not-for-profit and is dependent on grants, donations and volunteers.

These funding arrangements are likely to be the reason for variable capacity. Botanic gardens and other government-funded institutions appear to have the highest capacity and community-based entities have lower levels of capacity.

In addition, there are several networks/societies at a state (17) and national (6) level including the Australian Seedbank Partnership and native plant societies and other groups such as the Australian Network for Plant Conservation and Council of Heads of Australian Botanic Gardens that hold capacity primarily in terms of staff (capability) and research. Unfortunately, there is limited publicly available information available to support this assertion.

The database developed as part of this project is the first of its kind and is a solid start that can be further developed with input from the sector. The database is limited as it only focuses on publicly available information but the advantage of this is that there are no concerns in sharing this information across the sector.

Sector participants will be able to search for organisations on a state basis, by focus, by objective and by governance. It will also be easier to find seedbanks, SPAs and nurseries involved in conservation. In particular, this database goes beyond the major botanic gardens and attempts to capture a large share (55 per cent of organisations in the database are community-based organisations) of the community-based conservation sector nationally.

Privacy concerns and lack of trust in the native seed sector overall limited the information that could be sourced for this project.

Descriptive statistics

As presented in Chapter 2 and Chapter 3, the 97 organisations captured in the database can be categorised and presented in several ways (see **Figures 2.1** to **2.5**, **Table 3.1** and **Figure 3.1**). The database contains information on 97 entities. The key findings from this analysis are:

- NSW has the largest number of organisations (27 per cent) in the conservation space, followed closely by Victoria (22 per cent). The community-based systems in Victoria are well aligned and networked under Landcare and Seeding Victoria.
- Community-based conservation organisations are well represented (55 per cent), followed by those organisations with a conservation focus (e.g. botanic gardens) (34 per cent).
- In line with the large proportion of community-based organisations, the majority are not-for-profits (56 per cent) followed by government agencies (28 per cent).
- Thirty-two per cent of organisations aim to improve the local environment and 22 per cent operate primarily as repositories for conservation purposes.
- Networks and societies are a key feature. State-based networks and societies (18 per cent) are more integral to the sector than national networks and societies (6 per cent).

- Commercial players identified on the internet with an interest in conservation are primarily found in NSW.
- There were 17 conservation seedbanks and 21 community-based seedbanks identified across Australia. Between them, they hold approximately 26,000 non-unique species, of which 94 per cent are held by the conservation seedbanks.
- There was very little publicly available information on the capacity of these organisations (refer to Section 3.3).
- The botanic gardens, as key players in the sector, have a well-developed research network and considerably more reported capacity than community-based entities who operate primarily on a volunteer basis with the objective of improving the local environment.

Observations

Stakeholder consultations make the following observations that broadly align with the findings of this review and add some context to capacity in the conservation sector.

Stakeholders consider that there is limited capacity in the sector specifically in relation to regionally-specific training for different sector participants (collectors, sellers and purchasers) and Traditional Owners.

Several stakeholders noted that the uncertainty of demand for native seed stifles investment in capacity across the sector and as a result there are funding shortages for infrastructure, skills/training, testing and seed production areas (SPAs).

The conservation sector, with a public good aim, may have less reliance on demand for native seed than the restoration or other more commercially focused sectors would have. An exception would be seedbanks many of which sell seed as well as store it for local/community use. Funding for the conservation sector is predominantly provided by government (with some philanthropic support) and is generally considered to be insufficient and highly variable.

It should be noted that a large proportion is community based not-for-profits and reliance on donations and grants is likely to be more variable and less sufficient than the funding available to botanic gardens and other government agencies.

Many stakeholders noted the importance of networks for the provision of information and coordination across the sector. The botanic gardens are considered to have a strong network focus that works well but is only focused on botanic gardens. Native Plant Societies and Landcare appear to be the most active at the state and regional level. However, these organisations are not solely focused on native seed although many are active in conservation and have links to seedbanks.

Key observations include:

- There is capacity available in the botanic gardens that could be targeted towards building the sector from the bottom up. Botanic gardens have the capacity to be more involved in the conservation of native seed in their states. They hold the majority of identified capability and have more financial assurance than other players in the sector. For example, fee for service extension programs such as specific training and development, the provision of specialised information services or facilities could be made available for the use of the community conservation sector.
- The conservation sector has the potential to support the restoration sector – but this should be a two-way relationship as it is likely that the restoration sector has capacity that could support the conservations sector, in particular the community-based entities and those that are not-for-profit. An example may include the use of restoration sector equipment (e.g. seed harvesting, sorting, cleaning etc equipment) that could be made available to the community-based conservation sector either through an in-kind or a commercial (fee for service) arrangement.

Evidence

Refer to Appendix A for survey questions and Appendix B for the list of stakeholders.

Recommendations

Key recommendations from this review are as follows:

1. The database provides valuable information for the conservation and the restoration sector as the information contained in the database has come from the public domain.
2. Consideration should be given to do further work on it in terms of:
   - broadening the database to include relevant information if appropriate in other Project Phoenix reports[8]
   - deepening the understanding of capacity through a comprehensive audit (noting the limitations of doing so, including privacy concerns).
3. Botanic gardens should provide fee for service extension programs within their state/territory to improve the capacity of community-based conservationists and the native seed sector more broadly.
4. The conservation sector should engage in dialogue with the restoration sector in order to identify the restoration sector's needs and how the capacity of the conservation sector can be used to assist restoration. Conversely, consideration on what the restoration sector may be able to offer the conservation sector in terms of capacity should also be explored — specifically in relation to capability, storage facilities, SPAs, nurseries and specialised equipment.

[8] For example, see Heaslip, P (2021) *Revealed! The National Native Nursery Network*, Project Phoenix and Baker, E (2021) *Australian native seed production in 2021*, Project Phoenix.

1 INTRODUCTION

1.1 Context

Greening Australia received $5 million under the Federal Government's $50 million Bushfire Wildlife and Habitat Recovery Package. This funding has been allocated to Project Phoenix, which aims to increase native seed and plant supply in preparation for the restoration of bushfire-affected areas and other valuable habitat. This aims to support a response to the recent challenges in two main ways: an immediate response to the bushfire impacts; and by developing a longer-term vision to address systemic issues in native seed supply in Australia. Project Phoenix will deliver strategic outcomes under eight priorities.

> **Priority 5: In collaboration with existing resources and expertise, support conservation seed banks for future safeguarding against local extinctions and adaptation.**

This project seeks to review the conservation seed sector in terms of national seed and plant restoration and commercial capacity.

1.2 Scope

The *Australian Native Seed Survey Report* (2020)[9] notes the sector is comprised of 'ad hoc group of individuals, businesses and government agencies' across the native seed value chain. The scope of this project is to identify entities across Australia related to native seed conservation and provide information on:

- their location
- number of non-commercial (conservation and community) native seedbanks
- threated species seed production areas (SPAs)
- seed storage and native plant production capacity.

This review aims to understand efforts across Australia in terms of the number of taxa represented in conservation seedbanks and any information on research and training capacity.

Although effort was taken to ensure all relevant organisations were identified, this report details a sub-set of entities whose data was publicly available on the internet. It is not a complete nor comprehensive report of native seed conservation capacity.

[9] Australian Network for Plant Conservation (ANPC), 2020, *The Australian Native Seed Survey Report*. Available at: https://www.anpc.asn.au/wp-content/uploads/2020/03/ANPC_NativeSeedSurveyReport_WEB.pdf

1.3 Methodology

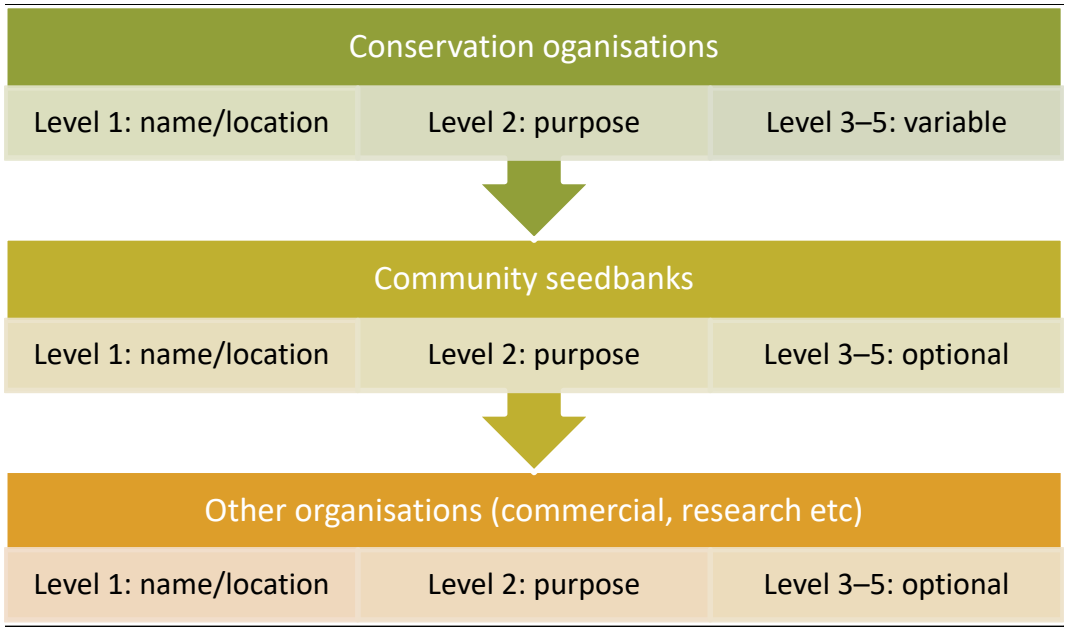
A cascading capacity framework was defined for the sector (see **Figure 1.1**) with several levels:

- Level 1: Name and location
- Level 2: Purpose — which implies governance structure and corporate form as well as what the organisation does
- Level 3: Capability — staffing numbers, full-time/part-time, paid or voluntary positions and where possible an assessment of skills/qualifications
- Level 4: Facilities — including physical infrastructure such as sheds or equipment as well as seed inventory/stock, production facilities such as nurseries etc
- Level 5: Finances — where possible

A cascading hierarchy was used due to the nature of the native seed sector and the potential difficulty obtaining and collecting information.

Information was collected on (levels 1 and 2) for all entities and some information was sourced for levels 3 and 4. Very little information was available (or provided) on finance (level 5).

FIGURE 1.1. CASCADING CAPACITY IDENTIFICATION FRAMEWORK BY SECTOR



Source: ACIL Allen

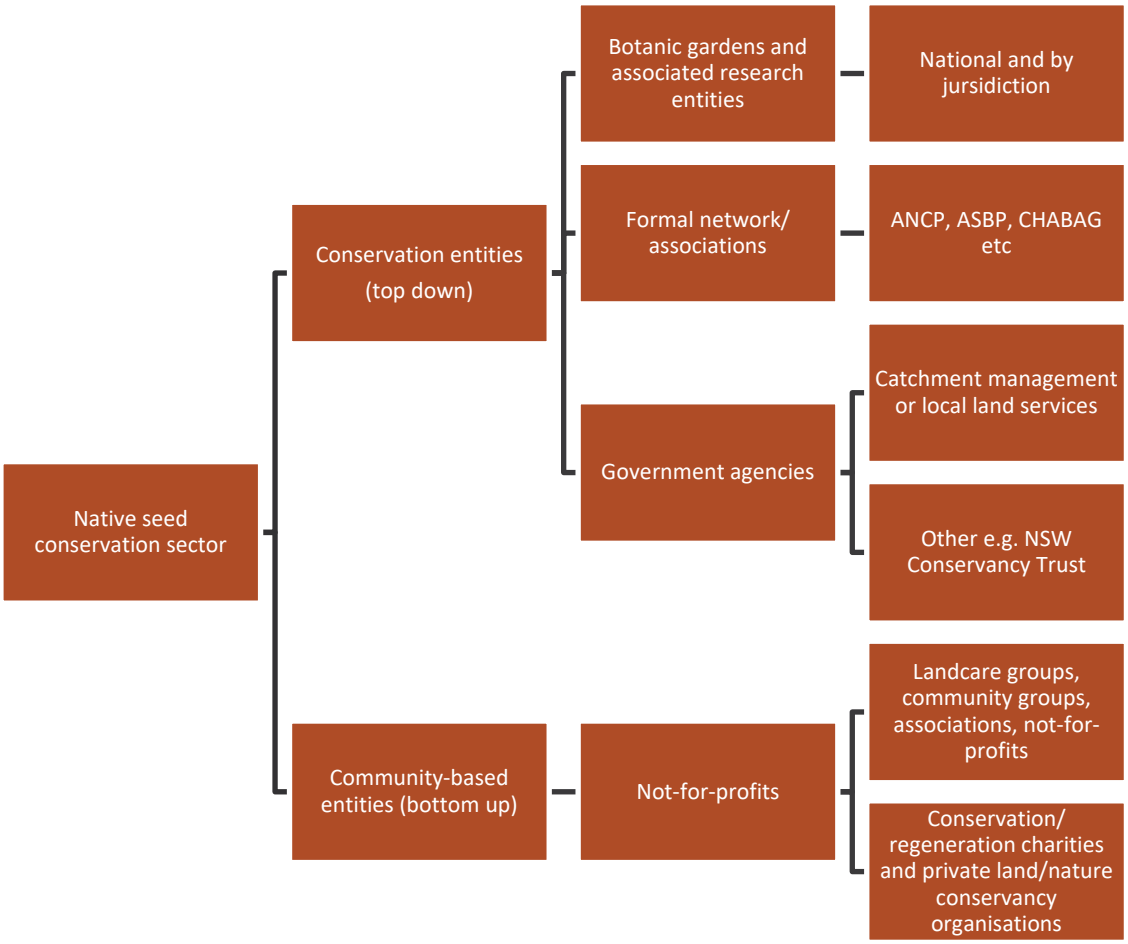
Search for relevant organisations was undertaken on two distinct categories (focus) in the conservation sector (see **Figure 1.2**).

- A conservation entity is a top down entity such as a botanic garden, network/association of botanic gardens or government related entity with the primary purpose of conservation for public good.
- A community-based entity is a bottom up entity developed for the purposes of local or regional level conservation (even if it operates nationally) for a specific purpose or to fill an identified gap. These are commonly not-for-profit organisations, or registered charities.

Throughout the process of searching, speaking with stakeholders and developing the database, two additional categories were identified:

- research (or supporting) entities with capacity to assist the native seed sector and
- commercial service providers with capacity to assist the native seed sector.[10]

FIGURE 1.2. CATEGORISING THE SECTOR FOR THE PURPOSES OF IDENTIFYING PARTICIPANTS



Source: ACIL Allen

[10] Consultation with Martin Driver indicated several key commercial entities he considered as part of the conservation sector.

1.3.1 Desktop review and data capture

The methodology used in this study included a desktop review of sector participants related to native seed conservation and stakeholder consultations through the Strategy Workshops (April-May 2021) and several individual consultations. A short survey was developed see Appendix A) and released through the Australian Network for Plant Conservation and Council of Heads of Australian Botanic Gardens networks. However, as of 16 June 2021, only three responses had been received. It is assumed that the sector is facing considerable survey and consultation fatigue following several concurrent surveys from other (non-conservation specific) Project Phoenix activities.

A series of one-on-one interviews were held with stakeholders (see Appendix B) but unfortunately these did not yield significant information. As a result, the focus pivoted to sourcing publicly available information on the internet. Identification of entities and the information collected came from the following sources:

- Google search (with a variety of search terms including for example: conservation, native seed, native plant, seed bank, botanic gardens, Landcare, community, catchment management, land services etc).
- Botanic Gardens Conservation International Database (see https://www.bgci.org/resources/bgci-databases/gardensearch/).[11]

Data collected included as much information as possible on:

- name, location (physical location and webpage) (including publicly available names contact details)
- purpose
- number of native seedbanks
- number of taxa (species)
- threated species seed production areas
- seed storage and storage capacity
- native plant production capacity (nurseries and SPAs)
- research capacity and facilities
- training and education capacity
- staffing
- finance
- other relevant information.

[11] Note that there are a total of 149 botanic gardens in Australia (according to the Botanic Gardens Conservation International Database). All of these have not been included in this database. There are two reasons for this: (a) many are smaller council or privately run botanic gardens who do not have information on capacity and (b) they do not have seedbanks. The database does include all large/major botanic gardens and smaller botanic gardens purporting to have a seedbank with at least a proportion of native species.

In addition to the desktop review, a series of 14 strategy design workshops were conducted in April and May 2021.[12] Conservation and capacity were discussed as a part of each of these workshops and there was one workshop that focused on the conservation sector more specifically (36 people attended this workshop — each jurisdiction except South Australia was represented — refer to Appendix Table B.1). See **Box 1** and **Box 2** for a summary of findings on the conservation sector and capacity.

Box 1. Summary of stakeholder consultations on conservation

As part of the development of a ten-year Strategy, a series of 14 workshops were run in April–May 2021. Conservation was part of the discussion in some of these workshops.

There is a market failure for species that are difficult to collect etc. The challenges/ limitations to conservation are:

- land clearing (driven by government, local councils)
- an absence of targets for sustainable land use
- poor long-term planning (i.e. climate adjusted translocation)
- seed accessibility
- poor coordination — participants do not know where to go to get support, and government departments have conflicting policies.

There is limited government follow-up on conservation activities.

There is an opportunity to:

- Share conservation information with the restoration sector to improve direct seeding outcomes.
- Better coordinate and leverage lessons from across the sector, including cross-border projects.
- Generate an additional income stream from philanthropy.
- Consider functional improvements and climate-adaptation.
- Better train workers in the sector, which is dominated by volunteers.
- Build storage capacity.

Source: ACIL Allen

[12] The Report 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.

1.3.2 Database design

A database was developed in an Excel spreadsheet and includes variable amounts of publicly available information on 97 organisations involved in conservation in the native seed sector. For all 97 organisations there is information on:

- name
- location (physical location and webpage) and
- purpose.

Where available information is reported on:

- contact names and details (phone numbers/email addresses)
- number of seedbanks
- number of taxa (species)
- native plant production capacity (nurseries and SPAs)
- research capacity
- facilities
- training and development
- education
- staffing.

There was no information available on:

- finance
- threated species seed production areas.[13]

The database is searchable and can be filtered by:

- purpose – categorised as:
  - focus (conservation, community, commercial and research).
  - objective (repository, improving the local environment, state or national network and society, environmental services, land owner/manager, funding provider and research).
  - governance (not-for-profit, government agency, company, statutory body).
- state/territory
- whether the organisation has a seedbank and/or SPA and/or nursery.

[13] It may be assumed that Botanic Gardens are likely to have threated species production areas.

- capacity – categorised as:
  - facilities (including equipment)
  - research
  - training and development
  - education
  - staff (including volunteers).

1.4 The rest of this report

The rest of this report is structured as follows:

- Section 2 provides an overview of the conservation sector captured in the database.
- Section 3 provides an overview of the capacity of organisations in the conservation sector.
- Section 4 provides key findings and recommendations.

2 AN OVERVIEW OF THE CONSERVATION SECTOR AND ITS CAPACITY

2.1 Background

The native seed sector is a complex sector characterised by several sub-sectors including conservation and restoration (amongst others) which share the inter-related objective of achieving beneficial outcomes for society. Conservation provides an enduring core of the sector with a focus on preservation and protection of species and ecosystems either at a national, state or local level.

In the context of native seeds, the conservation and restoration sectors are closely linked. The seedbanks, seed production areas (SPAs) and nurseries within the conservation sector assist in the provision of seed for restoration purposes. There are 'pure' conservation entities such as botanic gardens that act as repositories for seeds and have capacity in research and development. There are community-based conservation groups which hold stores of seeds with the purpose of improving or restoring the local environment. Some community-based seedbanks sell seed to the restoration (and other) sectors. In addition, there are several commercial organisations that have been identified which have specific capacity in conservation and provide environmental services and seed for restoration purposes.

Figures 2.1, 2.2 and **2.3** present a national map of the conservation sector based on the database developed in this project.

2.2 The conservation sector

Within the conservation sub-sector are a variety of different entities that can be characterised by their purpose in the following way:

- focus
- objective
- governance.

Each of these terms is defined below, and summary statistics from the database are presented in **Figure 2.4** and state-based maps in **Figure 2.5**.

2.2.1 Focus

Each entity has been categorised as either:

- A conservation entity is a top down entity such as a botanic garden, network/association of botanic gardens or government related entity with the primary purpose of conservation for public good. Conservation organisations represent 33 per cent of the entities in the database.
- A community-based entity is a bottom up entity developed for the purposes of local or regional level conservation (even if it operates nationally) for a specific purpose or to fill an identified gap. These are commonly not-for-profit organisations. Community-based organisations represent 54 per cent of entities in the database.
- A commercial entity is a key player in the conservation sector but who operates as a service provider. Commercial entities account for 10 per cent of entities in the database.
- Research entities are those who primarily conduct (or fund) native seed related research for the purposes of conservation. Research entities are 1 per cent of entities in the database.

2.2.2 Objective

The objective of each entity has been developed from each entity's stated purpose. These have been broken into eight categories:

- **Repository:** the primary purpose of a botanic gardens (as defined by the Botanic Gardens Conservation International) "holding documented collections of living plants for the purpose of scientific research, conservation, display and education". [14] They hold various capacity in nearly all areas: seedbanks, facilities, training and development, research, education and staff. The objective of repository accounts for 21 per cent of entities.

[14] See https://www.bgci.org/about/about-botanic-garden/#:~:text=Botanic%20gardens%20are%20institutions%20holding,%2C%20conservation%2C%20display%20and%20education.

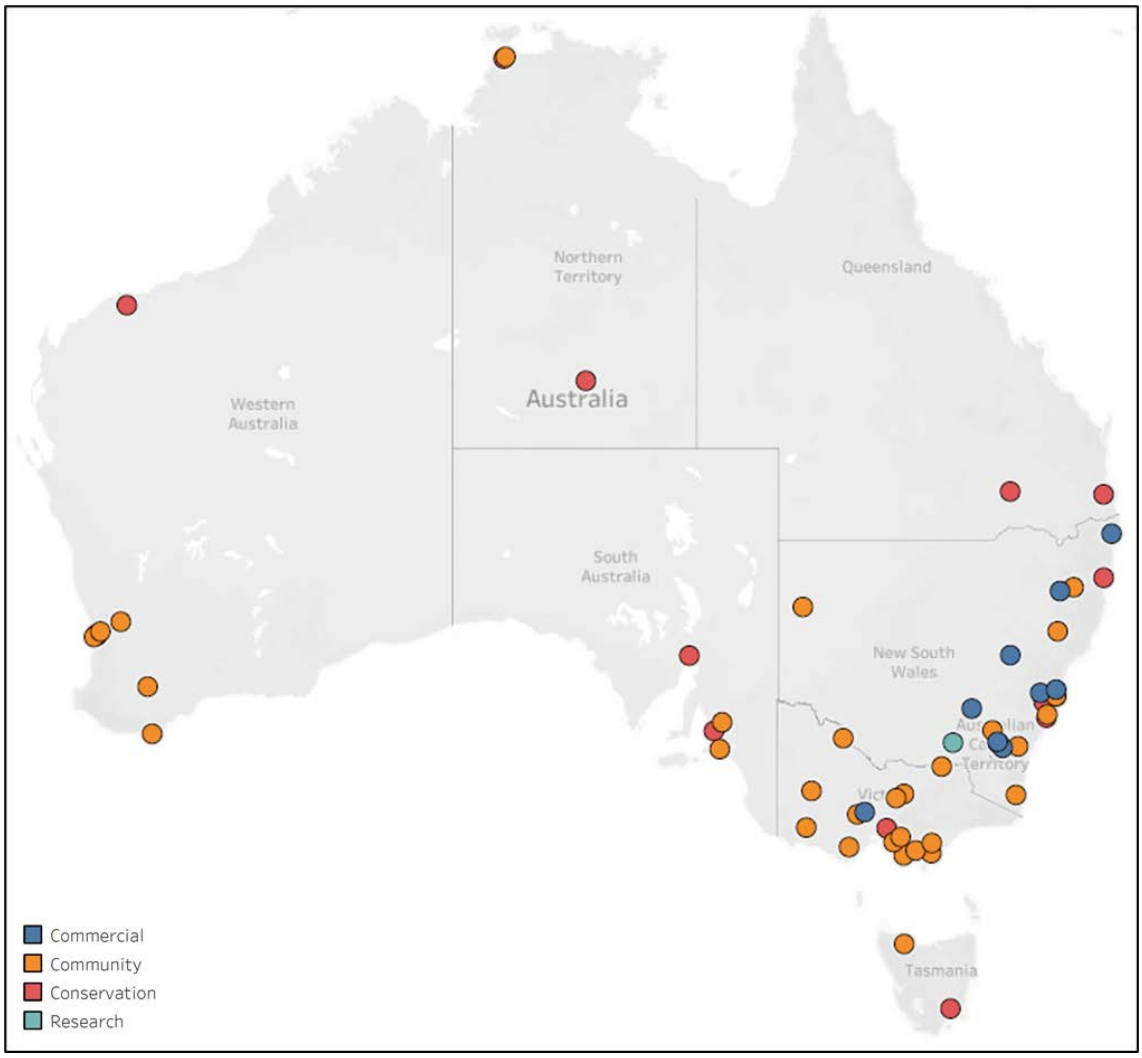
- **Improving the local environment:** this is the aim of many community-based entities who have a primary focus on local (or regional) conservation. Some of these entities have seedbanks, SPAs and nurseries and some have dedicated staff and training programs. The aim of improving local environment can be attributed to 31 per cent of entities.
- **National network and society:** national networks or societies are generally member or partnership-based organisations who operate at the national level in the conservation space. They hold training and development and education capacity. Six per cent of entities are national networks/societies.
- **State network and society:** state-based networks or societies operate at the state level and are generally member-based organisations. They hold capacity in seedbanks, SPAs, nurseries, training and development, and research and education. Seventeen per cent of state based networks or societies.
- **Environmental services:** are the primary objective of commercial enterprises. Some have seedbanks, SPAs and nurseries and specialised facilities and/or equipment. They account for 10 per cent of entities in the database.
- **Land owner/manager:** these entities own and/or manage land for the purposes of conservation. They have some training and development capacity. Five per cent of entities are land owner/managers.
- **Funding provider:** these entities provide funding for the sector; some also have research capacity. Three per cent of organisations in the database are funding providers.
- **Research:** these organisations contribute to the research capacity of the conservation sector including facilities/equipment. They account for four per cent of entities in the database.

2.2.3 Governance

The governance of different entities gives an insight into their financial capacity. There are four categories of governance:

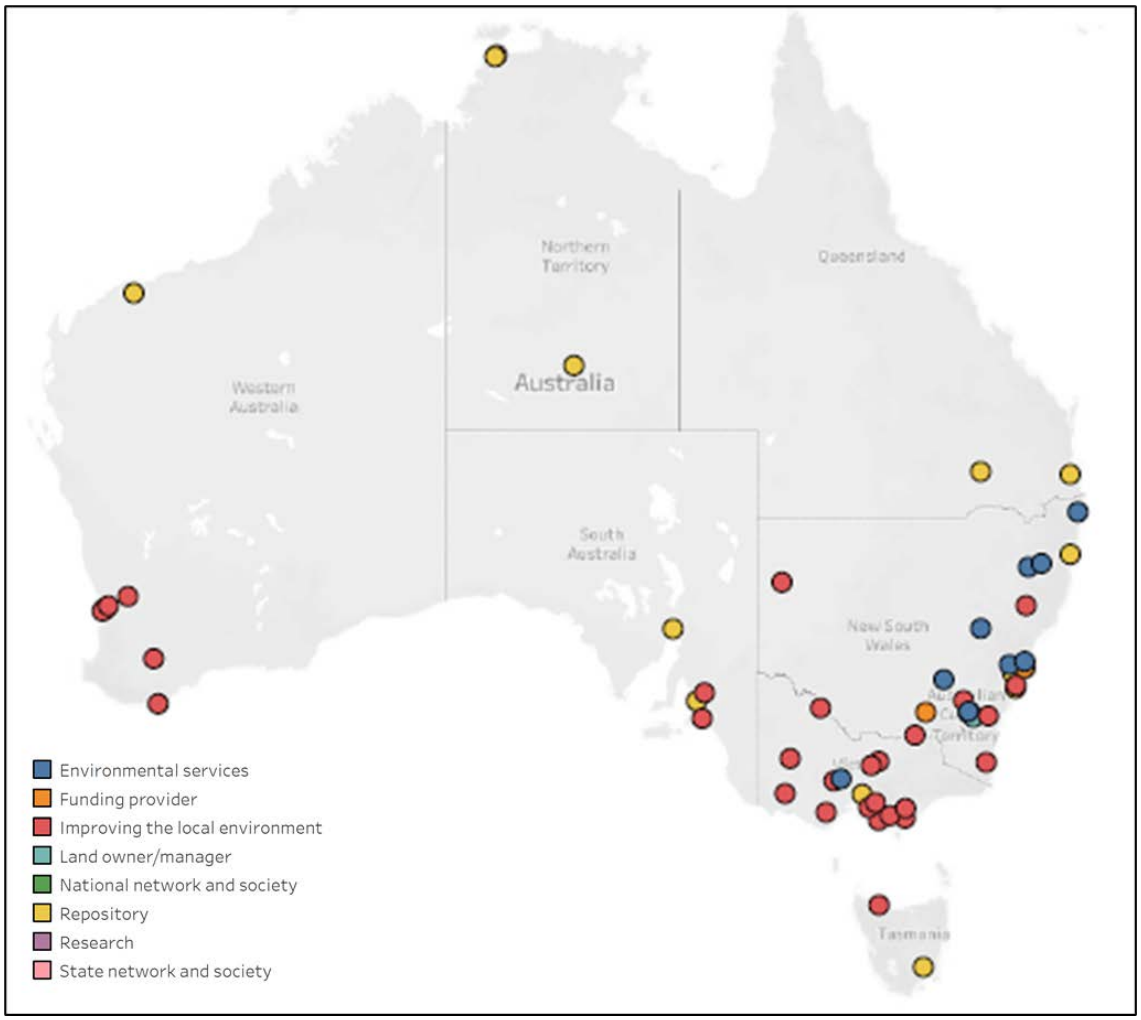
- **Government agency:** these entities are likely to have more secure funding arrangements and financial capacity relative to other categories. Twenty-seven per cent of entities are government agencies.
- **Company:** these entities are private organisations; the level of financial capacity is likely to be variable. Fourteen per cent of entities are companies.
- **Not-for-profit:** these entities are likely to have lower financial capacity than companies or government agencies. Many rely on volunteers; some are subscription based and some rely on donations. They account for 54 per cent of the database.
- **Statutory bodies:** are likely to be government funded and are similar to government agencies. They account for two per cent of the database.

FIGURE 2.1. MAP OF THE CONSERVATION SECTOR BY FOCUS



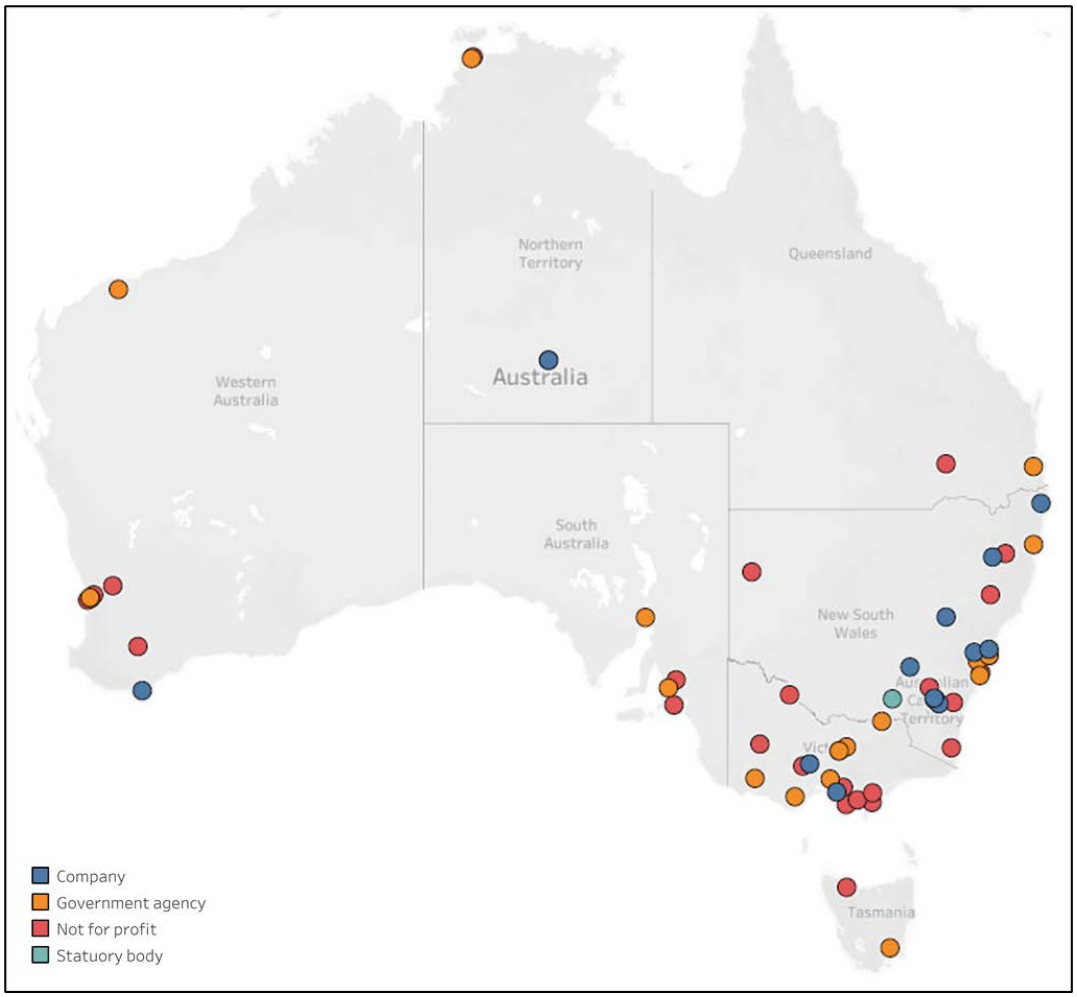
Source: ACIL Allen

FIGURE 2.2. MAP OF THE CONSERVATION SECTOR BY OBJECTIVE



Source: ACIL Allen

FIGURE 2.3. MAP OF THE CONSERVATION SECTOR BY GOVERNANCE



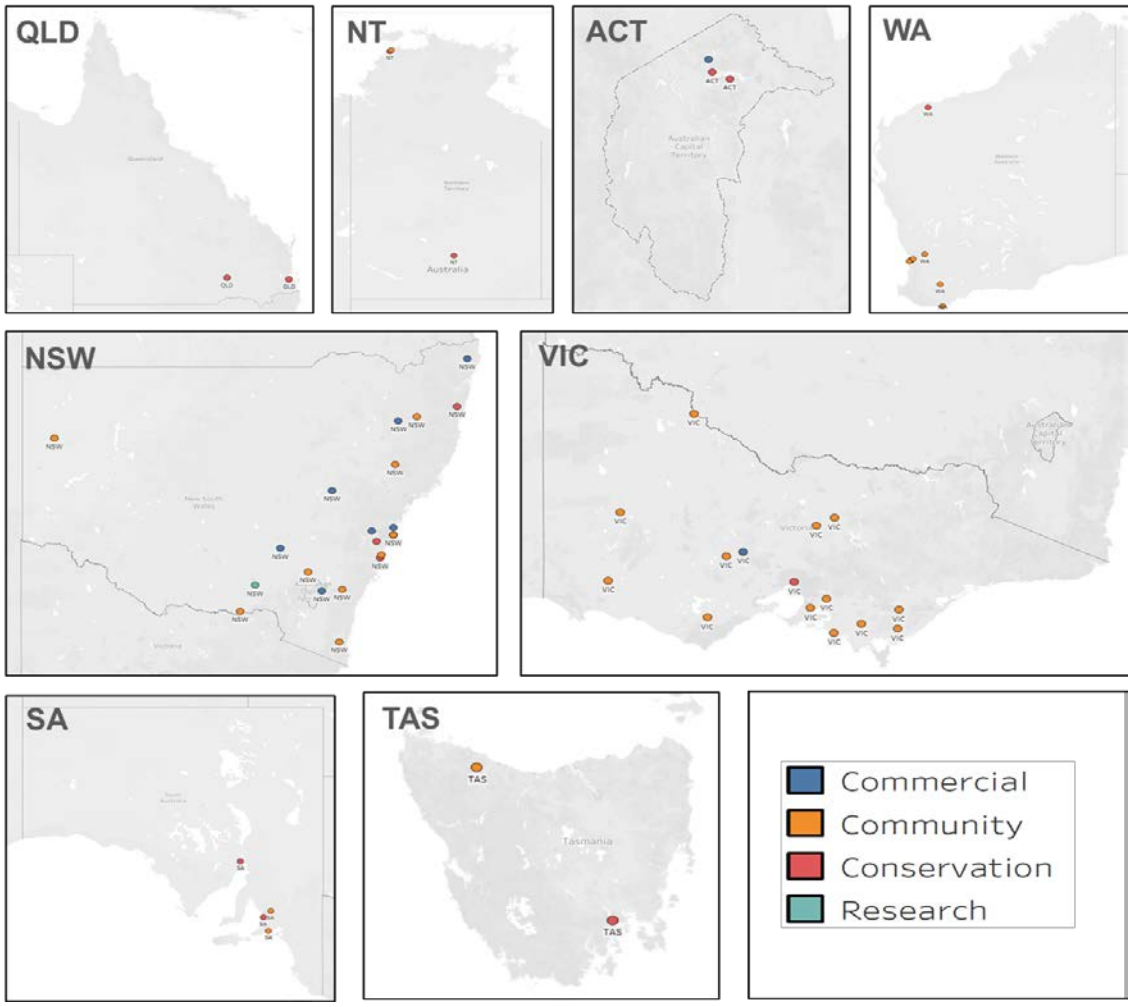
Source: ACIL Allen

FIGURE 2.4. OVERVIEW OF THE SECTOR BY JURISDICTION

		NSW	VIC	WA	ACT	SA	NT	TAS	QLD	NAT	Total
Total Count of Organisations		*26*	*22*	*10*	*9*	*7*	*6*	*6*	*5*	*6*	*97*
Focus	Community	12	19	7	2	4	2	4	2	1	53
	Conservation	5	2	3	6	3	4	2	3	5	33
	Commercial	8	1	-	1	-	-	-	-	-	10
	Research	1	-	-	-	-	-	-	-	-	1
Governance	Not for profit	11	14	6	4	4	2	4	4	5	54
	Government agency	5	5	3	4	3	3	2	1	1	27
	Company	8	3	1	1	-	1	-	-	-	14
	Statutory body	2	-	-	-	-	-	-	-	-	2
Objective	Improving the local environment	7	15	5	-	2	-	1	-	1	31
	Repository	4	1	3	2	3	4	2	2	-	21
	State network and society	2	3	2	2	2	2	2	2	-	17
	Environmental services	8	1	-	1	-	-	-	-	-	10
	National network and society	-	-	-	2	-	-	-	-	4	6
	Land owner/manager	3	-	-	-	-	-	1	1	-	5
	Funding provider	2	1	-	-	-	-	-	-	-	3
	Research	-	1	-	2	-	-	-	-	1	4

Source: ACIL Allen

FIGURE 2.5. CONSERVATION SECTOR BY JURISDICTION AND FOCUS



Source: ACIL Allen

3 SECTOR CAPACITY

Capacity was discussed in the series of workshops conducted as part of the Strategy development in April and May 2021. The findings of these workshops in terms of capacity are summarised in **Box 2**.

Capacity (along with information provision and quality and standards) was considered an important component of sector growth and development.

Box 2. Summary of stakeholder consultations on capacity

As part of the development of a ten-year Strategy, a series of 14 workshops were run in April–May 2021. Capacity was part of the discussion in some of these workshops.

There is limited capacity in the sector:

- There is a need for a diverse range of training for different regional areas, participants (collectors, sellers and purchasers), policy and program makers, communities, Traditional Owners.
- Some consider demand to be strong (from mining and construction) with supply capacity the constraint.
- Others consider that unpredictable demand is limiting capacity building.
- There is a need for funding for capacity building: infrastructure, skills/training, testing, seed production areas (SPAs).

Networks:

- These are often regional and within agencies. There is not much crossover between networks.
- Some considered there to be strong communication between botanic gardens.
- There is a need for more connected networks:
  - to connect seed suppliers with seed procurers
  - to share and communicate learnings, data, insights and to connect with others
  - that align with existing government or university run programs and networks
  - some considered that there was significant competition across the commercial part of the sector, with information sharing inhibited by the need to protect IP.

There needs to be greater transparency so networks can more easily form. Existing networks that could be leveraged:

- RIAWA
- National Environmental Science Program Hub
- FloraBank/ANPC
- seedbanks (which are essential coordinators of supply, demand and funding).
- networks across the supply chain and personal commitment create sustainability (projects, funding availability, training programs).

Training programs:

- Poor/lack of training is leading to poor outcomes.
- Training should be attached to Communities of Practice.
- There are issues with the availability and affordability of specialised training courses and linkage of training for accreditation.
- Training can occur through TAFE, Landcare groups, town hall meetings, universities, community groups, apprenticeships and mentorships.
- Some larger-scale organisations operate in-house capacity building. Others outsource capacity when needed (but this results in quality issues).
- Traditional Owners — there is some ongoing capacity building, but more engagement is needed.

Source: ACIL Allen

Within the database, information was collected on seedbanks, SPAs and nurseries and capacity has been categorised as:

- facilities (including equipment)
- research
- training and development
- education
- staff (including volunteers).

Information collected in the database (from the public domain) is reported in Sections 3.1, 3.2 and 3.3. Please note that what is reported is only information that was easily accessible on the internet — there may well be entities with seedbanks, SPAs, nurseries, facilities, equipment, programs and staff involved in the conservation sector that are not listed in the database or these summary tables.

3.1 Seedbanks

Table 3.1 presents an overview of the seedbanks identified through this review and **Figure 3.1** maps seedbanks, nursery and SPAs by focus (conservation, community and commercial).

3.1.1 Conservation seedbanks

Desktop research found 17 conservation seedbanks. These account for 94 per cent of the taxa (species) identified. These conservation seedbanks have the objective of providing a repository for Australian (and other)[15] flora. These repositories are generally for the purpose of conserving biodiversity, scientific research, display and education.

[15] Some seedbanks include non-native species. Many seedbanks report their taxa and also the proportion of native seeds. The numbers presented here correspond where possible to the number of native seed species.

3.1.2 Community seedbanks

There were 21 community seedbanks identified, accounting for 6 per cent of taxa. Most of these are for the purpose of improving the local environment but are also repositories. Many of them are not-for-profit organisations. Some of them sell seed to the public and some retain seed only for their own community use.

Murray Local Land Services Seedbank is an exception as this is a government-funded organisation.

TABLE 3.1. ENTITIES WITH SEEDBANKS BY JURISDICTION (TAXA PROVIDED WHERE AVAILABLE)

	SEEDBANK	LOCATION (STATE)	TAXA (SPECIES)*	GOVERNANCE
COMMUNITY				
1.	Apace Aid Inc (Swan Regional Seedbank)	Western Australia	—	Not-for-profit
2.	Australian Native Plant Society Canberra	ACT	600	Not-for-profit
3.	Ballarat Region Seedbank	Victoria	203	Not-for-profit
4.	Broken Hill Landcare Seedbank	NSW	—	Not-for-profit
5.	Cardinia Environment Coalition Indigenous Seedbank	Victoria	—	Not-for-profit
6.	Far South Coast Landcare Seedbank	NSW	—	Not-for-profit
7.	Goulburn Broken Indigenous Seedbank	Victoria	—	Not-for-profit
8.	Hindmarsh Island Landcare Group Seedbank	South Australia	—	Not-for-profit
9.	Murray Local Land Services Seedbank	NSW	—	Not-for-profit
10.	Murray Mallee Seedbank	Victoria	193	Government agency
11.	Native Plants Queensland Seedbank	Queensland	—	Not-for-profit
12.	South Australian Plant Society Seedbank	South Australia	—	Not-for-profit
13.	South Gippsland Seedbank	Victoria	80	Not-for-profit
14.	Upper Hunter Landcare Seedbank	NSW	—	Not-for-profit
15.	West Gippsland Seedbank	Victoria	—	Not-for-profit
16.	Wildflower Society of Western Australia	Western Australia	—	Not-for-profit
17.	Williamstown and Lyndoch Landcare Seedbank	South Australia	—	Not-for-profit
18.	Wimmera Region Seedbank	Victoria	96	Not-for-profit
19.	Wonthaggi Seed Bank & Nursery	Victoria	—	Not-for-profit
20.	Wynyard Community Seed Bank	Tasmania	—	Not-for-profit
21.	Yarram Yarram Landcare Network	Victoria	100	Not-for-profit
Sub-total			**1,272****	

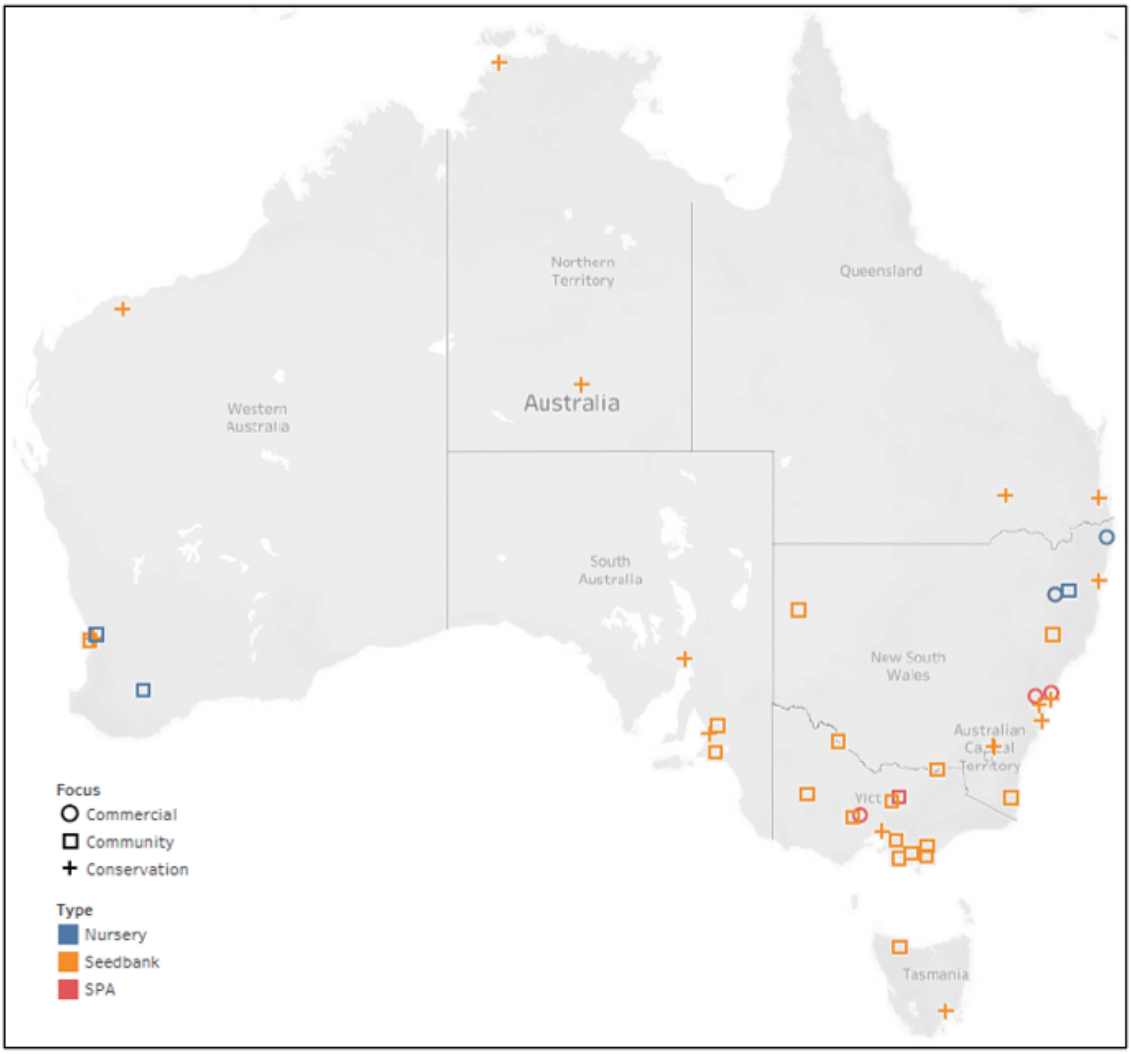
SEEDBANK	LOCATION (STATE)	TAXA (SPECIES)*	GOVERNANCE
CONSERVATION			
22. Australian Arid Lands Botanic Garden	South Australia	—	Government agency
23. Australian Botanic Gardens	NSW	5,000	Government agency
24. Australian National Botanic Gardens	NSW	4,000	Government agency
25. Botanic Gardens and Parks Authority	Western Australia	—	Government agency
26. Brisbane Botanic Gardens Conservation Seedbank	Queensland	2,791	Government agency
27. Genetic Resources Section, Plant Industry, CSIRO Seedbank	ACT	—	Government agency
28. George Brown Darwin Botanic Gardens	Northern Territory	—	Government agency
29. Myall Park Botanic Garden Seedbank	Queensland	—	Not-for-profit
30. National Arboretum	ACT	—	Government agency
31. North Coast Regional Botanic Garden	NSW	—	Government agency
32. Northern Territory Seedbank	Northern Territory	700	Government agency
33. Royal Botanic Garden Sydney	NSW	5,184	Government agency
34. Royal Botanic Gardens Victoria	Victoria		Government agency
35. Tasmanian Seed Conservation Centre (TSCC)	Tasmania	945	Government agency
36. Threatened Flora Seed Centre – Western Australia	Western Australia	2,000	Government agency
37. Western Australia Seed Technology Centre (WASTC) — Kings Park and Botanic Garden	Western Australia	3,500	Government agency
38. Wollongong Botanic Gardens	NSW	699	Government agency
Sub-total		**24,819****	
Commercial			
39. BioBankSeed	NSW	200	Company
TOTAL		**26,291****	

Note:

* Although care has been taken to ensure that only native species have been accounted for it is possible that some non-native species have been captured in these figures so the taxa may be considered an overestimate.

** These are not unique species – many seedbanks may hold the same species.

FIGURE 3.1. MAP OF SEEDBANKS, SPAS AND NURSERIES BY FOCUS



Source: ACIL Allen

3.2 SPAs and nurseries

Five SPAs (two with nurseries) were identified. Another ten nurseries were identified. These are all reported as commercial or community nurseries. See **Table 3.2**.

TABLE 3.2. ENTITIES WITH SPAS AND NURSERIES BY JURISDICTION, FOCUS AND GOVERNANCE.

SPA AND/OR NURSERY		LOCATION (STATE)	FOCUS	GOVERNANCE
SPA AND NURSERY				
1.	Euora Arboretum — as part of Goulburn Broken CMA	Victoria	Community	Government agency
2.	Harvest Seeds & Native Plants	NSW	Commercial	Company
SPA				
3.	TopSeed (and Cumberland Plain Seeds)	NT	Commercial	Company
4.	Murray LLS	NSW	Community	Government agency
5.	Victorian Native Seed	Victoria	Commercial	Company
NURSERY				
6.	Armidale Tree Group	NSW	Commercial	Not-for-profit
7.	Cardinia Environment Coalition	Victoria	Community	Not-for-profit
8.	Far South Coast Landcare	NSW	Community	Not-for-profit
9.	Fields Environmental Solutions (linked to BioBank Seed)	NSW	Commercial	Company
10.	Firewheel Rainforest Nursery	NSW	Commercial	Company
11.	Hindmarsh Island Landcare Group	South Australia	Community	Not-for-profit
12.	Katanning Landcare	Western Australia	Community	Not-for-profit
13.	South Australian Plants Society	South Australia	Community	Not-for-profit
14.	Trillion Trees	Western Australia	Community	Not-for-profit
15.	Wonthaggi Seed Bank & Nursery	Victoria	Community	Not-for-profit

Australian Native Seed Production in 2021[16] identified 130 native seed SPAs across Australia. Amalgamating the information from this report into the database developed as part of this project would be useful for the sector. The report notes that some of those 130 SPAs are set up for threatened species production but provides no further information.

There were no threatened species production areas specifically identified through the desktop research.

3.3 Specific capacity

3.3.1 Facilities

Nineteen entities provide publicly available information on their facilities. All of these entities have a conservation or a commercial focus. See **Table 3.3**. For seedbanks, refer to **Table 3.1**.

[16] Baker, E (2021) *Australian native seed production in 2021*, Project Phoenix.

TABLE 3.3. FACILITIES BY ENTITY, JURISDICTION, FOCUS AND GOVERNANCE

	FACILITY	LOCATION (STATE)	FOCUS	GOVERNANCE
DATABASES, CATALOGUES AND COMPUTER RECORD SYSTEMS				
1.	Adelaide Botanic Gardens	South Australia	Conservation	Government agency
2.	Australian Arid Lands Botanic Gardens	South Australia	Conservation	Government agency
3.	Australian Botanic Gardens	NSW	Conservation	Government agency
4.	Australian National Botanic Gardens	ACT	Conservation	Government agency
5.	Botanic Gardens and Parks Authority	Western Australia	Conservation	Government agency
6.	Brisbane Botanic Gardens Conservation Seed Bank	Queensland	Conservation	Government agency
7.	Centre for Australian National Biodiversity Research and the Australian National Herbarium	ACT	Conservation	Government agency
8.	George Brown Darwin Botanic Gardens	NT	Conservation	Government agency
9.	Myall Park Botanic Garden	Queensland	Conservation	Not-for-profit
10.	National Arboretum	ACT	Conservation	Government agency
11.	Royal Botanic Garden Sydney	NSW	Conservation	Government agency
12.	Royal Botanic Gardens Victoria	Victoria	Conservation	Government agency
13.	Royal Tasmanian Botanical Gardens	Tasmania	Conservation	Government agency
SPECIALISED SEED EQUIPMENT (E.G. HARVESTING, CLEANING, PROCESSING, GRADING ETC)				
14.	Royston Petrie Seeds	NSW	Commercial	Company
15.	Seedtech	NSW	Commercial	Company
16.	South Gippsland Seed Bank	Victoria	Community	Not-for-profit
17.	BioBankSeed	NSW	Commercial	Company
18.	TopSeed (and Cumberland Plain Seeds)	NSW	Commercial	Company
SPECIALISED SCIENTIFIC EQUIPMENT				
19.	Adelaide Botanic Gardens	South Australia	Conservation	Government agency
20.	Australian Botanic Gardens	NSW	Conservation	Government agency
21.	BioBankSeed	NSW	Commercial	Company
22.	Centre for Australian National Biodiversity Research and the Australian National Herbarium	ACT	Conservation	Government agency
23.	Royal Botanic Garden Sydney	NSW	Conservation	Government agency
24.	Royal Botanic Gardens Victoria	Victoria	Conservation	Government agency
25.	Threatened Flora Seed Centre – Western Australia	Western Australia	Conservation	Government agency

3.3.2 Research, training and education

Twenty-one entities state they are currently involved in research. The majority are focused on conservation (14) with the remainder commercial (2), community (2) or research (3). Seventeen entities reportedly conduct or provide some sort of training and development.

Eight have a community focus, two have a commercial focus and the remainder (7) are conservation focused.

Sixteen entities provide education — 11 of these have a conservation focus, four have a community focus and one is a commercial entity. See **Table 3.4**.

TABLE 3.4 PROGRAMS BY ENTITY, JURISDICTION, FOCUS AND GOVERNANCE

PROGRAMS		LOCATION (STATE)	FOCUS	GOVERNANCE
RESEARCH PROGRAMS				
1.	Adelaide Botanic Gardens	South Australia	Conservation	Government agency
2.	AgriFutures Australia Ltd	NSW	Research	Statutory body
3.	Alice Springs Desert Park	NT	Conservation	Government agency
4.	Australian Arid Lands Botanic Gardens	South Australia	Conservation	Government agency
5.	Australian Botanic Gardens	NSW	Conservation	Government agency
6.	Australian National Botanic Gardens	ACT	Conservation	Government agency
7.	Australian Network for Plant Conservation	ACT	Conservation	Not-for-profit
8.	Australian Seed Bank Partnership	ACT	Conservation	Not-for-profit
9.	BioBankSeed	NSW	Commercial	Company
10.	Botanic Gardens and Parks Authority	Western Australia	Conservation	Government agency
11.	Brisbane Botanic Gardens Conservation Seed Bank	Queensland	Conservation	Government agency
12.	Bush Heritage	Tasmania	Community	Not-for-profit
13.	Conservation Volunteers Australia	Victoria	Conservation	Not-for-profit
14.	Fields Environmental Solutions (linked to BioBank Seed)	NSW	Commercial	Company
15.	Myall Park Botanic Garden	Queensland	Conservation	Not-for-profit
16.	National Arboretum	ACT	Conservation	Government agency
17.	Planet Ark and National Tree Day	National	Conservation	Not-for-profit
18.	Royal Botanic Gardens Victoria	Victoria	Conservation	Government agency
19.	Royal Tasmanian Botanical Gardens	Tasmania	Conservation	Government agency
20.	The Nature Conservancy	National	Conservation	Not-for-profit
21.	Threatened Species Conservancy	Victoria	Community	Not-for-profit

	PROGRAMS	LOCATION (STATE)	FOCUS	GOVERNANCE
TRAINING AND DEVELOPMENT PROGRAMS				
22.	Adelaide Botanic Gardens	South Australia	Conservation	Government agency
23.	Apace Aid Inc	Western Australia	Community	Not-for-profit
24.	Australian Botanic Gardens	NSW	Conservation	Government agency
25.	Botanic Gardens and Parks Authority	Western Australia	Conservation	Government agency
26.	Centre for Australian National Biodiversity Research and the Australian National Herbarium	ACT	Conservation	Government agency
27.	Far South Coast Landcare	NSW	Community	Not-for-profit
28.	Myall Park Botanic Garden	Queensland	Conservation	Not-for-profit
29.	National Arboretum	ACT	Conservation	Government agency
30.	Natural Capital Pty Ltd	Queensland	Commercial	Company
31.	Royal Botanic Garden Sydney	NSW	Conservation	Government agency
32.	Seeding Victoria	Victoria	Community	Not-for-profit
33.	South Gippsland Seed Bank	Victoria	Community	Not-for-profit
34.	TopSeed (and Cumberland Plain Seeds)	NSW	Commercial	Company
35.	West Gippsland Seedbank (Victorian Landcare Network)	Victoria	Community	Not-for-profit
36.	Wheatbelt Natural Resource Management Inc	Western Australia	Community	Not-for-profit
37.	Wildflower Society of Western Australia	Western Australia	Community	Not-for-profit
38.	Wonthaggi Seed Bank & Nursery	Victoria	Community	Not-for-profit
EDUCATION PROGRAMS				
39.	Adelaide Botanic Gardens	South Australia	Conservation	Government agency
40.	Australian Arid Lands Botanic Gardens	South Australia	Conservation	Government agency
41.	Australian Botanic Gardens	NSW	Conservation	Government agency
42.	Australian National Botanic Gardens	ACT	Conservation	Government agency
43.	Australian Native Plant Society	National	Conservation	Not-for-profit
44.	Brisbane Botanic Gardens Conservation Seed Bank	Queensland	Conservation	Government agency
45.	Myall Park Botanic Garden	Queensland	Conservation	Not-for-profit
46.	National Arboretum	ACT	Conservation	Government agency
47.	Natural Capital Pty Ltd	NSW	Commercial	Company
48.	Royal Botanic Garden Sydney	NSW	Conservation	Government agency
49.	Royal Botanic Gardens Victoria	Victoria	Conservation	Government agency
50.	Royal Tasmanian Botanical Gardens	Tasmania	Conservation	Government agency

PROGRAMS		LOCATION (STATE)	FOCUS	GOVERNANCE
51.	SEEDS Bushland Restoration	Victoria	Community	Company
52.	South Gippsland Seed Bank	Victoria	Community	Not-for-profit
53.	West Gippsland Seedbank (Victorian Landcare Network)	Victoria	Community	Not-for-profit
54.	Wildflower Society of Western Australia	Western Australia	Community	Not-for-profit

In addition to those entities included in the database, *Applied research — Communities of practice, people and science*[17] documented participants in native seed sector research (see **Table 3.6**). Some of these participants (listed in **Table 3.6**) are included in the database such as the major botanic gardens and others, such as the universities, were not included in the database as they are not entities with a specific focus on research for the purposes of conservation.

3.3.3 Staff

Sixteen entities have information available in the public domain on their staffing. Twelve of these entities have a conservation focus, 3 have a community focus and 1 entity is commercial. Of the 16 entities, 9 have volunteers as part of their workforce. See **Table 3.5**.

[17] Baker, E (2021) *Applied research — Communities of practice, people and science*, Project Phoenix.

TABLE 3.5. STAFFING BY ENTITY, JURISDICTION, FOCUS AND GOVERNANCE

	STAFF	LOCATION (STATE)	VOLUNTEER INVOLVEMENT	FOCUS	GOVERNANCE
STAFFING DETAILS PUBLICLY AVAILABLE					
1.	Adelaide Botanic Gardens	South Australia	Yes	Conservation	Government agency
2.	Alice Springs Desert Park	NT		Conservation	Government agency
3.	Armidale Tree Group	NSW		Community	Not-for-profit
4.	Australian Arid Lands Botanic Gardens	South Australia	Yes	Conservation	Government agency
5.	Australian Botanic Gardens	NSW	Yes	Conservation	Government agency
6.	Australian Network for Plant Conservation	ACT		Conservation	Not-for-profit
7.	Brisbane Botanic Gardens Conservation Seed Bank	Queensland	Yes	Conservation	Government agency
8.	George Brown Darwin Botanic Gardens	NT		Conservation	Government agency
9.	Myall Park Botanic Garden	Queensland	Yes	Conservation	Not-for-profit
10.	National Arboretum	ACT	Yes	Conservation	Government agency
11.	Natural Capital Pty Ltd	Queensland		Commercial	Company
12.	Royal Botanic Garden Sydney	NSW	Yes	Conservation	Government agency
13.	Royal Botanic Gardens Victoria	Victoria		Conservation	Government agency
14.	Royal Tasmanian Botanical Gardens	Tasmania	Yes	Conservation	Government agency
15.	Wheatbelt Natural Resource Management Inc	Western Australia		Community	Not-for-profit
16.	Wonthaggi Seed Bank & Nursery	Victoria	Yes	Community	Not-for-profit

TABLE 3.6. NATIVE SEED SECTOR PARTICIPANTS INVOLVED IN APPLIED R&D

GOVERNMENT	NON-GOVERNMENT/NOT-FOR-PROFIT/ CONSERVATION SEEDBANKS	COMMERCIAL	PROFESSIONAL ORGANISATIONS/ NETWORKS	TERTIARY SECTOR	INTERNATIONAL ORGANISATIONS
• Australian Government, Department of Agriculture, Water and the Environment (Environment Restoration Fund; National Landcare Program) • The Office of the Threatened Species Commissioner • CSIRO • Parks Australia • State Government environment departments • Catchment Management Authorities (VIC) • Local Land Services (NSW) • Western Australian Department of Biodiversity Conservation and Attractions • Australian Institute of Aboriginal and Torres Strait Islander Studies	• Alice Springs Desert Park • Australian National Botanic Gardens • Australian Native Plant Society Canberra • Australian Plant Society Tasmania • Australian Plants Society Victoria • Australian Seed Bank Partnership • Australian Wildlife Conservancy • Botanic Gardens and State Herbarium of South Australia • Brisbane Botanic Gardens Conservation Seed Bank • Bush Heritage Australia • Conservation Collective • Conservation Volunteers Australia • Council of Heads of Australian Botanic Gardens • George Brown Darwin Botanic Gardens • Kings Park, Botanic Gardens and Parks Authority • Landcare Australia • Native Plants Queensland • NRM Regions Australia • Planet Ark and National Tree Day	• Commercial seed collectors • Restoration practitioners • Nurseries • Traditional Owner groups • Landholders and land managers • Greening Australia • Alcoa of Australia Limited • Kalbar Resources	• Australian Association of Bush Regenerators • Australian Network for Plant Conservation • Australian Seed Federation • Australasian Institute of Mining and Metallurgy • Australian Local Government Associations • Australian Native Plants Society • Botanic Gardens Association of Australia and New Zealand • Environmental Consultants Association • Ecological Society of Australia • Greenlife Industry Australia (formerly NGIA) • National Indigenous Australians Agency • RegenWA • Revegetation Industry Association of WA • Society of Ecological Restoration Australasia • Terrestrial Ecosystem Research Network	• Australian National University • Charles Darwin University • Charles Sturt University • Clean Air and Urban Landscapes Hub • Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) • Cooperative Research Centre for Transformations in Mining Economies (CRC TiME) • Curtin University • Deakin University • Edith Cowan University • Federation University • Flinders University • Griffith University	• International Network for Seed-based Restoration • International Union for the Conservation of Nature • Society of Ecological Restoration • UN Environment Program

GOVERNMENT	NON-GOVERNMENT/NOT-FOR-PROFIT/ CONSERVATION SEEDBANKS	COMMERCIAL	PROFESSIONAL ORGANISATIONS/ NETWORKS	TERTIARY SECTOR	INTERNATIONAL ORGANISATIONS
	• Royal Botanic Garden Sydney • Royal Botanic Gardens Victoria • Royal Tasmanian Botanical Gardens • SEEDS Bushland Restoration • South Australian Plants Society • South Australian Seed Conservation Centre • The Nature Conservancy • The Royal Botanic Gardens and Domain Trust • Top End Native Plant Society • Traditional Owner groups • Wildlife Society of Western Australia			• James Cook University • La Trobe University • Macquarie University • Murdoch University • Threatened Species Recovery Hub • University of Adelaide • University of New England • UNSW • University of Queensland • University of Tasmania • University of the Sunshine Coast • University of Western Australia • University of Wollongong • WA Biodiversity Science Institute • Western Sydney University	

Note: this table is indicative only. Some organisations will perform multiple roles across the sector, yet are only indicated once.
Source: Various – see Applied research — Communities of practice, people and science*. Dr Lucy Commander, personal communication 30 April 2021.*

4 RECOMMENDATIONS

4.1 Key findings

The conservation sector, not unlike the native seed sector as a whole, is comprised of multiple players some big and many small. As a result, it is no surprise that there is limited coordination within and across the sector and that capacity is highly variable.

Most botanic gardens are government-funded and dependent on budgets as well as top up funding from grants or donations. The community-based conservation sector in the large part operates as not-for-profit and is dependent on grants, donations and volunteers.

These funding arrangements are likely to be the reason for variable capacity. Botanic gardens and other government-funded institutions appear to have the highest capacity and community-based entities have lower levels of capacity.

In addition, there are several networks/societies at a state (17) and national (6) level including the Australian Seedbank Partnership and native plant societies and other groups such as the Australian Network for Plant Conservation and Council of Heads of Australian Botanic Gardens that have capacity primarily in terms of staff (capability) and research. Unfortunately there is limited publicly available information available to support this assertion.

The database developed as part of this project is the first of its kind and is a solid start that can be further developed with input from the sector.

The database is limited as it only focuses on publicly available information but the advantage of this is that there are no concerns in sharing this information across the sector. Sector participants will be able to search for organisations on a state basis, by focus, by objective and by governance. It will also be easier to find seedbanks, SPAs and nurseries involved in conservation. In particular, this database goes beyond the major botanic gardens and attempts to capture a large share (55 per cent of organisations in the database are community-based organisations) of the community-based conservation sector nationally.

Privacy concerns and lack of trust in the native seed sector overall limited the information that could be sourced for this project. One-on-one interviews with Martin Driver at Australian Network for Plant Conservation and Damian Wrigley at Council of Heads of Australian Botanic Gardens identified additional entities in the conservation seed sector but they were only able to provide information on those organisations with public profiles.

4.1.1 Descriptive statistics

As presented in Section 2 and Section 3, the 97 organisations captured in the database can be categorised and presented in several ways (refer to **Figures 2.1 to 2.5**, **Table 3.1** and **Figure 3.1**).

The key findings from this analysis are:

- NSW has the largest number of organisations (27 per cent) in the conservation space, followed closely by Victoria (22 per cent). The community-based systems in Victoria are well aligned and networked under Landcare and Seeding Victoria.
- Community-based conservation organisations are well represented (55 per cent), followed by those organisations with a conservation focus (e.g. botanic gardens) (34 per cent).
- In line with the large proportion of community-based organisations, the majority are not-for-profits (56 per cent) followed by government agencies (28 per cent).
- 32 per cent of organisations aim to improve the local environment and 22 per cent operate primarily as repositories for conservation purposes.
- Networks and societies are a key feature. State-based networks and societies (18 per cent) are more integral to the sector than national networks and societies (6 per cent).
- Commercial players identified on the internet with an interest in conservation are primarily found in NSW.
- There were 17 conservation seedbanks and 21 community-based seedbanks identified across Australia. Between them they hold approximately 26,000 non-unique species, of which 94 per cent are held by the conservation seedbanks.
- There was very little publicly available information on the capacity of these organisations (refer to Section 3.3).
- The botanic gardens, as key players in the sector, have a well-developed research network and considerably more reported capacity than community-based entities who operate primarily on a volunteer basis with the objective of improving the local environment.

4.1.2 Observations

Stakeholder consultations make the following observations that broadly align with the findings of this review and add some context to capacity in the conservation sector.

Stakeholders consider that there is limited capacity in the sector specifically in relation to regionally-specific training, for different sector participants (collectors, sellers and purchasers) and Traditional Owners.

Several stakeholders noted that the uncertainty of demand for native seed stifles investment in capacity across the sector and as a result there are funding shortages for infrastructure, skills/training, testing and seed production areas (SPAs).

The conservation sector, with a public good aim, may have less reliance on demand for native seed than the restoration or other more commercially focused sectors would have. An exception would be seedbanks many of which sell seed as well as store it for local/community

use. Funding for the conservation sector is predominantly provided by government (with some philanthropic support) and is generally considered to be insufficient and highly variable.

It should be noted that a large proportion is community-based not-for-profits and reliance on donations and grants is likely to be more variable and less sufficient than the funding available to botanic gardens and other government agencies.

Many stakeholders noted the importance of networks for the provision of information and coordination across the sector. The botanic gardens are considered to have a strong network focus that works well but is only focused on botanic gardens. Native Plant Societies and Landcare appear to be the most active at the state and regional level. However, these organisations are not solely focused on native seed although many are active in conservation and have links to seedbanks.

Key observations include:

- There is capacity available in the botanic gardens that could be targeted towards building the sector from the bottom up. Botanic gardens have the capacity to be more involved in the conservation of native seed in their states. They hold the majority of identified capability and have more financial assurance than other players in the sector. For example, fee for service extension programs such as specific training and development, the provision of specialised information services or facilities could be made available for the use of the community conservation sector.
- The conservation sector has the potential to support the restoration sector but this should be a two-way relationship as it is likely that the restoration sector has capacity that could support the conservation sector — in particular the community-based entities and those that are not-for-profit. An example may include the use of restoration sector equipment (e.g. seed harvesting, sorting, cleaning etc equipment) that could be made available to the community based conservation sector either through an in-kind or a commercial (fee for service) arrangement.

4.2 Recommendations

Key recommendations from this review are as follows:

1. **The database provides valuable information for the conservation and the restoration sector and should be made publicly available.**

This is possible as all the information contained in the database has come from the public domain.

2. **Consideration should be given to do further work on it in terms of:**

    - broadening the database to include other information captured in other Project Phoenix activities (e.g. *Australian native seed production in 2021*)[18]
    - deepening the understanding of capacity through a comprehensive audit (noting the limitations of doing so, including privacy concerns).

3. **Botanic gardens should provide fee for service extension programs within their state/territory to improve the capacity of community-based conservationists and the native seed sector more broadly.**

4. **The conservation sector should engage in dialogue with the restoration sector in order to identify the restoration sector's needs and how the capacity of the conservation sector can be used to assist restoration.**

Conversely, consideration on what the restoration sector may be able to offer the conservation sector in terms of capacity should also be explored – specifically in relation to capability, storage facilities, SPAs, nurseries and specialised equipment.

[18] Baker, E (2021) *Australian native seed production in 2021*, Project Phoenix.

APPENDIX A — SURVEY QUESTIONS

No.	Question	Response rubric
1	What is the name of your organisation?	Free-text
2	Where are you located?	Drop downs (state)
3 a)	How widely do you collect seeds from your stated location?	Drop downs
3 b)	How widely do you distribute seeds from your stated location?	Drop downs
4	What is your organisation's operating purpose?	Drop downs (all that apply)
5 a)	If you have storage facilities for seed how many different taxa (species) do you currently store?	Number
5 b)	Please list the top (up to 10) genus you currently store	Free text
6 a)	What facilities do you have to run your organisation?	Drop downs (all that apply)
6 b)	What facilities do you need but do not currently have?	Free-text
6 c)	What is the main reason don't you have these facilities?	Drop downs
7	What is your annual operating budget?	Drop downs
8	How variable is your annual operating budget?	Drop downs
9	How are you funded?	Drop downs (all that apply)
10 a)	How many full-time staff do you employ that work on the native seed part of the organisation?	Number
10 b)	Part-time?	Number
10 c)	Casual / contract?	Number
10 d)	How many volunteers?	Number
10 e)	How many volunteer hours per week?	Number

Drop downs relating to purpose referred to:

- commercial business
- research for conservation
- research for restoration/other R&D
- training and education
- native seed storage
- native plant production
- native seed production
- threatened species production
- conservation seedbank/restoration seedbank
- community seedbank
- government

Drop downs relating to capacity (Questions 5–9) referred to:

- seed storage facilities
- sheds/other buildings/nurseries
- seed production areas/seed research equipment
- other seed related equipment
- non seed related equipment
- vehicles
- other (please state)

APPENDIX B — STAKEHOLDER LIST

In May and June 2021, a series of 6 one-on-one interviews were conducted on conservation capacity. These stakeholders were:

- Kate Andrews — NRM Regions Australia
- Damian Wrigley — ASBP
- Clare McDougal — Hunter LLS
- Peter Cuneo — Royal Botanic Garden Sydney
- Martin Driver — Healthy Seeds Partnership
- Eamonn Flanagan — BGANZ.

In April and May 2021, a series of 14 strategy design workshops were conducted as part of Project Phoenix Activity 3.1. Conservation and capacity was discussed as a part of each of these workshops and there was one workshop that focused on the conservation sector more specifically. The 36 stakeholders that attended the conservation workshop and are listed in **Table B.1**.

TABLE B.1. CONSERVATION WORKSHOP — STAKEHOLDER LIST BY JURISDICTION AND FOCUS

	ORGANISATION	LOCATION (STATE)
1.	ACT Government	ACT
2.	ACT Government, Parks and Conservation Service	ACT
3.	Australian Institute for Botanical Sciences	NSW
4.	Australian Network for Plant Conservation	WA
5.	Australian Network for Plant Conservation	NSW
6.	Australian Network for Plant Conservation	NSW
7.	Australian Seed Bank Partnership	ACT
8.	Bush Heritage	TAS
9.	Cardinia Environment Coalition	VIC
10.	Conservation property manager	NSW
11.	Department of Agriculture, Water and the Environment	ACT
12.	Environment and Planning Directorate	ACT
13.	Field's Environmental Solutions	NSW
14.	Field's Environmental Solutions	NSW
15.	Fitzroy Basin Association	QLD

ORGANISATION		LOCATION (STATE)
16.	Greening Australia	WA
17.	Landcare	NSW
18.	Landcare Illawarra	NSW
19.	Local Land Services	NSW
20.	Natural Capital Pty Ltd	NSW
21.	NSW Department of Planning, Industry and Environment	NSW
22.	NSW Department of Planning, Industry and Environment	NSW
23.	NSW National Parks and Wildlife Service	NSW
24.	Plantrite	WA
25.	Royal Botanic Gardens and Domain Trust	NSW
26.	Royal Botanic Gardens Victoria	VIC
27.	Royal Botanic Gardens Victoria	VIC
28.	Royal Botanic Gardens Victoria	VIC
29.	SEEDTREE MAPS	NSW
30.	Self employed	NT
31.	The Backyard Garden Enthusiast	VIC
32.	The University of Queensland	QLD
33.	Verterra	QLD
34.	Victorian Department of Environment, Land, Water and Planning	VIC
35.	Vitroflora	QLD
36.	Yass Area Network of Landcare Groups	NSW