AUSTRALIAN SEEDBANK PARTNERSHIP

Safeguarding Australia's Flora

through a national network of native plant seed banks

2018-19 ANNUAL REPORT

safeguarding Australia's flora

CONTENTS

Abbreviations

Australian Grains Genebank (AGG)
Australian National Botanic Gardens (ANBG)
Brisbane Botanic Gardens (BBG)
Botanic Gardens and State Herbarium (BGSH)
Botanic Gardens and Parks Authority (BGPA)
George Brown Darwin Botanic Gardens (GBDBG)
Royal Botanic Gardens and Domain Trust (RBGDT)
Royal Botanic Gardens, Kew (RBG Kew)
Royal Botanic Gardens Victoria (RBG Vic)
Royal Tasmanian Botanical Gardens (RTBG)
The Council of Heads of Australian Botanic Gardens Incorporated (CHABG Inc.)
Western Australian Seed Centre (WASC), Department of Biodiversity Conservation and Attractions (DBCA)

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Editor: Alan Cummine, GoodWords Consulting
Design: Siobhan Duffy

Cover: The diversity of the Australian flora can also be seen through the variation of seed traits both across and within species. These traits are adaptations that assist the seeds to disperse and remain viable within the specific environment in which they adapt. Refer to the back cover for a list of the species names of each of the seeds included in the image. (Photo: BGSH)

This page: The flowers and buds of *Corymbia abbreviata*, otherwise known as the Scraggy bloodwood.
The inflorescences are generally terminal inflorescences with the cream-white flowers providing a stark contrast to the deep reddish-pink of the pedicel. (Photo: Ben Wirf, GBDBG)

LETTER FROM THE CHAIR

As our changing climate impacts more and more on biodiversity in Australia, the preservation of threatened plant species in seed banks has become critically important. Since our last annual report, unprecedented events have severely challenged our environment's ability to recover from disaster. Flooding occurred in Townsville in Queensland's north, whilst bush fires incinerated large parts of eastern Victoria, South Australia and NSW as well as ancient fire-sensitive landscapes throughout Tasmania. Fires also ravaged Eungella – Australia's largest subtropical rainforest, west of Mackay, as well as the renowned Binna Burra in Lamington National Park's World Heritage-listed forests in the Gold Coast hinterland.

These natural disasters have placed further pressure on ecosystem resilience for our already stressed natural environment experiencing the ongoing drought. The long-term consequences of continued changes with our climate remain hard to predict, but it is undisputed that the role of seed banks working to conserve species has never been more vital as a key factor in flora conservation.

Internationally, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) launched the first Global Assessment Report on Biodiversity and Ecosystem Services since 2005. Involving 150 experts in the natural and social sciences with contributions from a further 250 experts from 50 countries, the Global Assessment of Biodiversity and Ecosystem Services comes at a time when key policies and actions by governments and key institutions are being enacted. While implementation of policy and actions to conserve and manage our natural environment is occurring around the globe, sufficient progress has not been achieved to halt the cause of decline of our natural systems in the face of our changing climate and human-induced rapid changes to our land, water and air. Our Partners regularly report changes witnessed in various landscapes, such as earlier flowering and fruiting for many species. The amount of seed available for some species is also in decline. It is critical that we continue our work to collect threatened species and undertake fundamental research, to ensure the botanical and restoration communities are effectively supported in their efforts to conserve Australia's biodiversity.

Since 2013, our collectors have worked tirelessly to bank seeds from Australia's many tree species. This is our fifth and final year of contributing to the Global Trees Seed Bank Project, and the Partnership has made a substantial contribution to global efforts to secure collections of these important life forms. Our combined efforts this year have secured 102 taxa across 58 genera representing 36 families of Australia's endangered, endemic and economically significant tree species. This has been a valuable project for the Partnership, and has facilitated extensive collecting efforts in 32 bioregions. Furthermore, this last year of the project has helped us achieve our Phase 1 target under the 1000 Species Project. Over 1100 native Australian taxa are now conserved across the country, with the majority of these also secured in the Millennium Seed Bank in the UK.

The Australasian Seed Science Conference in 2020 will be hosted in April by Canberra's stunning Australian National Botanic Gardens. The conference will cover the themes of seed biology and evolutionary ecology, seed sourcing and end-use, seed and gene-bank management, and seeds in culture and society. I encourage you to visit https://seedscience2020.com.au/ to submit an abstract and to register for this not-to-be-missed opportunity to learn and share.

The network of Australia's nine conservation seed banks provide a future-proof insurance policy for our unique flora, vitally important in these times of environmental stress, and I would like to acknowledge the ongoing achievement, passion and commitment of our Australia-wide alliance of 12 organisations and the network of seed collectors and seed bank technical staff. The ongoing commitment by Council to look for new and innovative ways to continue to support funding and operation of the Australian Seed Bank Partnership displays the priority all Australia's capital city botanic gardens hold for this program.

I would like to thank the Australian Seed Bank Partnership National Steering Committee members, and National Coordinator Damian Wrigley, for his leadership and dedication as we move into a significant and crucially important new decade in seed science and conservation of Australia's flora.

Dale Arvidsson
Chair, Council of Heads of Australian Botanic Gardens Inc.

LETTER FROM THE NATIONAL COORDINATOR

The Partnership has had a busy and challenging 12 months as we finalise collecting for the fifth and final year of our largest collecting project, the Global Trees Seed Bank Project. As mentioned in the Letter from our Chair, extreme weather events across the continent resulted in some target species no longer being available for collection. Our collectors continue to monitor the recovery of the burnt and flooded areas; if possible, these species will be prioritised for re-collection in future years.

In addition to these collective efforts, the Partnership completed its second crop wild relatives collecting trip to Kakadu National Park in the Northern Territory. Our collecting team met with Djurrubu Rangers to discuss seed collecting and the ways that seeds are stored in conservation seed banks and gene banks for conservation and research. Future research utilising seed from these collections will need the permission of traditional owners to ensure that access and benefit-sharing arrangements are appropriately considered. A total of 28 collections of 18 taxa were collected under the Kakadu National Park Plan of Management this year, bringing the project's total to 43 collections of 22 taxa.

This year's collections have helped the Partnership to well and truly achieve our collecting goal under Phase One of our 1000 Species Project, by securing a total of more than 1100 endangered, endemic or economically significant species since 2012. Seeds collected over the past decade are stored securely in our network of seed banks, with duplicate collections sent to the Millennium Seed Bank of the Royal Botanic Gardens, Kew, UK as added insurance against species loss.

As the Partnership transitions from a prolonged period of substantial collecting, we are looking to focus efforts on strengthening our germination data and making it more readily and openly available. Doing so will support greater utilisation by the seed science and conservation communities to undertake critical plant research and restoration projects. We will of course continue to collect the various national, state and territory-listed threatened species and flora conservation initiatives through which our Partners are engaged.

I would like to extend a warm welcome to Ross Demuth, who joins the Partnership through his new role as the Botanic and Technical Coordinator at the Brisbane Botanic Gardens, Mt Coot-tha, and to thank Jason Halford for his continued support of the Partnership in Queensland this year. I also want to welcome Samantha Craigie, Senior Ecologist at Greening Australia, who replaces Dr Paul Gibson-Roy on our National Steering Committee, and to thank Paul Gibson-Roy for his many years of invaluable contributions to the Partnership. I wish Paul well in his next endeavours.

I'm very pleased and excited to be working with the Partners to hold our second science forum for the seed science community. We are looking to expand the reach and relevance of this second forum – the Australasian Seed Science Conference. In conjunction with Partners and Associates, we will welcome delegates from across Australasia and further afield to explore recent advances in seed science, and share opportunities to collaborate further on priority research for the conservation and agricultural sectors. We look forward to hosting you at the Australian National Botanic Gardens in April next year.

As we look to the future, it is critical that we continue to collaborate as widely and as constructively as possible. The Global Partnership for Plant Conservation is providing seed banks, botanic gardens and the plant conservation community with the opportunity to shape the next decade of the Global Strategy for Plant Conservation, and I strongly encourage the botanical community to engage with this process. As we enter the next ten years of this important global strategy, it is imperative that we work together to develop a revised set of aspirational targets that are measurable, and provide direction and impetus to plant conservation for many years to come.

I hope you enjoy reading our annual report for 2018–2019.

Damian Wrigley
National Coordinator

PROFILES OF OUR PEOPLE

Peter Cuneo, Manager, Seedbank & Restoration Research, Australian PlantBank – Royal Botanic Gardens and Domain Trust

Peter Cuneo collecting seed of the endangered *Grevillea beadleana* at Guy Fawkes River National Park, NSW. (Photo: RBGDT)

I was always interested in plants and nature from a young age. After graduating from university, I was inspired to enter the world of native plants by my mentor – botanist and native plant author, Dr Thistle Harris – who wrote some of the first books on native plant horticulture and design. With native plants and horticulture now 'in the blood', my great career break was being appointed as the first plant propagator at the inception of the Australian Botanic Garden, Mount Annan (ABGMA) in the late 1980s.

These were exciting times, collecting and propagating the very first plants used to establish this ambitious garden, which opened to the public in 1988. As the garden started to take shape in the early 1990s, I moved into a coordination role, leading the living collection development, garden design, thematics and seedbank program.

By the late 1990s, the emerging conservation values of the ABGMA woodlands and the threatened species work of the seed bank saw a shift in my interests from horticulture to conservation and woodland ecology. After a stint with the New South Wales National Parks and Wildlife Service in conservation planning, I returned to ABGMA in 2003 to focus on natural area management and seed conservation programs. Establishing our partnership with the Millennium Seed Bank in 2003 gave the seedbank program renewed momentum and increased conservation focus. At this time the endangered woodland areas at ABGMA and western Sydney were under increasing threat from African olive invasion, which became the stimulus for my PhD research into the ecology and management of this aggressive invader, which I completed in 2012.

The 'icing on the cake' for me has been watching the emerging conservation role of the seedbank expand over the decades through partnerships like ASBP and the Royal Botanic Gardens, Kew's Millennium Seed Bank and culminate in PlantBank's establishment in 2013. I enjoy every day working with the PlantBank team, as we look towards the next exciting phase at ABGMA with the construction of the new herbarium – bringing together the seed and herbarium collections at the one location.

Seeing the emerging conservation role of the seedbank expand over the decades through partnerships like ASBP and RBG Kew's Millennium Seed Bank and culminate in PlantBank's establishment in 2013 really has been the 'icing on the cake' for me. I enjoy every day working with the PlantBank team, as we look towards the next exciting phase at ABGMA with the construction of the new herbarium – bringing together the seed and herbarium collections at the one location!

Thai Te, Seed Collections and Curation Officer, South Australian Seed Conservation Centre, Botanic Gardens and State Herbarium, South Australia

Thai Te collecting seeds of *Swainsona dictyocarpa* in Oct 2010 from Bitter Well after an exceptional rainfall year. Only previously known from two historic records, one from 1929 and the other from 1954. (Photo: BGSH)

I have worked with the South Australian Seed Conservation Centre (SASCC) since 2006, following many years as a Ranger with the Department of Environment and Water and as the Department's Threatened Flora Ecologist and Monitoring and Science Officer.

Working at the SASCC has allowed me to travel with the field collections program around the entire state, with the single exception being Mt Woodroffe in the Musgrave Ranges near the Northern Territory border. One of the highlights over the many years was the fieldwork in the rangelands during 2010 following significant seasonal rainfall. This trip included fieldwork

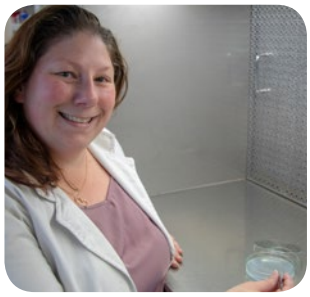
across the Painted Desert and Mound Springs region of South Australia's north, when station tracks were hidden among the fields of annuals and were exceptionally difficult to follow. A number of rare and endemic plant species were recorded during that period, including a number of cryptic and undescribed species that will lay hidden until another such rainfall event.

I've dedicated many days to field work with the SASCC. One very memorable trip involved stopping to assist with field work in Witjira National Park while en route to the Northern Territory for a honeymoon holiday with my wife Linh. Although it was a very successful field trip collection wise, unfortunately the Land Rover didn't survive Witjira National Park and was towed back to Coober Pedy and the honeymoon holiday was postponed.

I have been lucky enough to be involved in all aspects of the seed conservation program from field and lab work through to education programs and nursery propagation. At the moment the focus has been the propagation of threatened flora for recovery programs, including in-vitro propagation of threatened orchids in the lab. Our team is currently surveying for threatened orchids, including setting up baseline monitoring for populations. I have a keen eye for orchids, so try to accompany the team on as many of the orchid survey trips as possible. There is always plenty to do at the SASCC and I enjoy sharing what we discover. So I encourage you to take a look at the Seeds of South Australia website to learn more about the seeds that we conserve in our collections:
https://spapps.environment.sa.gov.au/seedsofsa/

Kelly Lilburn, Volunteer, Department of Biodiversity, Conservation and Attractions

My interest in all thing's botanical stems from an early age, starting with growing herbs and indoor plants as a child. My inquisitiveness about the conservation and propagation of native species started during my undergraduate studies in Environmental Biology at Curtin University. During this time, I was able to delve into the fields of botany, soil science, ecology and restoration. These subjects served only to increase my curiosity about the intriguing organisms that we so often overlook.



Kelly Lilburn has been assisting with cleaning seeds and running germination trials of threatened species at the Western Australian Seed Centre, Kensington. (Photo: DBCA)

Towards the end of my bachelor's degree, I was fortunate to participate in the Kings Park Science's Summer Scholarship Program. As part of this program, I worked on a project investigating the link between metabolism and the longevity of seed held in *ex situ* storage. This work stimulated my interest in seed storage, leading to an honours project on the same topic. I learnt many things during my time in the Kings Park lab, including: using an x-ray machine to differentiate filled seed from empty or damaged seed; the role of humidity and temperature on seed longevity; differing types of seed dormancy; and how temperature stresses can be used to mimic the ageing process in seeds and seedlings.

During this time, I also started volunteering at the Western Australian Herbarium as part of their mounting team. Knowing my interest and background working with seed, the herbarium's volunteer coordinator suggested I might be interested in volunteering at the Western Australian Seed Centre which is co-located with the herbarium. In 2018 I started volunteering at the seed centre, helping to process and test the conservation-significant seed collections housed in their purpose-built facility. I've been involved in tasks such as seed cleaning and running germination trials of collections to estimate their viability.

My volunteer work at the Herbarium helped me to secure a place in a team travelling to Cape Range National Park, WA, as part of the Bush Blitz species discovery program in 2019. The team gathered data on species in the region, including the collection of type material for a new *Hibbertia* species. My aim is to continue along the theme of botanical research in both my professional and home life, and I will continue to promote the importance of the role that flora plays in our collective survival.

Ross Demuth, Botanic and Technical Coordinator, Brisbane Botanic Gardens

Ross collecting for the Mackay Regional Botanic Garden fern collection along a creek bed somewhere in Calen around five years ago. (Photo: Dale Arvidsson)

I have a long and diverse background in horticulture but am new to seed banking for conservation purposes. In my current role at the Brisbane Botanic Gardens, I divide my time between the seed bank and the living collection, with responsibility for overseeing the technical aspects of the seed bank and gardens operations.

As a young boy, I lived in Fiji for three years. We lived in the last house on a road leading to remnant rainforest and a traditional village. With friends from the village, we spent our days in that forest catching 'fresh water prawns' (cherabin) by hand and climbing coconut palms. It was here that I learnt the respect and awe for the natural world that I carry with me to this day.

I began my career working in bush regeneration and nurseries in the mountains behind Brisbane, and soon became a qualified nurseryperson. I have gone on to work in diverse positions in horticultural and related industries, including: commercial retail and wholesale nurseries; landscape maintenance at the Queensland Cultural Centre (State Museum, Art Gallery, Library, etc.); as a field technician with Bureau of Sugar Experiment Stations in the sugar cane Industry conducting trials on improved varieties and efficient harvesting techniques; and the past 12 years at the newly formed Mackay Regional Botanic Gardens (MRBG).

During my time at the MRBG, I was involved in developing the gardens from a largely greenfield site into the world-class facility it is today. MRBG's collections were largely of the Central Queensland Coastal Bio-region and we often collected from the surrounding areas. My responsibilities included overseeing the herbarium, curating collections and developing the living collections database. I also had the pleasure of getting involved in areas as diverse as tropical sports turf trials with the then Queensland Department of Primary Industries and Fisheries; performing field surveys in Eungella with Griffith University; and becoming a key member in the BGANZ Botanic Records Officers Network.

Gastrolobium mondurup seed and fruit taken with a tripod-mounted digital SLR camera with macro lens. Photos such as this one are taken with natural light and a remote is used to avoid camera shake. The seed and fruit are placed on a glass petri dish to provide a clear stage with no shadow, with a paint sample card providing a uniform background. A physical ruler can be included in the field of view or inserted to the image using imaging software. Some seeds require more depth to capture their various traits, and so imaging software can enable image stacking and can ensure these features are clearly visible. (Photo: Andrew Crawford, DBCA)

WHO WE ARE

The Australian Seed Bank Partnership is a national collaboration of nine conservation seed banks and two flora-focused organisations. With support from our dedicated Partner and Associate organisations, the Partnership contributes to the critical dialogue between policy-makers, researchers and the conservation and restoration sectors to help safeguard Australia's plant populations and communities.

Seed banking is the principal tool for the safe and efficient storage of wild plant genetic material. A sound understanding of seed harvest, storage and germination is crucial to combating the global decline of plant diversity, particularly in the face of a rapidly changing climate and extensive land-use change. Together, these seed collections and the understanding of seed technology underpin our efforts to protect and restore natural ecosystems. Our Partners generously provide resources and knowledge that support the management of plant species and communities, and our collaborative efforts offer an insurance policy against further loss.

Our Vision

A future where Australia's native plant diversity is valued, understood and conserved for the benefit of all.

Our Mission

A national effort to conserve Australia's native plant diversity through collaborative and sustainable seed collecting, banking, research and knowledge sharing.

Anthocercis anisantha ssp. *anisantha* is endemic to South Australia, found in the central and northern Eyre Peninsula. The species grows in Triodia hummock grassland on the rhyolitic-porphyritic hills of the Gawler Ranges and on isolated hilltops further south. (Photo: BGSH)

Luke Sweedman collecting seeds from *Eremophila pterocarpa* ssp. *acicularis*. (Photo: John Henson, BGPA)

Our nationally collaborative projects and initiatives enable us to focus on seed banking and seed science, on sharing the knowledge we create, and on working with others throughout the country and overseas, to build capacity throughout the broader seed conservation community. The Partnership is committed to ensuring the practical application of our work is of the highest standard. We follow internationally recognised protocols for collecting and storing the seed of Australian native plants, with all Partners assessed against the Millennium Seed Bank Partnership's Seed Conservation Standards.

We record environmental data crucial to our role in plant conservation, and make it openly available through the Australian Seed Bank online and through jurisdiction-specific websites. Our research is critical for establishing germination protocols, particularly for species with dormancy issues. By building this knowledge base, we aim to help practitioners restore vital plant communities throughout Australia's diverse landscapes. Over many years and numerous field trips, our Partners and Associates have collected seed from newly discovered species, from previously unknown populations, and from rediscovered species that were thought to be extinct.

We continually look for opportunities to share our knowledge and skills, collectively identify and manage risk, and develop and use regional expertise to optimise the effective use of our resources.

AUSTRALIAN SEED BANK PARTNERSHIP HIGHLIGHTS FOR 2018–2019

Annual Steering Committee meeting at the George Brown Darwin Botanic Gardens

This year's Steering Committee meeting was held at the George Brown Darwin Botanic Gardens in the Northern Territory. Partners met for two days to discuss our achievements and to share insights from recent experiences, including some of the daily challenges of managing diverse and complicated seed conservation programs and research. Partners also participated in workshops over the two days to define future priorities for seed collecting in Australia and to identify potential future projects that would benefit the Partnership's efforts to collect and undertake research to support native species conservation.

Collecting genetically diverse and representative collections from Australia's endemic and threatened species will continue to be a priority for the Partnership. Other priorities include: improving data management; continuing to contribute to guidelines and standards that support international best-practice seed conservation and research; and developing better linkages across the various sectors involved in seed conservation, including restoration, agricultural, and cultural seed and gene banking both within Australia and internationally.

Acacia tolmerensis collected from Litchfield National Park in the Northern Territory. This collection was made with support from the Millennium Seed Bank Partnership's Global Trees Seed Bank Project. This individual's leaves were being used by Green ants, *Oecophylla smaragdina* to make a nest. (Photo: Damian Wrigley, ASBP)

Jacquemontia sp. Douglas Daly collected near the Stuart Highway at the turn-off to Litchfield National Park in the Northern Territory. (Photo: Damian Wrigley, ASBP)

Following the meeting and workshops, the Partners participated in joint field collecting in Litchfield National Park in support of the George Brown Darwin Botanic Gardens seed bank. The Partners secured collections of *Jacquemontia* sp. Douglas Daly, *Patersonia macrantha*, *Acacia tolmerensis* and *Helicteres tenuipila*. Each of these collections have been processed and stored in the seed bank at the George Brown Darwin Botanic Gardens as an insurance against the loss of these species *in situ*. They will also be available for displays at the botanic gardens as well as for potential future restoration and research projects.

Revisiting Kakadu National Park to secure Crop Wild Relatives and share knowledge with Indigenous Rangers

The Crop Wild Relatives project team undertook a second field trip to Kakadu National Park in the Northern Territory in April 2019. Dr Sally Norton from the Australian Grains Genebank (AGG), Tom North from the Australian National Botanic Gardens, and Ben Wirf from the George Brown Darwin Botanic Gardens set out across Kakadu's Jabiru and Mary River districts to secure target species that had eluded the team the previous year. The most notable collection included a species of *Sorghum grande* that, until this project, had not been represented in the global Genebank system.

Before collecting, the team trained nine Djurrubu Rangers from the Gundjeihmi Aboriginal Corporation in practical aspects of seed conservation, such as species identification, reasons for ex situ seed conservation, and the use and intention of collections of crop wild relative species. The Djurrubu Rangers joined the project team in the field to learn more about how seed collection theory translates to the practicalities of fieldwork.

Following the Kakadu component of the trip, Sally and Ben continued on to Katherine and the Adelaide River to secure additional collections from Northern Territory government lands. These areas hadn't been targeted previously, but did manage to contribute additional taxa to the project's overall total of 36 collections of 21 taxa.

Plant Propagation and Translocation in South Australia

The South Australian Seed Conservation Centre have been working with fauna ecologists from Ecological Horizons during the past year to reintroduce threatened plant species to a 900-hectare vermin-proof exclosure at Secret Rocks Nature Reserve on Eyre Peninsula. Seeds were collected and propagated from fifteen threatened plant species and over 900 seedlings were planted in June this year, with more species to follow in August. The list includes some of the most threatened plants in South Australia, with only a few known individuals still extant in the wild.

Planting *Limosella granitica* into rock holes at Secret Rocks that will become an important seed resource for further restoration work in the area.

Many of the collections our Partners secure are sourced within a short distance of road verges, like this one on the Arnhem Highway in Kakadu. Roads provide ready access to various landscapes and can also present interesting finds, particularly as some species will be dispersed by vehicles while other species that respond well to disturbance can potentially establish new populations.
(Photo: Ian Oswald-Jacobs, DoEE)

Bio-swale restoration at Millbrook Reservoir. Translocated populations like these provide valuable insurance against regional extinction.

The SA Seed Bank, in partnership with SA Water, continued to help restore seasonally inundated wetlands adjacent to Millbrook and Mt Bold Reservoirs. The team contributed technical advice about using suitable species, and wild material they had collected for use in the project. The SA Seed Bank also undertook germination research and the propagation of thousands of plants for more than fifteen threatened species that were included in the project. In a similar project at the Deep Creek and Stipiturus Conservation Parks on the Fleurieu Peninsula, the SA Seed Bank collected seeds, performed germination research, and propagated thousands of plants for selected difficult-to-propagate plant species required for targeted restoration programs in these unique habitats.

Threatened Species Strategy Year Three Report

The Australian Government's Threatened Species Strategy has set some very ambitious goals for plant conservation, with a year-three target of 50% of Australia's known threatened plant species stored in conservation seed banks. At the start of the financial year our Partner seed banks held collections of various sizes representing 61% of Australia's threatened plants listed at the national level. While this is a good start, much more collecting and research are needed for these threatened species.

The Partnership collects extensively throughout Australia and its external territories, with the aim of securing genetically diverse and multi-provenance collections of our native flora. However, many of the threatened species held in Australian seed banks are represented by very small collections – in some cases less than 50 seeds. Collections of this size reflect the challenges we face in securing genetically diverse collections from across a particular species range. While herbarium records may show some threatened species with historically widespread distributions, threats such as land clearing, changing fire regimes, drought, pests, disease and a rapidly changing climate can significantly reduce and restrict population size and distribution.

For some of Australia's threatened species, there is simply not enough seed available in situ to make a sufficient conservation collection. It is therefore critical that we continue to work with governments, business, philanthropy and the community to ensure Australia's native species are represented by collections that are of sufficient size and adequate viability, and that reflect the genetic diversity across their range. For many species, this will involve continuing to target species *in situ*. For others, we will need to incorporate additional ex situ techniques, including ongoing research collaborations, establishment of seed production areas, and translocation of native species in collaboration with a variety of land managers across the country.

Despite the ongoing challenges we face in protecting and conserving our diverse native flora, it is great that the Threatened Species Commissioner considers ex situ conservation to be a critical tool in our shared efforts to improve threatened species conservation throughout Australia.

GOALS AND ACHIEVEMENTS

The Australian Seed Bank Partnership's national program to conserve Australia's native plant diversity has five goals. The Partnership's business plan identifies strategies, actions, priorities and outcomes under each of the goals that guide our work. These outcomes help us to maintain focus and ensure our work is relevant to our vision of 'a future where Australia's native plant diversity is valued, understood and conserved for the benefit of all'.

The five goals are:

1. Collecting and storing seed in secure seed banks as long-term insurance against loss of plant diversity.
2. Conducting research to improve both conservation and restoration outcomes from seed banking.
3. Developing national standards and improving capacity to enable conservation and restoration of biodiverse and resilient ecosystems.
4. Sharing knowledge and engaging the public, private and charity sectors, as well as community members, in the work of the Australian Seed Bank Partnership.
5. Securing and strategically managing our resources to strengthen and support the work of the Australian Seed Bank Partnership to achieve its vision.

Conservation horticulture at the Royal Botanic Gardens Victoria

Stored seed from selected Victorian Conservation Seedbank collections are currently growing in outdoor plots at Royal Botanic Gardens Victoria's Cranbourne Gardens, aiming to identify any collections showing horticultural potential and to establish the best methods to grow these plants in a predictable way. This is a collaborative project with The University of Melbourne and funded by The Australian Flora Foundation and Royal Botanic Gardens Victoria.

Trial species include rare or threatened herbs from Victoria such as *Argyrotegium nitidulum*, *Brachyscome chrysoglossa*, *Brachyscome tadgellii*, *Craspedia canens*, *Drabastrum alpestre*, *Glycine latrobeana*, *Leptorhynchos orientalis*, *Leucochrysum albicans* subsp. *tricolor*, *Lobelia gelida*, *Podolepis laciniata*, *Rutidosis leptorhynchoides*, *Stylidium armeria* subsp. *pilosifolium*, *Wahlenbergia densifolia* and *Xerochrysum palustre*.

This project is an opportunity to raise public awareness of the importance of ex situ seed conservation and the role of conservation horticulture. For further details regarding the first year of this project, see Hirst *et al* (2019) 'Raising Rarity: horticultural approaches to conserving Victoria's rare and threatened wildflowers'. *Australasian Plant Conservation* 27: 14-16.

Rutidosis leptorhynchoides growing in experimental plots at Cranbourne Gardens. (Photo: Meg Hirst, Royal Botanic Gardens Victoria)

Research to inform the design of mechanical seeders for mine site restoration

Sowing seeds for restoration using direct seeding machinery can be challenging where landscapes vary in topography. An increasing requirement to return biodiverse seed mixes to a variety of landscapes motivates continued improvements in the design and flexibility of direct-seeding operations.

Seed biologists at the Western Australian Seed Centre have teamed up with agricultural engineers at The University of Western Australia to address some of the difficulties associated with direct seeding for the restoration of mine sites in the Pilbara region. Controlling the sowing depth and spatial distribution of diverse seed mixes into the

sloped and rocky landforms common to these mine-site landscapes is one of the important components of improving restoration capabilities.

Research over the past few years has shown that the current practice of sowing seeds onto the soil surface results in almost no germination. Armed with this knowledge, field trials conducted over the past year aimed to identify the optimal seed sowing depth and to test the influence of rocks within the soil on seedling emergence of species of *Triodia* (spinifex), which form the major grassy understorey component of the natural vegetation.

Findings show that covering seeds to a depth of 5 mm yields optimal emergence. Emergence declines considerably at 10 mm depth, reaching almost zero at 30 mm depth. Although rock content contributes to a reduction in emergence of seeds sown deeper than 15 mm, sowing depth is clearly the primary factor controlling emergence.

Most mechanical seeders currently in operation are unable to control sowing depth to this level of precision in such rocky and uneven terrain. A range of machinery components are now being evaluated to improve depth control, including double-disc-opener type assemblies used as pasture drills in the agriculture industry, as well as knife-point tynes, and more novel designs that aim to splay the soil fraction over the seeds, thereby creating a suitable seedbed.

A trial examining seedling emergence at a field station in the Pilbara. Plots within the rainout shelter contain different soil substrates that are used for restoration and that allow for controlled experiments to understand seed biology and to test seed treatments to improve restoration success. (Photo: David Merritt, DBCA).

Back from the dead: the rediscovery of a presumed extinct Acacia in Western Australia

Acacia prismifolia was known from only two plant collections. The first was first collected in 1901, and the second in 1933 – before being listed in the 1990s as 'presumed extinct' after extensive searches failed to find any trace of the species.

That remained the status until late in 2018, when consultant botanist, Libby Sandiford, was doing work in the Cranbrook area and came across an Acacia that she didn't recognise. Curious as to its identity she took a specimen to key it out. Using botanical keys such as WATTLE, Libby quickly came up with a name, *Acacia prismifolia*.

Knowing that this species was presumed to be extinct, Libby rechecked her identification but still came up with the same answer. Excited about her find, but wanting more certainty, Libby made the trip to Perth with her specimen so that the Western Australian Herbarium's *Acacia* specialist, Bruce Maslin, could examine it. Bruce confirmed the identification, thereby confirming that, more than 80 years after it had last been seen, *Acacia prismifolia* had not gone the way of the dodo and was in fact alive and apparently doing okay.

The seeds of *Acacia prismifolia* captured for cataloguing as a reference for the species. The variation among seeds of Acacia species can be significant, so images like these can help to identify species and to share knowledge about seed morphology. (Photo: Andrew Crawford, DBCA)

Acacia prismifolia was rediscovered by chance on the side of a country road in Western Australia. Many species are collected on roadways throughout Australia, illustrating how important even significantly modified habitats can be for threatened species. (Photo: Andrew Crawford, DBCA)

News of the exciting find was brought to the attention of Andrew Crawford at the Department of Biodiversity, Conservation and Attractions' Western Australian Seed Centre. Andrew added the *Acacia* to his seed collection target list. The *Acacia*'s location was visited in November and several small, localised populations of the Acacia were found. The plants had immature fruit so seed capture bags were placed over fruit to catch mature seed when it was shed from the plant. These bags were retrieved in January 2019, and seed collections from each of the populations are now safely stored in the Western Australian Seed Centre.

Tough but successful collecting in the Top End 'build-up'

In October 2018, staff and a volunteer from George Brown Darwin Botanic Gardens spent eight days collecting in Judbarra / Gregory National Park, in the Victoria River District approximately 400 km south west of Darwin. During the trip, the team clocked up more than 1,400 km of driving, utilised a helicopter to reach inaccessible sites and traversed rugged terrain on foot, battling very dry conditions and daytime temperatures in the mid-40s.

Over the course of the week, the team made seed collections of 18 species, seven of which are new to conservation seed banks. Three of the collected species the seed bank was especially pleased about securing were *Melaleuca triumphalis*, *Eucalyptus gregoriensis* and *Brachychiton spectabilis*.

Melaleuca triumphalis is a small tree known only from a few populations in the Victoria River Gorge, where it is restricted to sheltered seepage areas and drip lines at the base of escarpment cliffs. The species was discovered relatively recently in 1996, and is currently listed as Near Threatened under the *Territory Parks and Wildlife Conservation Act (1976)*.

Eucalyptus gregoriensis was also discovered in 1996, but is more widespread than *Melaleuca triumphalis*. The species is also endemic to Judbarra / Gregory National Park, where it inhabits rocky creek lines and slopes on plateau margins. This species is currently listed as Data Deficient under the *Territory Parks and Wildlife Conservation Act (1976)*.

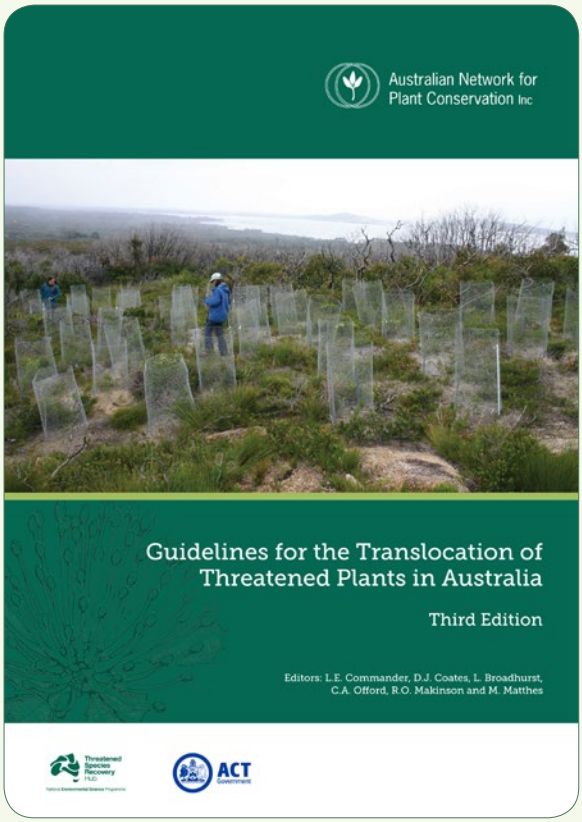
The third species, *Brachychiton spectabilis* is a small tree growing to around 7 metres, usually occurring in woodland on dry, rocky slopes of gorges, ridges and escarpments. Although not currently threatened, *Brachychiton spectabilis* is also endemic to the western Top End of the Northern Territory, with a restricted distribution from Victoria River Gorge, extending almost to the West Australian border.

The seed bank was able to make a large, high quality collection of *Melaleuca triumphalis*, as well as valuable collections of *Eucalyptus gregoriensis* and *Brachychiton spectabilis*, despite populations of the latter two being affected by dry-season fires. These collections will be banked at the GBDBG seed bank, with seeds also identified for sending to the Millennium Seed Bank as part of the Global Trees Seed Bank Project.

Glen Holland (L) and Ben Wirf (R) looking for capsules on a *Eucalyptus gregoriensis* specimen that largely escaped dry season fires in Judbarra / Gregory National Park in October 2018. (Photo: Marjorie King)

12th Australasian Plant Conservation Conference

In November 2018, the Partnership participated in the 12th Australian Network for Plant Conservation Conference at the CSIRO Discovery Centre at Black Mountain, Canberra. The conference provided a valuable opportunity for seed collectors, scientists and botanical experts to come together and share their findings with the plant conservation sector.



The *Guidelines for the Translocation of Threatened Plant in Australia* is a valuable tool for conservation practitioners working to improve on-ground outcomes for Australia's native flora. Partners from across the country shared their expertise to help make this update to the guidelines possible. (Photo: ANPC)

The Network also used this opportunity to launch the 3rd edition of *Guidelines for the Translocation of Threatened Plants in Australia*. Dr Lucy Commander led the project, bringing together translocation practitioners from across Australia to contribute to this important revision of the guidelines. It was great to see so many from within the Partnership once again providing their skills and expertise to the project. Congratulations to the ANPC for another successful conference and to Dr Commander for leading the update of this vital plant conservation resource.

The Council of Heads of Australian Botanic Gardens focus on the future

The global outlook for wild plants continues to decline, with a wide variety of threats compromising the continued existence of many plant species *in situ*. As a result, botanic gardens are continuing to play an important role in collaborative efforts to improve plant conservation outcomes through *ex situ* conservation practices.

Members of the Council of Heads of Australian Botanic Gardens recognise the increasing importance of botanic gardens in ongoing efforts to improve conservation outcomes for native plants. In March 2019, the Council met at the Royal Tasmanian Botanical Gardens in Hobart to review and update their shared strategic direction for Australia's capital city botanic gardens. These discussions are helping to prioritise the work of the Council and to guide the collaborative resourcing of projects across botanic gardens. The Council continues to view *ex situ* conservation of Australian plants as an ongoing and major area of continued focus for their botanic gardens.

ACHIEVEMENTS AROUND AUSTRALIA TOWARDS OUR 1000 SPECIES TARGET

Victoria

Victorian Conservation Seedbank in the field

During the 2018–2019, seed collecting season, the Victorian Conservation Seedbank (VCS) was mainly focused on collecting shrubs and trees. This included Acacia species from the Mallee regions in western Victoria and species of *Pomaderris* and *Kunzea* from Gippsland in the east of the state. Dry conditions over the past two years meant that flowering and seed production was much reduced in some target species.

Observations of selective browsing by feral Sambar deer show that these animals are a real and growing concern for many rare or threatened species, particularly in eastern Victoria. This year, seed production of *Pomaderris pauciflora*, a rare and very restricted species in the state, was noted to have been greatly diminished through selective browsing by Sambar, with flower and fruit production restricted to the upper branches of very old, tall plants. While only a small collection (around 400 seeds) was obtained for this species, it is regarded as a highly significant conservation collection.

While undertaking fieldwork related to the description of a new, rare Acacia species in western Victoria, an opportunistic seed collection was taken. Fieldwork suggested that the yet-to-be-named species has been drastically reduced through extensive cereal cropping on better soils of the Wimmera, with populations now largely restricted to roadside remnants and two more extensive occurrences in conservation reserves at the very margins of the species range, adjacent to farmland. It is hoped that the collected seed can provide the basis for translocation into further suitable, safe sites within the highly modified Wimmera landscape.

Acacia sp. aff. *rigens* (Gerang Gerung), Glenlee Flora and Fauna Reserve, western Victoria. (Photo: Neville Walsh, Royal Botanic Gardens Victoria)

There is a current focus on the conservation of threatened orchid species due to the rapid decline of population numbers in recent years. Strategies for safeguarding our orchids include *ex situ* and *in situ* methods that have only been possible through partnerships with Dr. Noushka Reiter (Royal Botanic Gardens Victoria), volunteers, regional partners and schools.

This year we translocated four nationally threatened orchid species in the Adelaide and Mount Lofty region. Two of these threatened orchid species were propagated using in vitro symbiotic germination techniques with students from Kildare College – culminating nearly three years of field, laboratory and nursery work. The project's work was presented at an Orchid Symposium at Melbourne in June 2019. This work will expand in 2019–2020 with surveys, monitoring and collections of fifteen orchid species in the Mount Lofty region listed in the *Environment Protection and Biodiversity Conservation Act (1999)*. Propagation and translocation work is scheduled for ten of these species.

Species with a restricted range, like that of *Eucalyptus farinosa*, are important target species for the Partnership to collect, in the hope that we can ensure their genetic material is represented in conservation seed banks as insurance against climate change. (Photo: Jason Halford, BBG)

Queensland

New beginnings

A total of 18 collections were made this year, most of them in the Brigalow Belt South and Einasleigh Uplands bioregions. One species in particular that may one day be displayed in the Queensland Conservation Collection is *Eucalyptus farinosa*, a species secured on the final Global Trees Seed Bank Project collecting trip in April 2019. This particular species was an important addition to the collection. The tree is not only spectacular but also highly restricted, with its range limited to the foothills of the Lolworth Ranges near Pentland.

Historically, Brisbane Botanic Gardens (BBG) has maintained its seed banking activities by the sheer will and pure determination of a few dedicated staff members and occasional volunteers, assisted by collaborating partners (Universities and others). With no current collaborators, no current volunteers, and the recent departure of Jason Halford – a key driver in the Seeds for Life project – and Phil Cameron ('Red'), who had been there since the start, we are back to a new beginning.

Ross Demuth was recently appointed Botanic and Technical Coordinator, and has hence taken on the coordination of the Queensland Conservation Seed Bank. With the last of the Global Trees Seed Bank Project seed collecting trips completed around the time of his appointment, Ross was afforded the space to look at the seed bank with fresh eyes and a strategic point of view.

Facility management was the first item on the radar. After several recent freezer failures, we are proceeding with upgrades that will include adding a Building Management System that has early warning capabilities. Several gaps in equipment maintenance schedules have also been rectified. Possibly our greatest long-term priority is to catch up on final processing and germination trials. We are looking to source volunteers and employ an extra staff member to commence delivery of this in 2019–2020.

Looking to the future, we aim to embed what we do with the seed bank into the operations of the Botanic Gardens as a whole. This will allow us to introduce the project to a wider audience, both internal and external, and afford the program more stability. To this end, recent plantings in our Queensland Conservation Collection have been sourced from the seed bank, to conduct trials and to educate the wider community of the importance of our state's threatened plant species.

Commonwealth

This has been a very exciting year for the team at the National Seed Bank (NSB) at the Australian National Botanic Gardens (ANBG). It was announced in early 2019 that we had the green light to build a new seed bank on-site in the Gardens. Works are scheduled to begin in 2019–2020 alongside a capital fund-raising campaign to ensure we have a fully equipped fit-for-use building for our conservation and research work for many years into the future.

Over the past year, the NSB secured 128 new accessions of 69 species from across Australia (ACT, NSW, NT, QLD and Norfolk Island). This included 12 EPBC-listed species and 55 accessions of 37 species from Commonwealth Terrestrial Reserves. We also made progress toward targets for the ACT flora and Parks Australia's Commonwealth Terrestrial reserves.

With the extension of the Global Trees Seed Bank Project, the ANBG targeted endangered and endemic species and species-of-concern for collection from Norfolk Island National Park. ANBG undertook collecting trips in November 2018 and February 2019 with seed bank and horticultural staff, assisted by NSB volunteers.

Norfolk Island has experienced extreme drought over the past year, and collections were difficult to procure in both number of species available and the size of collections.

In terms of conservation outcomes, we were able to identify why some target species were not recruiting naturally, finding that, at lower altitudinal levels, fruits were heavily infested with grubs. This was particularly so for *Zanthoxylum pinnatum* and *Exocarpos phyllanthoides* var. *phyllanthoides*. We then found that trees at high altitudes on the island that weren't subject to edge-effects were not infested, and we were able to collect good seed from these populations.

The second Crop Wild Relatives collection trip to Kakadu National Park was notably more successful than the first, mostly due to timing. Great collaboration between all the agencies (and people) involved – ANBG, George Brown Darwin Botanic Gardens, Australian Grains Genebank, Kakadu National Park (KNP) and the Gundjeihmi Aboriginal Corporation – meant we were all able to meet our targets for both collecting and training.

Werner Stur, Tom North and Dan Marges, checking seed viability of *Melicytus latifolius*, Norfolk Island February 2019. (Photo: Jeanette Jeffery)

Over the year, the NSB was involved in nine collaborative conservation and research projects led by, or with significant contributions from the NSB. These endeavours led to the publication of four peer-reviewed scientific papers and one book chapter by NSB staff and our collaborators. Projects increased our broad network of national and international partnerships (including new partnerships with the University of Canberra, James Cook University and the University of QLD). We also secured external resources to support project activities, that enabled staff to supervise seven undergraduate, honours and PhD students and share specialised seed biology and conservation skills that are not available to students through higher education courses.

Examples of student projects include:

- A CSIRO Summer scholar project known as 'Seedy Synapses: An exploration of *Eucalyptus* seed morphology using deep learning'. This project was a

multi-disciplinary project utilising machine learning for biological research, co-supervised by NSB and the Australian Tree Seed Centre (ATSC, CSIRO), with additional advice from CSIRO's Data61. The collaboration between NSB and ATSC enabled the project to harness collections from both institutions and considerable expertise covering seed biology, ecology, genetics and image analysis.

- A UNSW/NSB student of seed ecology completed a first class Honours thesis titled 'Do polyploidy and rarity affect seed and seedling traits of Pomaderris species?'. Results of the study are being utilised for conservation and management, and provided valuable information on the germination and seedling growth of rare Pomaderris species.

Tasmania

The collecting season of 2018–2019 was challenging, with summer fires over a third of the state. By sheer misfortune, the two main areas that had been surveyed in the spring were impacted by the fires, which seriously interfered with the scheduled collecting program.

Despite this setback, 28 collections were made in total, nine from the RTBG nursery seed orchard program and the remainder from the field. Three collections are species new to the ASBP program, including a collection of *Ozothamnus floribundus*, a newly described endemic restricted to a single road verge. Four other collections are new to the Tasmanian program. Included in this group is *Cardamine tryssa*, a herb previously believed extinct in Tasmania and which we failed to collect last year due to grazing. Surveys this season added three more populations of this species to the four discovered in the previous two years, and one particularly large new site yielded 21,000 seeds.

Another follow up from the previous year was *Viola cunninghamii*. Last year we collected 110 seeds from plants on the Central Plateau. These seeds were sown in the RTBG nursery in March 2018, and provided 60 plants by November 2018. The plants commenced seeding in January 2019 and by the middle of April we harvested 28,000 seeds. This makes this the largest *Viola* collection we hold, and more than 10 times larger than our average *Viola* collection size. This exercise revealed that capsules visibly mature and disperse their seeds in 24 hours. This might explain the challenge of collecting Viola, and suggests that seed orchards might be a better approach for this genus.

The collecting season closed with a particularly fruitful trip to Lake Mackenzie, an area impacted by a major fire in 2016. This trip collected five species of daisies, including the recently described endemic *Xerochrysum alpinum*, and the alpine fire ephemeral *Veronica nivea*. These six collections contributed half of the total seed harvested this season, with a combined total of 540,000 seeds.

RTBG Horticultural Botanist Natalie Tapson collecting *Asteraceae* near Lake Mackenzie in the Central Plateau Conservation Area. Five daisies were collected from the site – *Xerochrysum alpinum, Xerochrysum subundulatum, Celmisia asteliifolia, Coronidium monticola* and *Olearia myrsinoides*. (Photo: James Wood, RTBG)

South Australia

Sourcing seeds and saving threatened orchids

This year the South Australian Seed Bank's seed collection strategy was to target threatened species not currently held in the seed bank, including a number of small regional populations identified as at risk of extinction in the short-term. With the assistance of volunteers and regional partners, more than 180 collections were achieved throughout the year with 148 of these species collections listed as threatened in South Australia. This included collections from 37 plant taxa new to the South Australian Seed Bank; 94 plant taxa listed as threatened in South Australia (Critically Endangered, Endangered, Vulnerable, Rare); and 31 plant taxa endemic to South Australia.

These new collections have helped achieve an overall target of approximately 80 per cent of South Australia's threatened flora currently conserved in the Seed Bank. In addition, more than 40 seed collections were used to propagate plants for on-ground projects with SA Water, Natural Resources Adelaide, Natural Resources Adelaide and Mount Lofty Ranges, and Ecological Horizons on Eyre Peninsula.

The critically endangered Black-beak duck-orchid (*Paracaleana disjuncta*) was collected from Cox Scrub Conservation Park by volunteers of the Native Orchid Society of South Australia. (Photo: BGSH)

The endemic *Daviesia schwarzenegger* from Tarcowie which is currently known from fewer than a hundred plants. BGSH are using their seed collections to propagate plants in 2019 that will be used for recovery work in 2020. (Photo: BGSH)

The South Australian Seed Conservation Centre has made collections of all three known subpopulations of the critically endangered blue-top sun-orchid *(Thelymitra cyanapicata)*. The extant wild populations are currently estimated to be fewer than 200 individuals, so we grew-on seeds in the nursery and translocated 104 plants in July 2019. (Photo: BGSH)

New South Wales

A state-wide seed-collecting program based on NSW threatened species continues to be the main program focus for the Royal Botanic Gardens and Domain Trust (RBGDT) team located at the Australian PlantBank. This seed conservation work is being funded as part of the NSW Government's Saving our Species (SoS) program, which continues until 2021. The SoS program prioritises threatened species for conservation investment, and a key objective for the RBGDT is to increase the number of SoS priority species held at PlantBank, supporting the full range of SoS on-ground conservation actions, including conservation translocations. Activities include multi-provenance seed collections to increase genetic diversity held as part of risk management.

This year a total of 300 new threatened species seed collections were made, representing 87 species. Main target regions in NSW included the north east and south east, with fieldwork also occurring in the Illawarra, Metro and Hunter regions. Threatened terrestrial orchids have been a feature of the program, and included the first pollen and seed collections from the last known extant plant of *Diuris byronensis* at Byron Bay. Other threatened orchid species collected included *Pterostylis gibbosa* from the Shoalhaven and Illawarra and the first collection of *Genoplesium rhyoliticum* from near Pambula. Other orchid species collected were *Prasophyllum affine*, *Genoplesium plumosum* and *Prasophyllum petilum*, many from new localities, to support the SoS 'Improving ex situ techniques to support Orchid translocations' research project based at PlantBank. Collections of *Euphorbia psammogeton* (Sand spurge), a prostrate herb growing on coastal foredunes, were made from multiple locations to support a translocation being managed by the NSW National Parks and Wildlife Service.

Ongoing drought across significant areas of the state has impacted on the Global Trees Seed Bank Project and SoS program, with many species producing little or no seed, even after reasonable flowering events. Some ephemeral species were removed from the target list due to the ongoing dry conditions. During the season, bushfires in the south coast area of Bega completely burnt out three of our key target tree species – *Eucalyptus wilcoxii*, *Acacia blayana* and *Pomaderris brogoensis*. Despite challenging conditions, an additional six NSW tree species were collected in the final year of the Millennium Seed Bank-funded Global Trees Seed Bank Project, bringing the total number of species collected by NSW to 95. A significant tree collection (after three previous attempts) was the large mintbush family shrub *Prostanthera petraea* from the wet sclerophyll forests and granite outcrops in the Boonoo Boonoo area.

In June 2018, the NSW Government announced that it would move the irreplaceable scientific, cultural and historical resources of the National Herbarium of NSW to the Australian Botanic Garden Mount Annan and revitalise the existing Herbarium building. The new Herbarium will be co-located with the award-winning Australian PlantBank, and include the build of a new nursery at the Gardens.

The new state-of-the-art facility will protect the Gardens' nationally and internationally significant collection of more than 1.4 million plant specimens. Currently housed in the Robert Brown Building, which has limited environmental controls, the herbarium collection was at risk from degradation, mould and insects. Additionally, with more than 8,000 new specimens being added to the collection every year, the storage will be at capacity by 2022.

Mature capsule of *Prostanthera petraea* in Boonoo Boonoo National Park near Tenterfield, NSW (Photo: Gavin Phillips, RBGDT)

Seedbank Officer Gavin Phillips collecting *Prostanthera petraea* in Boonoo Boonoo National Park (Photo: Jessica Wait, RBGDT)

A key feature of the new Herbarium will be six protective vaults made of thermal mass materials to shield the collection from bushfires and extreme temperature events. Inspiration for the Herbarium has been drawn from the seed pod of NSW's floral emblem, the iconic waratah.

The construction of the herbarium is due to commence early in 2020 and be completed in 2021, and will form part of the recently announced Australian Institute of Botanical Science. The new Institute will bring together science facilities and collections across all RBG Sydney and ABG sites, and significantly reduce travel times for our seed collectors who require access to the herbarium collections.

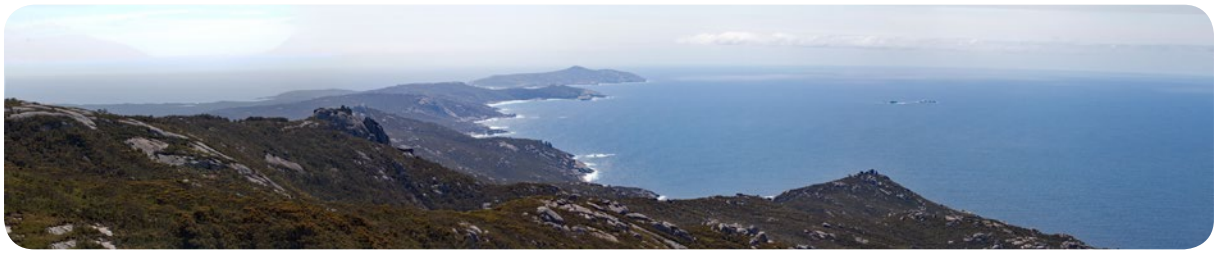
Western Australian Seed Centre, Kensington

Setback and success: collecting for the 1000 Species Project

On paper it might seem like a simple task, a walk of just over five kilometres in the Mount Manypeaks Nature Reserve to visit populations of the poorly known *Scaevola xanthina*, as well as a population of the threatened *Banksia verticillata*, with the aim of collecting seed. However, the reality on the ground was quite the opposite. An early start was made as the walk in was known to be a difficult in thick vegetation and a steep terrain. The first target was the *Banksia* and, although the going was slow, the population was easily found and a suitable collection made. That's when things became interesting.

It wasn't far – around 300 metres as the crow flies – from the *Banksia*'s location to where over a thousand plants of the *Scaevola* had been recorded five years earlier.

Scaevola xanthine remained elusive during this collecting season, with a population decline observed at Mount Manypeaks Nature Reserve. It is hoped that future collecting trips will result in a collection being made. (Photo: Andrew Crawford, DBCA)



The Mount Manypeaks Nature Reserve is located near Cheynes in the southern reaches of Western Australia. The reserve is home to an impressive array of wildflowers and was one of the focus areas for collecting this season. (Photo: Andrew Crawford, DBCA)

Finding the *Scaevola* shouldn't have been too difficult; the plants should have been flowering, the habitat where it was known to grow was restricted and clearly defined, and one of the previous finders of the population was present on the trip. Still, it took over half an hour to find the first plant. It was flowering, but there was no sign of fruit.

An extensive survey of the habitat located only thirty-two more plants. Only a few of these had small quantities of immature fruit, which did not warrant collection. Another population was then investigated and, where the species had previously been common, now only a single plant was found. As the return walk was expected to be tough, the decision was taken to abandon the search and return to the vehicle. With daylight fading, and 12½ hours after setting off, the vehicle was finally reached. The trip had secured a collection of *Banksia verticillata*, but unfortunately a seed collection of *Scaveola xanthina* was not to happen that day.

Despite the disappointment of the Mount Manypeaks trip, the rest of the 2018–19 seed collecting season was successful for the team from the Western Australian Seed Centre, Kensington. Collections were made from across south-western Australia, from the heights of the Stirling Ranges to the plains of the Western Australian wheatbelt. Over 100 seed collections of conservation-significant species were banked in the Threatened Species vault of the Western Australian Seed Bank, including collections of six threatened species and eight priority species, previously unrepresented in the *ex situ* collection.

Western Australia, Western Australian Seed Centre, Kings Park

Persistence pays off in seed lottery

This year the Botanic Gardens and Parks Authority (BGPA) delivered its final collections for the Millennium Seed Bank (MSB), representing an extraordinary partnership of 18 years. A total of 3,289 collections were sent from WA during that time, combining BGPA and the Threatened Flora Seed Centre contributions.

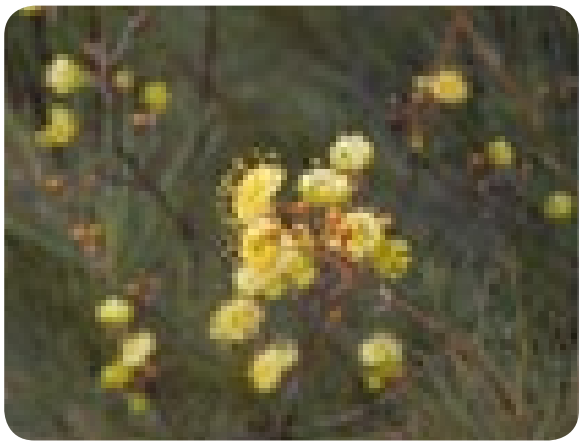
Some collections of tree species have proven to be more challenging to secure than others, with return visits required on multiple occasions to achieve a significant quantity of seed (up to six visits in one case). The collector often has to locate a species when flowering and then return when seed is available, always with the hope that it will be a great season.

This year, three species provided real challenges in this regard. *Grevillea gordoniana* is a spectacular tree growing to around 10 metres that favours red sand dunes from the north-west of WA to Shark Bay. The yellow ball-like flowers produce seed in late January, and these tend to rely on wind dispersal once mature. The first visit to the target population on the Useless Loop Road near Shark Bay was in October 2017 when the species was in flower. A significant seed collection was finally achieved in January 2019 just prior to a major wind event that would have scattered the seeds throughout the landscape. The result was 1,800 seeds delivered to the MSB at 98% viability.

Brachychiton acuminatus, the Pilbara Kurrajong, is a feature on the Burrup Peninsula, and had eluded collection over the last 18 years due to lack of fruiting pods on any of the trees surveyed. This changed last year when every single tree in the region burst into life, flowering in August and then setting fruit in November. A return trip in January 2019 yielded a major collection from the area of over 20,000 seeds at 98% viability. This was the first collection of seeds of this species ever made by Kings Park and a welcome addition to the collection.

The third challenging species was *Banksia seminuda*. This medium-sized tree can reach 15 metres, growing along waterways in the south-west of WA amongst the Karri forests. After looking at hundreds of trees over five years and finding no fruiting cones, the temptation to give up on collecting seed from the species was looming. However, a timely tip-off from the nurseryman in Denmark shire led to the discovery of a population with a large number of heavy, intact fruits. This resulted in 2,500 seeds at 98% viability being collected to send to the MSB in July 2019. Additionally, persistence in the cleaning process of banksias has paid off, with extraction of almost all seeds now possible from cones that were previously discarded too early.

Persistence with the task will almost always yield a good result eventually.



Grevillea gordoniana near Shark Bay, WA. (Photo: Luke Sweedman, BGPA)

Banksia seminuda near Denmark WA, December 2018. (Photo: Luke Sweedman, BGPA)

Northern Territory

A year of successful collecting in the Top End

During the final collecting season for the Global Trees Seed Bank Project, collectors from George Brown Darwin Botanic Gardens conducted field work across the Top End, from Kakadu and Litchfield National Parks to Judbarra / Gregory National Park, located approximately 450 km south-west of Darwin. The team was able to make some valuable contributions towards the 1000 Species targets for the Partnership, securing collections of 21 species new to the Millennium Seed Bank, including a number of species of conservation significance.

A species of particular interest this year was *Acacia repens*, which is a low, semi-prostrate, spreading shrub with narrow, bright green, whorled phyllodes and yellow, globular inflorescences. It is known only from two locations – Jasper Gorge in the Northern Territory and the Carr Boyd Range in north-east Western Australia. The species is currently listed as Data Deficient under the Northern Territory Parks and Wildlife Conservation Act (1976). Collectors from the GBDBG seed bank found this rare species during field work in June and October 2018 while scrambling over rocks and rubble on broken sandstone pavements and terraces at Jasper Gorge. *Acacia repens* flowers and fruits continuously over several months, but the thin, papery pods split quickly, making seed collection particularly challenging.

Isotropis faucicola was the second Northern Territory species of note collected this year. This short-lived, small, spindly shrub is known only from scree slopes below sandstone escarpments near the Victoria River in the northern portion of Judbarra / Gregory National Park. Due to its restricted distribution and small populations, it is currently listed as Near Threatened under the *Northern Territory Parks and Wildlife Conservation Act (1976).*

The third species that created some excitement this year was *Helicteres tenuipila*. This is a low, multi-stemmed spreading shrub, endemic to sandy, Eucalyptus woodland slopes of Litchfield National Park, approximately 100 km south west of Darwin. The species is also listed as Near Threatened under the *Northern Territory Parks and Wildlife Conservation Act (1976).*

The GBDBG seed bank team managed to secure seed collections of these three rare species, as well as a further six species of conservation significance during the 2018–2019 collecting season. These precious seeds will be banked in long-term conservation storage at GBDBG Seed Bank and the Millennium Seed Bank in the UK.

Acacia repens in Judbarra/ Gregory National Park, NT. (Photo: Ben Wirf, GBDBG)

FUTURE DIRECTIONS

The Australian Seed Bank Partnership is working towards **a future where Australia's native plant diversity is valued, understood and conserved for the benefit of all**. As part of our ambitious program of work, we will focus on the following activities in 2019–2020.

Australasian Seed Science Conference 2020

Scientific conferences are essential forums for sharing scientific advances in the fields of plant conservation, integrated conservation management, agricultural cropping, cultural seed banking and landscape restoration. In 2016 we held the very successful National Seed Science Forum at the Australian Botanic Gardens, Mt Annan. Since then we have received overwhelming support from researchers and practitioners to convene another seed science-focused forum to enable them to remain engaged with rapid advances throughout the sectors that rely on cutting-edge seed science.

In recognition of the expanding interest in seed science throughout the region, the Australian Seed Bank Partnership is rebranding the National Seed Science Forum to be the Australasian Seed Science Conference. The conference will be hosted by the Australian National Botanic Gardens in Canberra, Australia as part of its 50th Anniversary celebrations, with the plenary sessions and workshops held at the Kambri Centre and Research School of Biology at the Australian National University.

The conference will commence on the afternoon of Sunday, 5 April 2020 with tours of the Gardens and National Seed Bank followed by a welcome reception to formally open the proceedings. The main science program will take place on Monday 6 and Tuesday 7 April 2020. Workshops and field trips will follow on Wednesday 8 and Thursday 9 April respectively.

AUSTRALASIAN
Seed Science
Conference

Four Themes will guide the development of the Conference Program:

Seed biology – Unlocking the challenges of germination, dormancy and seed ecology in a changing world.

Seed sourcing and end use – Considering genetic diversity, restoration and translocations as well as sector specific approaches to seed conservation and use.

Seed and gene bank management – The ins and outs of managing *ex situ* seed banks and gene banks and the methods for maximising seed quality and longevity.

Seeds in culture and society – Sharing stories and learning about cultural seed use, including collaborations between traditional use and *ex situ* seed banks and gene banks.

We are also pleased to be able to announce our International Keynote speaker for the Conference. Dr Si-Chong Chen – an ecologist working on the macroecological patterns in seed ecology at the Millennium Seed Bank of the Royal Botanic Gardens, Kew, UK – will present her work on latitudinal gradients in seed predation, seed defence and seed dispersal.

We look forward to once again welcoming multi-disciplinary seed scientists from around Australia and overseas to join us for another exploration of the fascinating discoveries made by the diverse and exceptional seed science community.

More information is available on the conference website: https://seedscience2020.com.au.

Securing resources for seed conservation

During the past year, the Partnership has sought to develop collaborative and sustainable approaches to fundraising that complement the funds raised through grants for specific conservation and research projects. Most of the botanic gardens involved in the Partnership have staff dedicated to fundraising and to developing partnerships with external philanthropic organisations and businesses. The expertise and skills already available

in botanic gardens provides a unique opportunity for the Partnership to develop multi-jurisdictional approaches to improve funding opportunities around the country. Over the next 12 months, we will be exploring ways to capitalise on the diversity of skills within the Partnership to improve our ability to conserve the diversity of the Australian flora through ex situ seed conservation.

Resourcing for seed conservation covers a great diversity of activities – from collecting in the field to conducting research and capturing images of the incredible diversity of Australia's native species. (Photo: Brook Clinton).

Seed Banking Australia – Australia Post Stamp Release

The Partnership has worked with Australia Post to develop a set of special-issue stamps for release in October 2019. The set of three stamps include seed images of *Petrophile latericola* from Western Australia; *Rytidosperma clelandii* from South Australia, and *Epacris petrophila* from the ACT. The stamps will be used to raise awareness of the importance of seed banking for Australia's threatened flora, and to draw attention to the significant collaborations nationally and internationally that help to secure native species in seed banks for future restoration and research. The seed stamps and associated products will be available for purchase from Australia Post outlets and online from 8 October 2019.

The Seed Banking in Australia release will feature three $1.00 stamps, first day cover, maxicard set, three booklets of ten $1.00 stamps and a booklet collection of the featured Australian native species. (Photo: Dan Duval, BGSH; Andrew Crawford, DBCA; Brook Clinton, ANBG and Sonia Young, Australia Post).

Florabank Guidelines review and the Healthy Seeds Project

The Partnership congratulates the Australian Network for Plant Conservation for securing funding to deliver two major seed-focused projects over the coming years – the review of the Florabank Guidelines as part of the Healthy Seeds Project and the review of the Germplasm Guidelines.

The Healthy Seeds Project will engage practitioners, researchers and conservation groups in implementing more sustainable practices for seed sourcing and use with the aim of reducing pressure on natural populations and ecosystems. This project will improve seed sourcing and use throughout the Sydney basin, and produce a model that one day could be replicated Australia-wide. As part of the project, the Florabank Guidelines review will ensure that the latest information is made available to practitioners about the methodologies for seed germination, storage and use. The ANPC's other project will focus on reviewing the Germplasm Guidelines. The project will deliver an important update to this widely respected resource, which has helped to guide seed and other germplasm conservation efforts for many years. Updates to the guidelines will take into account various advances in technology and knowledge about germplasm conservation, and will provide the sector with practical advice and guidance for years to come.

The Partnership will contribute to both projects, imparting knowledge from seed conservation experts and researchers

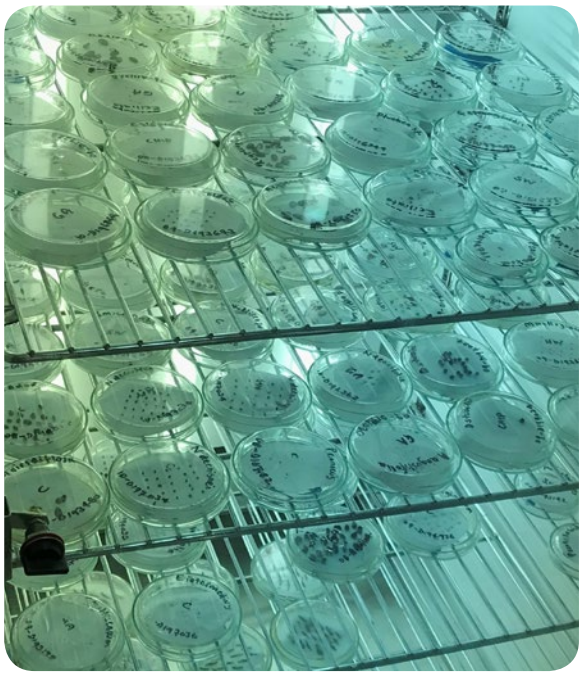
across the country, and contributing to the development of updated guidance for the seed conservation community. We look forward to collaborating with the plant conservation community on these two important projects in the years ahead.

Alice Springs Desert Park

In May this year, Dr Elinor Breman and the National Coordinator visited Alice Springs Desert Park to meet with the seed bank staff and explore options for their inclusion in the Partnership. Prior to 2010, the Alice Springs Desert Park received funding, equipment and capacity-building support through the Millennium Seed Bank Project. Since then, the team at the Alice Springs Desert Park have continued their work to collect and germinate seed from the surrounding arid landscapes. It was great to see that the collections made so many years ago continue to remain viable with nearly 1,000 germination tests having been completed in recent years – a significant achievement for any seed bank. The Partnership will continue to share knowledge and provide opportunities for building capacity in seed conservation and research with the staff at the Alice Springs Desert Park. We hope that, as future funding becomes available, we can partner with the seed bank on nationally-focused seed collecting projects.

Managing our data to support better conservation outcomes

The Partnership continues to collect and manage data related to the collection and storage of native seeds, including germination data. Providing open access to accurate data is an ongoing commitment of the Partnership. It is imperative that we continually seek to improve the data we collect and share through the Australian Seed Bank online. We will continue to share data and support opportunities for collaboration across the botanical, conservation and restoration communities. The Partnership welcomes the ongoing support of the *Atlas of Living Australia* to host the Australian Seed Bank online. This long-term association ensures data from the collection and germination of seed can be shared, retrieved and utilised by the seed science and conservation sectors.



Storing seeds in the right conditions is crucial to ensuring their long term viability. Drying seeds to approximately 15% relative humidity and storing in foil bags at -18°C can help prolong the life of some seeds for many years. Germination testing is also important, as it helps seed conservation experts to know whether a seed collection is viable. In many cases, these tests can take several months as we attempt to understand what treatments are required in order to break either physiological or morphological dormancy. (Photos: Damian Wrigley, ASBP)

HOW YOU CAN HELP

The Australian Seed Bank Partnership is committed to working collaboratively to secure a future where native species continue to exist in-situ. To achieve this, we believe it is critical that we continue to build on Australia's ex-situ seed collections of native species. Sharing our knowledge and strategically directing our resources are some of the best ways we can contribute to the pressing need to realise better plant conservation outcomes.

Botanic Gardens and conservation organisations around the country have the skills and expertise needed to conserve our threatened species. Collaborations among these organisations are innumerable. They rely on the dedication and commitment of the plant conservation community – a community constantly striving to achieve better outcomes for Australia's threatened species. These efforts and collaborations take time and resources and we are seeking your help to support us in these endeavours.

With your help, we can continue to grow our national effort to conserve Australia's native plant diversity by collaborative and sustainable seed collecting, banking and research, and by sharing our knowledge about Australian plants across the equally diverse plant conservation community. With your help, we can make a difference.

Dan Marges, Jenny Owen, Werner Stur, Jeanette Jeffery and Elinor Breman, collecting DNA samples during a Global Trees collecting trip to Norfolk Island in February 2019. The ANBG relies on their incredible 'Seedy Vols' to collect, clean, store and test a diversity of species collected across a geographic range that extends from Norfolk Island in the Pacific Ocean to the searing heat of Kakadu National Park, the freezing heights of the Australian Alps, and across the continent to the tropical forests of Christmas Island in the Indian Ocean. (Photo: Tom North, ANBG)

Volunteers are our seed life savers

Collecting and banking native seed is an incredibly rewarding experience. However, a lot of work goes into ensuring we're banking the right seeds in the best possible conditions. Our collectors devote significant time to identify target species and plan collecting trips to coincide with seed-set across a diversity of species. They also spend several weeks a year in the field making collections. In addition to the time in the field, many weeks are dedicated to cleaning, drying and cataloguing seeds and herbarium specimens. Germination trails are also conducted for every species we collect, to ensure seeds are actually viable and therefore worth storing in the bank.

All of this work relies not only on the work of paid staff but also of dedicated volunteers within the Partnership. Our volunteers also help to raise awareness and encourage community support for plant conservation by contributing to the Partnership's website and social media.

The help of volunteers throughout all stages of seed conservation is invaluable. We are grateful for the wonderful support of our volunteers. We thank you. We couldn't possibly achieve all we do without you.

If you are interested in becoming a volunteer, or would like to find out more about how you can help, please visit our website or contact us atcoordinator@seedpartnership.org.au.

Donating to the Australian Seed Bank Partnership is a simple way for you to contribute to better conservation outcomes for Australia's threatened plants. The Partnership welcomes donations of any size and can work with you to design a package of support that suits your interests. Your donation will help ensure that future generations continue to benefit from the diversity of Australia's unique landscapes.

If you would like to donate to the Australian Seed Bank Partnership, contact our National Coordinator on +61 (0) 2 6250 9473 or email: coordinator@seedpartnership.org.au.

Donations of more than $2 are tax-deductible

ANNUAL FINANCIAL REPORT for the year ending 30 June 2019

The Australian Seed Bank Partnership is a trading name of The Council of Heads of Australian Botanic Gardens Incorporated (CHABG), as well as its primary conservation program. CHABG is an association incorporated under the *Australian Capital Territory Associations Incorporation Act 1991*, an Act administered by the Office of Regulatory Services in the ACT. CHABG, a charitable institution endorsed by the Australian Taxation Office, is also endorsed as a deductible gift recipient under Subdivision 30-BA of the *Income Tax Assessment Act 1997* for the operation of the 'Council of Heads of Australian Botanic Gardens Public Fund'.

The financial report contained within this annual report also includes financial statements for CHABG's other program activities.

Statement by the Management Committee

for the year ended 30th June 2019

In the opinion of the Management Committee of CHABG Inc

the attached financial statements and notes thereto comply with Accounting Standards

the attached Income Statement is prepared so as to give a true and fair view of the Financial Performance of the association for the year ended 30th June 2018

the accompanying Balance Sheet is prepared so as to give a true and fair view of the Financial Position of the association as at 30th June 2019

there are reasonable grounds to believe that the CHABG Inc. will be able to pay its debts as and when they fall due and payable

that no officer of this association, or any firm of which an officer is a member, or any body corporate in which an officer has a substantial financial interest has received or is entitled to receive any benefit from a contract with this association, nor has any officer received any direct or indirect pecuniary benefit from this association.

SIGNED In accordance with a resolution of the Management Committee

This 29th day of January 2020
On behalf of the Management Committee

.....
(Name: Dale Arvidsson)
(Position: Chair, CHABG)

.....
(Name: Alan Barratt)
(Position: Secretary, CHABG)

CHABG Inc

Annual Financial Statements

2018/2019

Independent Auditor's Report

for the year ended 30th June 2019

To the Members CHABG Inc

Scope
The financial report and management committee's responsibility

The Management Committee are responsible for the financial report, being a special purpose financial report, that gives a true and fair view of the financial position and performance of CHABG Inc, for the year ended 30th June 2019 and that it complies with Accounting Standards in Australia. This includes responsibility for the maintenance of adequate accounting records and internal controls that are designed to prevent and detect fraud and error, and for the accounting policies and accounting estimates inherent in the financial report.

The Management Committee have determined that the accounting policies used are consistent with the financial reporting requirements of the *CHABG Inc*, and are appropriate to meet the needs of the members.

The financial report comprises the balance sheet, income statement, accompanying notes to the financial statements, and the management committee's statement, for CHABG Inc.

Audit Approach

I conducted an independent audit of the financial report in order to express an opinion on it to the members of the association. The audit was conducted in accordance with Australian Auditing Standards in order to provide reasonable assurance as to whether the financial report is free of material misstatement. The nature of an audit is influenced by factors such as the use of professional judgment, selective testing, the inherent limitations of internal control, and the availability of persuasive rather than conclusive evidence.

Therefore, an audit cannot guarantee that all material misstatements have been detected.

I performed procedures to assess whether in all material respects the financial report presents fairly, in accordance with the *Associations Incorporation Act 1991*, including compliance with Accounting Standards in Australia, and other mandatory financial reporting requirements in Australia, a view which is consistent with our understanding of the association's financial position, and of its performance as represented by the results of its operations, changes in equity and cash flows.

I formed my audit opinion on the basis of these procedures, which included:
> Examining, on a test basis, information to provide evidence supporting the amounts and disclosures in the financial report

> Assessing the appropriateness of the accounting policies and disclosures used and the reasonableness of significant accounting estimates made by the committee.

While I considered the effectiveness of management's internal controls over financial reporting when determining the nature and extent of my procedures, my audit was not designed to provide assurance on internal controls. I performed procedures to assess whether the substance of business transactions was accurately reflected in the financial report.

These and my other procedures did not include consideration or judgment of the appropriateness or reasonableness of the business plans or strategies adopted by the management committee of the association.

Independence

I am independent of the association, and have met the independence requirements of Australian professional ethical pronouncements and the *Associations Incorporation Act 1985*. I have given to the management committee of the association a written auditor's independence declaration, a copy of which is included in the financial report. In addition to my audit of the financial report, I was engaged to undertake the services disclosed in the notes to the financial statements. The provision of these services has not impaired my independence.

Qualification

As is common for organisations of this type, it is not practicable for the management committee to maintain an effective system of internal control over its cash income prior to initial entry into the accounting records. Accordingly, my audit in relation to these items was limited to the amounts recorded in the books and records for the financial year and I therefore am unable to express an opinion whether proceeds of cash income obtained are complete.

Audit Opinion

In my opinion, except for the effects on the financial report of such adjustments, if any, as might have been required had the limitation on my audit procedures referred to in the qualification paragraph not existed, the financial report of CHABG Inc, is in accordance with:

a) The Associations Incorporation *Act 1991*, including:

i. Giving a true and fair view of the financial position of CHABG Inc and of its performance for the year ended on 30 June 2019

ii. Complying with Accounting Standards in Australia and the Associations Incorporations *Act 1991*

b) Other mandatory financial reporting requirements in Australia.

Signed this the 21st day of January 2020

.....

Tony Thimboli - CPA

Auditor's Declaration of Independence
for the year ended 30th June 2019

To the Management Committee of CHABG Inc.

I declare that, to the best of my knowledge and belief, there have been no contraventions of:

(i) The auditor independence requirements of the *Associations Incorporation Act 1991* in relation to the audit

(ii) Any applicable code of professional conduct in relation to the audit.

Signed this the 21st day of January 2020

.....

Tony Trimboli - CPA

CHABG Inc. Statement of Expenditure and Income

	2018–19	2017–18
Income		
Membership Contribution - Annual Subscription		13,000
Membership Contribution - Data Curation		44,150
Membership contribution - Cost reimbursement	3,182	
Donation		
Reimbursement New Zealand - Seed Conservation Training		2,554
Grant Funding - Royal Botanic Gardens Kew - Fieldwork Funds		81,860
Grant Funding - Royal Botanic Gardens Kew - Global Trees		276,550
Grant Funding - Royal Botanic Gardens Kew - C4 Grasses		31,447
Grant Funding - Royal Botanic Gardens Kew - Wild Crop Relatives		39,378
National Seed Science Forum Revenue		
Interest	361	336
Total Income	**3,543**	**489,275**
Expenditure		
General Expenditure	13,593	3,098
Data Curation	10,150	34,000
New Zealand - Seed Conservation Training		2,833
Dept of Environment - Phytophthora Research		
Grant Funding - Royal Botanic Gardens Kew - Fieldwork Funds	2,608	79,288
C4 Grass Collectionns - Royal Botanic Gardens Kew Funds	20,964	
Grant Funding - Royal Botanic Gardens Kew - Global Trees	157,203	112,653
Grant Funding - Royal Botanic Gardens Kew - Wild Crop Relatives	11,488	13,612
Total Expenditure	**216,006**	**245,484**
Surplus/Deficit	**(212,463)**	**243,791**

CHABG Inc. Balance Sheet

	2018–19	2017–18
Current Assets		
Deposit account 224159	133,196	321,266
Deposit account 224167	152,157	134,746
Sundry Debtor	500	2,000
ATO - GST refundable	3,580	921
Total Assets	**289,433**	**459,133**
Liabilities		
Sundry Creditors	42,763	
ATO - GST Payable		
Net Assets	**246,670**	**459,133**

Equity	(549,133)	(215,342)
Surplus/Deficit for year	212,463	(243,791)
Retained earnings	**(246,670)**	**(459,133)**

GOVERNANCE OF THE AUSTRALIAN SEED BANK PARTNERSHIP

The Management Committee of The Council of Heads of Australian Botanic Gardens Incorporated (CHABG Inc.) draws on the expertise of senior executives from Australia's capital city botanic gardens, who guide the strategic direction of the Partnership's work to ensure it addresses national plant conservation priorities and contributes to international conservation targets.

Members of the Management Committee of the Council in 2018–19 were:

Prof Tim Entwisle – Director and Chief Executive, Royal Botanic Gardens Victoria (CHABG Chair November 2015–October 2018)

Mr Dale Arvidsson – Curator, Brisbane Botanic Gardens (CHABG Chair, October 2018-present)

Mr Alan Barrett – Chief Executive Officer, Botanic Gardens and Parks Authority (Kings Park)

Mr Gary Davies – Director, Royal Tasmanian Botanical Gardens

Mr Bryan Harty – Director, George Brown Darwin Botanic Gardens

Dr Brett Summerell – Executive Director, Royal Botanic Gardens and Domain Trust

Dr Lucy Sutherland – Director, Botanic Gardens and State Herbarium, South Australia

Dr Judy West – Executive Director, Australian National Botanic Gardens.

We would like to recognise the contribution of **Dr Peter Cuneo**, Manager, Seedbank and Restoration Research, PlantBank, Royal Botanic Gardens and Domain Trust and **Tory Ross**, Business Enterprise and Marketing Manager, Royal Tasmanian Botanical Gardens.

Tim Entwisle

Dale Arvidsson

Alan Barrett

Gary Davies

Bryan Harty

Brett Summerell

Lucy Sutherland

Judy West

The Australian Seed Bank Partnership grew out of the Royal Botanic Gardens, Kew's Millennium Seed Bank Project, which supported Australian institutions to help achieve the Project's goal of banking 10 per cent of the world's plant species by 2010. We continue to support Kew's endeavour to bank 25 per cent of the world's flora by 2020.

The Partnership program is carried out in collaboration with our partner organisations (see page 41). Other organisations (our Associates) assist with individual projects that contribute to the overall program (see page 40).
The program is managed by a National Steering Committee and led by the National Coordinator provided by the Director of National Parks (through the Australian National Botanic Gardens).

The Australian Seed Bank Partnership is supported by financial and in-kind contributions (e.g. scientific expertise, project management, fieldwork, information management, promotion and marketing) from partner and associate organisations, through philanthropic and public donations and the generous time commitment from many dedicated volunteers. Our business plan outlines our national program, which includes specific strategies, actions and timelines for achieving our vision: http://seedpartnership.org.au/about/reports.

The golden flowers of *Acacia* sp. El Sharana located in Kakadu National Park in the Northern Territory. The species is often found in disturbed areas on track verges. (Photo: Ben Wirf, GBDBG)

National Coordinator Australian Seed Bank Partnership

Mr Damian Wrigley

The role of the National Coordinator is to provide strategic leadership and program management to oversee the implementation of the Partnership's business plan, policy and operations. The Coordinator works with the members of the Partnership to secure the necessary funds for operations and programs that will realise the business plan for the Partnership.

Grevillea olivacea seed and fruit (Photo: Andrew Crawford, DBCA)

National Steering Committee

The National Steering Committee brings together a team of leading experts from the members of the Partnership, who help deliver real plant conservation outcomes. These experts range from seed scientists, botanists, taxonomists and ecologists to horticulturalists and plant conservation ambassadors.

Phlegmatospermum eremaeum is a small annual herb found in open mallee in calcareous clay or loam throughout the north-eastern and central parts of South Australia. The species is also found in Victoria and Western Australia. The pods are a pale brown containing very small, hard seeds. Seeds from this species were collected from the Clements Gap Conservation Park in South Australia. (Photo: Dan Duval, BGSH)

Members of the National Steering Committee during 2018–19 were:

Dr Elinor Breman – Program Coordinator, Millennium Seed Bank Partnership, Royal Botanic Gardens, Kew, UK

Ms Samantha Craigie – Senior Ecologist, Greening Australia (March 2019-present)

Dr Andrew Crawford – Committee Member, Australian Network for Plant Conservation; Seed Bank Manager, Western Australian Seed Centre, Kensington, Department of Biodiversity, Conservation and Attractions, Western Australia

Dr Peter Cuneo – Manager, Seedbank and Restoration Research, PlantBank, Royal Botanic Gardens and Domain Trust, New South Wales

Mr Ross Demuth – Senior Botanic Officer and Seed Bank Manager, Brisbane Botanic Gardens, Mt Coot-tha, Queensland

Mr Dan Duval – Seed Research Officer, South Australian Seed Conservation Centre, Botanic Gardens and State Herbarium, South Australia

Mr Graeme Errington – Seedbank Curator, PlantBank, Royal Botanic Gardens and Domain Trust, New South Wales

Dr Paul Gibson Roy – Lead Scientist Eastern Australia, Greening Australia (July 2018-February 2019)

Dr Jenny Guerin – Seed Research Officer, South Australian Seed Conservation Centre, Botanic Gardens and State Herbarium, South Australia

Dr David Merritt – Senior Research Scientist, Western Australian Seed Centre, Kings Park, Botanic Gardens and Parks Authority, Western Australia

Dr Andre Messina – Botanist, Royal Botanic Gardens Victoria, Victoria

Mr Tom North – Seed Bank Curator, Australian National Botanic Gardens, Australian Capital Territory

Mr Luke Sweedman – Curator, Western Australian Seed Technology Centre, Botanic Gardens and Parks Authority, Western Australia

Mr Neville Walsh – Senior Conservation Botanist, Royal Botanic Gardens Victoria, Victoria

Mr Ben Wirf – Nursery / Seedbank Manager, George Brown Darwin Botanic Gardens, Northern Territory.

Mr James Wood – Seed Bank Manager, Royal Tasmanian Botanical Gardens, Tasmania

The 2019 face-to-face meeting of the Steering Committee involved several workshops to refine future priorities across seed banks and to identify possible options for projects that could be developed to deliver further collecting, research, data management and capacity building within the Partnership. (Photo: Damian Wrigley, ASBP).

Following the Steering Committee meeting, Partners joined Bryan Harty and Ben Wirf in the field to collect species from Litchfield National Park. This was the first time that we had six Partners represented in the field together. Opportunities like these are rare, but are incredibly important for the sharing of skills and techniques and to improve our understanding of the diverse and often endemic Australian flora. Ben Wirf is checking seed quality of *Helicteres tenuipila* prior to the Partners collecting more seeds of the species for the GBDBG seed bank. (Photo: Damian Wrigley, ASBP).

THANK YOU—SUPPORTERS AND ASSOCIATES

The Australian Seed Bank Partnership would like to thank all our supporters and Associates. Your resources and in-kind support have made significant contributions to our mission to conserve Australia's native plant diversity over many years.

As the decade draws to a close, we look forward to working with our supporters and Associates and to continuing these collaborations well into the future. The combined efforts of the Partnership staff, volunteers and supporters is paramount to seeing us achieve our vision of a future where Australia's native plant diversity is valued, understood and conserved for the benefit of all.

Supporters

- Millennium Seed Bank Partnership, Royal Botanic Gardens, Kew
- Director of National Parks (Australian Government)
- Garfield Weston Foundation
- The Crop Trust

The flower and fruit of *Melaleuca* sp. Wanneroo. In 2018 this species was nominated and assessed for listing under the *Environment Protection and Biodiversity Conservation Act (1999)*. The species was included in the list of endangered species in the first week of July 2019. Seed from this species is held in the seed bank at the Western Australia Seed Centre in Kensington. (Photo: Andrew Crawford, DBCA).

Rhodanthe collina in flower. (Photo: Luke Sweedman, BGPA)

Associates

- Atlas of Living Australia
- Australian Government Department of the Environment and Energy
- Australian Grains Genebank
- Botanic Gardens of Australia and New Zealand Inc.
- Centre for Australian National Biodiversity Research
- CSIRO
- Global Crop Diversity Trust
- Grains Research and Development Corporation
- Kakadu National Park
- **Plant Health Australia**
- Society for Ecological Restoration Australasia
- University of New England

Volunteers

- Anna Moreing

PARTNER ORGANISATIONS OF THE AUSTRALIAN SEED BANK PARTNERSHIP

Australian Network for Plant Conservation Inc. (ANPC)

Australian PlantBank The Royal Botanic Gardens and Domain Trust (RBGDT)

Brisbane Botanic Gardens Conservation Seed Bank Brisbane City Council (BBG)

George Brown Darwin Botanic Gardens Parks and Wildlife Commission of the Northern Territory (GBDBG)

Greening Australia (GA)

Millennium Seed Bank Partnership Royal Botanic Gardens, Kew (RBG Kew)

National Seed Bank Australian National Botanic Gardens, Parks Australia (ANBG)

South Australian Seed Conservation Centre Botanic Gardens and State Herbarium, South Australia (BGSH)

Tasmanian Seed Conservation Centre Royal Tasmanian Botanical Gardens (RTBG)

The Victorian Conservation Seedbank Royal Botanic Gardens Victoria (RBGV)

The Western Australia Seed Centre Kings Park, Botanic Gardens and Parks Authority (BGPA)

The Western Australian Seed Centre Kensington, Department of Biodiversity, Conservation and Attractions, Western Australia (DBCA)

1. *Polycalymma stuartii*
2. *Amaranthus cuspidifolius*
3. *Spergularia tasmanica*
4. *Pycnosorus pleiocephalus*
5. *Sclerolaena blackiana*
6. *Rumex brownii*
7. *Osteocarpum acropterum* var. *acropterum*
8. *Picris squarrosa*
9. *Nicotiana velutina*
10. *Polygala glaucifolia*
11. *Gonocarpus humilis*
12. *Rhodanthe anthemoides*
13. *Senna planitiicola*
14. *Rutidosis helichrysoides* ssp. *helichrysoides*
15. *Portulaca filifolia*
16. *Logania crassifolia*
17. *Pandorea pandorana*
18. *Osteocarpum pentapterum*
19. *Minuria gardneri*
20. *Omphalolappula concava*
21. *Stellaria angustifolia* ssp. *angustifolia*

Australian Seed Bank Partnership
c/o Australian National Botanic Gardens
GPO Box 1777
Canberra ACT 2601
Australia

ABN: 58153442365

Contact: Damian Wrigley
t: +61 (0) 2 6250 9473
e: coordinator@seedpartnership.org.au

www.seedpartnership.org.au/

CHABG Inc. (trading as the Australian Seed Bank Partnership) is dedicated to supporting the protection, conservation and enhancement of Australian plants and their ecosystems. CHABG Inc. relies on support for the Australian Seed Bank Partnership Program and its other programs to achieve its vision of a future where native plant diversity is valued, understood and conserved for the benefit of all. Please help us to conserve Australia's unique flora and plant communities today and for the future. CHABG Inc. is a charitable institution, with deductible gift recipient status (item 1), and operates the Council of Heads of Australian Botanic Gardens Public Fund.