

PROJECT PHOENIX



MAKING TRACKS WHERE DOES SEED COME FROM AND WHERE DOES IT GO?



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.

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EXECUTIVE SUMMARY

About the project

This project explores the need for a national seed database and tracking system for seed sales. It would assist sellers and buyers to more readily determine species and seed availability, and allow for future auditing of seed-based restoration-based activities. In addition, it would provide the native seed sector with data on supply and demand.

Scope

The scope of this project was to:

- investigate if a seed collection tracking app would be an appropriate tool to ensure a consistent methodology in native seed collection for selling seed lots in a national marketplace
- identify if there are any existing product tracking apps or similar products that could be customised for the seed sector and
- develop recommendations on technology products/services that could be used to improve the data provision of seed lots for sale in Australia in the short to medium term.

This review will investigate if there are readily available seed data management systems working effectively within the sector that could be used for the development of a national database and tracking system for native seed sales.

Investigations may also include national systems for tracking other products that could be adapted to the movement of native seed. Options for introducing market stipulations that more effectively track native seed lot data and compliance requirements are also explored.



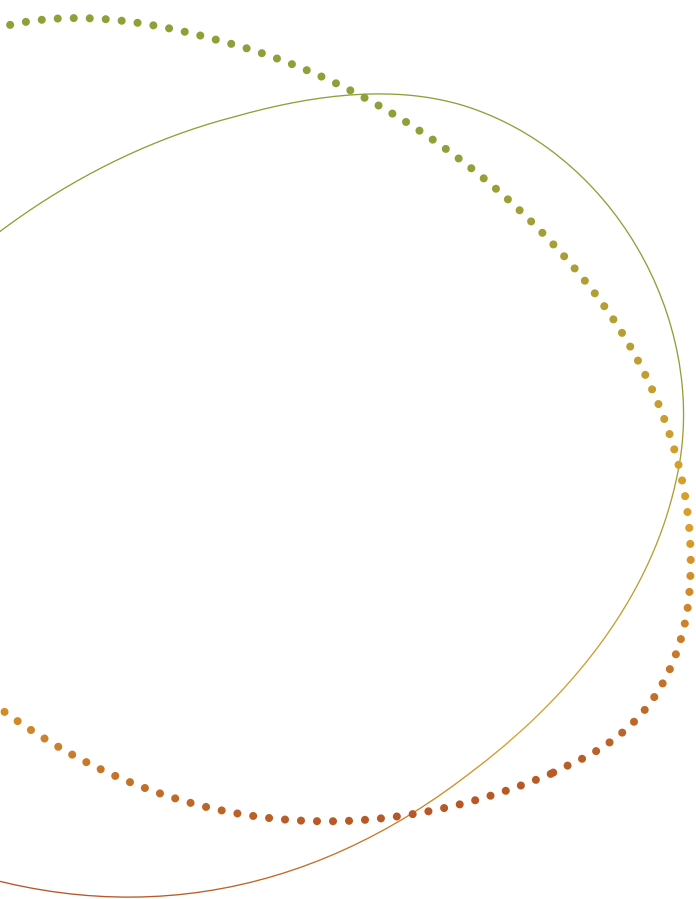
Introduction

No national system for monitoring the movement of native seed exists in Australia.

*The Australian Native Seed Survey Report*¹ identified the need for a national seed database and tracking system for seed sales, to assist sellers and buyers to more readily determine species and seed availability, allow for future auditing of seed-based restoration-based activities, and to provide the native seed sector with data on supply and demand.

In addition, the lack of seed data available in market transactions leads to a lack of consumer confidence in the purchased products, potentially undermining support for and investment in restoration outcomes.

Improved seed and data management systems improves quality assurance.



¹ Hancock, N., Gibson-Roy, P., Driver, M. and Broadhurst, L. (2020). *The Australian Native Seed Sector Survey Report*. Australian Network for Plant Conservation, Canberra.



Issues

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

- firstly, the short timeline precluded any collaboration with other authors and
- secondly, expert elicitation was used to determine currently used record keeping systems, which only involved a small number of organisations. Not all people responded to requests for information. A larger, sector-wide survey would determine the state of play of record keeping in Australia.

Comments

Not applicable

Key output

The key output is a written report *Making tracks — Where does seed come from and where does it go?* based on sector consultation through expert elicitation and literature review.

Outcomes

The report was developed to:

- identify if there are any existing product tracking apps or similar products that could be customised for the seed sector
- make recommendations on technology products/services that could be used to improve the data provision of seed lots for sale in Australia in the short to medium term and
- investigate seed and data management systems — market contract stipulation and tracking.



Findings

The importance of data collection

- Species from which seed is collected need to be correctly identified, and the species' name needs to be kept with the seed lot for its entire journey from collection to use.
- Genetic variation within species means that recording the exact source location of the seeds is essential, so that the end user can decide which population best suits their needs.
- Recording population size can provide information about genetic diversity, and whether mixing seeds from different populations may or may not be beneficial.
- Records of collection date, storage date, storage conditions and the results of any quality tests must be kept to provide information about the potential viability of the seed lot. Only seed lots containing viable seeds should be used for restoration.
- Record keeping enables seed banks to keep track of their stock and provide information to clients.
- Record keeping enables learning from previous practices, repetition of successful practices and adaptive management.
- Data about species' locations and seed lot characteristics that is good quality and accessible can improve decision making across the seed sector, especially in the fields of restoration, conservation and taxonomy. Accessible data can also inform policy and land management.
- Data needs to be recorded in a way that it can be easily transferred. Electronic record keeping systems are therefore preferable to paper-based systems. Electronic record systems need to be compatible to allow automatic rather than manual data transfer.

Data collection and record keeping systems for seeds

- It is not known which record keeping systems are used in the native seed industry, nor what proportion of the sector uses electronic records.
- There is no standard labelling system for native seeds to transfer information from seller to purchaser.
- Resources from the *FloraBank Guidelines*, International Principles and Standards for native seeds in ecological restoration, ASF, ISTA and RIAWA could be used to develop standardised record keeping and labelling systems for native seed in Australia.

Why does data collection, record keeping and tracking need to change?

- Record keeping databases are needed not only for seed collection, seed production areas, seed storage and end use, but also in licensing agencies. Thus, improved record keeping would have sector-wide benefits.



- Ultimately, by improving data collection, record keeping and seed lot tracking and seed collection could be more sustainable and seed sales more transparent and restoration more effective.

Current systems for seed and data management

- Currently, there is no national, standardised system for data management for native seeds.
- Organisations within the sector use different data management systems which they have purchased or developed. These systems are unlikely to be compatible. This means that if seed lots are transferred from one organisation to another, records cannot be easily transferred, consistently or electronically.
- There is no national numbering system for seed lots to assist with tracking an individual seed lot from collection to planting.
- Each seed collection needs a unique code.
- Transferring records electronically can minimise human error.
- A national seed collection program for restoration, with a centralised location for processing, testing and storage (or one location per state), with a database that collects and stores information about each collection, may be of benefit to Australia.
- Data management requires resources, in terms of both purchasing or developing systems, and employing a data manager.

Electronic systems available for biological data management

- A contact directory and propagation protocol database would be useful in Australia.

Current systems for data management and sales in other industries

- Other industries can provide examples of how the seed sector could improve tracking of seed lots through the supply chain as well as examples of online sales databases.

Evidence

The data sources include:

- expert elicitation
- peer-reviewed journal articles
- websites
- manuals.

Refer to the full report *Making tracks — Where does seed come from and where does it go?* for full references and sources.



RECOMMENDATIONS



Co-develop mobile & desktop application



Provide user guide & training



Develop national web database for species information



Develop national database of collectors & suppliers



Investigate the potential for an online sales portal



In the short-term, develop a universal spreadsheet

Seed Tracking App

A national seed collecting and tracking app should be developed and provided for free, or for a minimal cost, to those collecting, selling and purchasing native seed, including government organisations, commercial operators and community groups. The app could potentially be sold or licensed to larger organisations who have greater resources and the ability to pay.

The app would need several components. The seed collecting component would need to be used on a mobile device, such as a phone or tablet. The benefit of use of such a device is that data could be recorded in the field, and photos and a GPS location could be recorded and linked to the collection record.

The seed cleaning, testing, storage, sale and end use components do not need to be used on a mobile device and could be used on a desktop or laptop computer.

Records for individual seed lots would need to be exported either in full or in part. The records should be able to be exported in such a way that they are directly imported to the purchaser or end user's app. There should be an option to export all of the information necessary for a client, but also the option to export only part of that information, keeping some information as 'commercial in confidence', or to comply with licensing conditions (e.g. not releasing the location of threatened plants). There should also be an option to export summary information to the licensing agency for each licence holder.

Essentially, seed banks would need to have a recording system, like a financial institution, to show the conditions in which the seed is being stored and to track withdrawals.

Providing everyone with the same app would mean that when seed is bought and sold, all information about that seed could be transferred directly into the purchaser's app, negating the need for retyping information into the purchaser's system. Hence, the app and database could track seed collections from picking to planting.






It is unknown if a national app/online portal for seed sales would have widespread uptake at the current time. This is due to the fact that a lot of seed is bought on contract (reactive collections), or on demand, and may not be sitting on a shelf waiting to be purchased (proactive collections). Also, anecdotal evidence suggests that larger seed collectors may not wish to fill orders of only a few grams (although others may – and they may already have their seed list online). They may prefer to have conversations with purchasers so they are better able to meet individual needs, rather than just having clients buy from a list.

Seed collection timing depends on both species and location, which is another reason why clients may wish to consult directly with seed collectors and may also need to put in their orders one year in advance. Thus, an investigation into the potential use of an online sales application is required.

A national database of all the seed collectors and seed suppliers would be useful. The database should be available online and updated annually. Each collector/supplier should list the Interim Biogeographical Regionalisation for Australia (IBRA) sub-regions in which they collect. This list could then be queried, so that purchasers could find collectors in the area in which they want to source their seed. Each collector could list their licence/s number to give purchasers confidence that the collectors are collecting legally.

SPECIFIC RECOMMENDATIONS

 <p>1</p>	<p>Co-develop a mobile app and desktop application for data collection, record keeping and tracking, so that the mobile app is essentially an extension of the desktop application, and data transfer between them is simple.</p>
 <p>2</p>	<p>The mobile app for recording seed collection data in the field needs to:</p> <ul style="list-style-type: none"> ● record information including (but not limited to) species name, habitat, date, collector's name and licence number ● be able to link photos to records ● be able record GPS locations ● be able to function without access to the internet, so it can be used in remote locations.
 <p>3</p>	<p>The desktop application which can download data directly from the mobile app must:</p> <ul style="list-style-type: none"> ● have several modules to store information including: <ul style="list-style-type: none"> – processing



SPECIFIC RECOMMENDATIONS

- quality
- germination, dormancy, pre-treatments
- storage and
- seed production
- be able to transfer data to another organisation with the same app, i.e. when the seed lot or part thereof changes hands
- be able to transfer a subset of the data to the licensing organisation e.g. collector name, licence number, species collected, collection region and total seed weight collected
- be able to be accessed by multiple computers within an organisation, because there may be several locations for data entry, or different people responsible for different parts of the process (processing room, storage location, dispatch), or for large organisations like national NGOs or state government departments, many different offices or seed stores.

4

Provide a user guide and training to all app users, including training on the importance of record keeping. Training could be a mandatory component of seed licensing.

- Develop specialised training programs for Indigenous Australians in accordance with relevant national guidelines and appropriate consultation.

5

Develop a national database (web application) for seed information including, but not limited to, average seed weights, seed morphology, embryo morphology, processing protocols, dormancy class, pre-treatments, propagation protocols, and photos of fruits, seeds and dissected seeds. The database would need entries for each species to record species level information (e.g. seed weight) and also entries for genera with information such as processing and propagation protocols, which may be common to all species within a genus.

- Use existing knowledge or software to develop the database, and partner with organisations with existing databases (e.g. the Australian Seed Bank Partnership (Australian Seed Bank Online), ALA, BGCI, botanic gardens, the MSB (SID, MPSP data warehouse)).



SPECIFIC RECOMMENDATIONS

- Undertake a survey of the seed and restoration industry to determine the fields required in the database (i.e. information they need to know). Ensure that all parts of the sector are consulted, as collectors, purchasers and research may all have slightly different needs.
- Base the fields and field codes within the database on the traits, tests and field codes in TRY, Darwin CORE and SID, and seed tests outlined by ISTA (International Seed Testing Association).²
- Ensure that the information in the database may be compared with other global databases to enable global comparisons (i.e. consistent methodology for trait measurements, ability to export information as a .csv).
- Initially populate the database with information gathered from the scientific literature, then add to regularly (quarterly or annually) with new information, either directly from research partners, or gathered from the scientific literature.
- Investigate the possibility of a Wikipedia-style database, where registered users can add their own information. However, it is important that the source of the information is displayed, so other users can make a decision about its potential accuracy.

6

Develop a national database (web application) of native seed collectors and suppliers and native plant nurseries.

- Investigate the potential to develop an online marketplace, ensuring ease of uploading seed lot information from the desktop application for record keeping.

7

In the short-term, develop a universal spreadsheet with information currently contained in seed collection sheets and using field codes (i.e. column heading) from Darwin Core, SID or Australian Seed Bank Online (where possible), and provided for free to all collectors and end users.

- Then, when collectors sell seed, they can export the records for those seed lots, and the purchase can import the records into their spreadsheet, without having to retype the data, or save the data in multiple different spreadsheets.

² <https://www.seedtest.org/en/home.html>



WANT TO KNOW MORE?

For further information read the full report *Making tracks — Where does seed come from and where does it go?*

Related projects

- *Psst... Everything you wanted to know about native seed licensing*
- *Everything you wanted to know about access to land for native seed collection*
- *Do we need a National Seed Code of Practice?*

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.

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