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BOTANIC GARDENS OF SYDNEY



LIVING COLLECTIONS STRATEGY 2023+

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Remnant Forest Red Gum (*Eucalyptus tereticornis*), growing at the heart of the Australian Botanic Garden Mount Annan. J. Plaza

ACKNOWLEDGEMENT OF COUNTRY

We acknowledge that the Gardens are significant historical, ceremonial and traditional trade grounds for the local Gadigal, Dharawal and Darug peoples.

We pay respect to all Elders and Traditional Custodians of these lands and waters on which our Gardens sit, including their continuous custodianship, protection and management of these sacred lands.

We will continue to promote understanding and celebration of First Nations science, knowledge and cultural practices.

Aboriginal and Torres Strait islander cultures are the oldest living continuous cultures in the world. Botanic Gardens of Sydney will ensure that all visitors acknowledge that this land always was, always will be, Aboriginal land.



The orchid collection at the Royal Botanic Garden Sydney is accessible to the public through tours of the Nursery glasshouses. J. Plaza

FOREWORD

August 2023

Botanic Gardens are unique places where passion and purpose combine to grow opportunities and deliver truly remarkable outcomes. Botanic Gardens of Sydney’s living collections are the foundational element of our three Botanic Gardens, the Australian PlantBank, public spaces and the Australian Institute of Botanical Science. They enable our organisation to offer exceptional visitor experiences, and the critical science and conservation horticulture we need to safeguard plants for future generations.

The sourcing, curation and use of the living collections are guided by dedicated experts, working collaboratively to ensure they underpin every facet of what we do, and contribute to global advances in horticultural and science practices. The living collections are the setting and the substance of immersive and inspirational displays and spaces that make our Botanic Gardens well-loved and highly valued by the community as places for education, enjoyment and wellbeing. At the same time, they sit at the very heart of our research, science and conservation action for the recovery of threatened species, and the restoration of our precious and threatened ecosystems.

This Living Collections Strategy (the Strategy) is the first step in elevating our custodianship of comprehensive, representative, resilient and expertly curated living collections across the three Botanic Gardens, The Domain Sydney and the Australian PlantBank. The Strategy outlines the goals and outcomes that will ensure the living collections retain their integrity, and continually develop and improve to meet future needs. This will ensure a culturally safe, sustainable approach that facilitates meaningful partnerships and strengthens our contribution to local and global plant conservation endeavours.

The Strategy presents a roadmap for our efforts over the coming years to complement the fundamental science and research priorities of the Australian Institute of Botanical Science. A targeted Action Plan and Living Collections Policy will be developed over the next twelve months to support the Strategy. Through its implementation, Botanic Gardens of Sydney is committed to the stewardship of unique and diverse plant collections from Australia and around the world. We are dedicated to developing our living collections so that they remain resilient to the changing environment and provide a global legacy that supports generational change, lasting reconciliation through genuine collaboration, and the conservation of our essential biodiversity.

As we embark on this exciting new chapter for Botanic Gardens of Sydney and our unique living collections, we invite you to join us. Together, as agents of change, we can champion a world where plant conservation is front of mind — the cornerstone of a healthier, fairer and more sustainable future for all.



Denise Ora
Chief Executive



John Siemon
Director, Horticulture & Living Collections

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Our living collections are key to our delivery of critical science and conservation horticulture for future generations.

Orange Mistletoe (*Dendrophthoe glabrescens*). A. Orme

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OUR VISION

People, communities, institutions and industries are informed and inspired by our Botanic Gardens, public spaces and the Australian Institute of Botanical Science, and are motivated to recognise the importance of plants in their lives and to support their conservation.

The Royal Botanic Gardens and Domain Trust's Vision, 2023

The Living Collections and Records team maintains records for over 280,000 plants and undertakes a rolling stocktake of the collections across the three Botanic Gardens and The Domain Sydney. S. Daniel

INTRODUCTION

As Australia's oldest continually operating scientific and horticultural organisation, Botanic Gardens of Sydney has led the development of knowledge about plants — their cultivation, biology, documentation and conservation — for more than 200 years. Today, our living collections engage a diverse audience, nationally and internationally.

These collections are held across the 732 hectares that comprise the Royal Botanic Garden Sydney, Australian Botanic Garden Mount Annan, Blue Mountains Botanic Garden Mount Tomah and The Domain Sydney (The Domain) and also stored within the Australian PlantBank (PlantBank). The sourcing, curation and use of the collections is informed by the preserved collection, and associated databases, held at the National Herbarium of New South Wales and the Research Centre for Ecosystem Resilience.

The living collections are central to the organisation's core functions and strategic objectives, and the Living Collections Strategy — prepared by drawing on the vast expertise and knowledge within Botanic Gardens of Sydney — provides the framework for a plan of action to curate our collections to the highest international standards.

Figure 1 illustrates the seven outcomes that were identified to frame the Strategy and how it relates to the principle objects of the *Royal Botanic Gardens and Domain Trust Act 1980* (NSW).

This document brings together information about the living collections and the themes used to categorise them, providing snapshots of relevant data that support curation and help track provenance and current use. The quality of the current collections is assessed using various criteria including taxonomic diversity, biogeographical diversity, wild origin, provenance, extinction risk and presence in the PlantBank collections. These criteria will be updated over time as botanical knowledge improves and data collection and curation practices evolve.

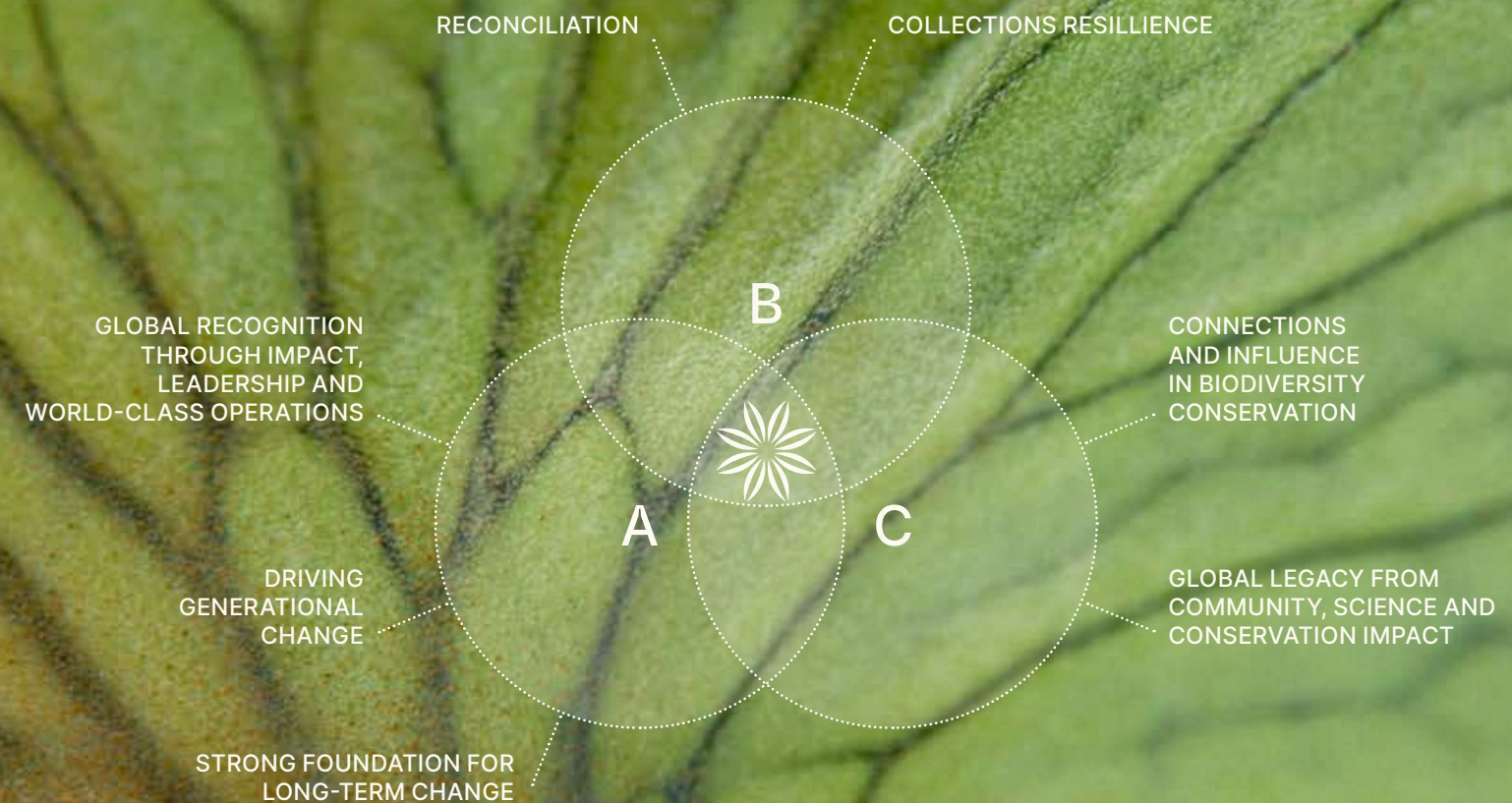
Botanic Gardens of Sydney aims to generate and promote solutions to critical environmental challenges facing all life on Earth, and to improve the quality of peoples' lives through meaningful connections to the inspiring Botanic Gardens, The Domain, First Nations cultural history and the wider world of plants. Our organisation will continue to build its influence, communicate and share its expertise, and ensure its ongoing relevance and sustainability. Moreover, through determined efforts and collaboration, it will maximise its impact and protect and evolve our precious gardens and cultural heritage for future generations through world-leading horticulture, science, education and visitor experiences.

In line with our vision to deliver horticultural, scientific and educational experiences that engage and inspire, an ambitious and interdisciplinary approach to the development and management of the collections is planned, with continual digital transformation, upgrading systems and databases. Staff will be able to manage living collections and associated records anywhere, any time, on any device, for every service to deliver world-leading horticultural and botanical services and benefits to a diversity of stakeholders.

A new governance model will be developed in year one of the Strategy's implementation to oversee the execution of the Living Collections Policy, as well as the resourcing and implementation of the Living Collections Strategy.

Seven outcomes underpin the Living Collections Strategy and support the principle objects of the *Royal Botanic Gardens and Domain Trust Act 1980*.

Figure 1
The seven outcomes of the Strategy in relation to Botanic Gardens of Sydney's principle objects.



Botanic Gardens of Sydney's principle objects are to:

- [A] maintain and improve Trust lands, the National Herbarium of New South Wales and the collections of living and preserved plant life owned by the Trust,
- [B] increase and disseminate knowledge about the plant life of Australia, and of New South Wales in particular, and
- [C] encourage the public use and enjoyment of Trust lands by promoting and increasing the educational, historical, cultural and recreational value of these lands.

Staghorn Fern (*Platyserium superbum*). J. Plaza



LIVING COLLECTIONS

Over 18,000 plants create a spectacular vertical garden in The Calyx. This living artwork sets the stage for inspiring horticultural exhibitions at the Royal Botanic Garden, J. Plaza

1.1 What is a Living Collection?

A living collection is an assemblage of plants curated, data-based and grown/stored for defined purposes, including reference, research, conservation, education or ornamental display. Living collections include nursery-potted collections and other live germplasm — such as seeds, embryos, tissue cultures, freeze-dried fungi and cultures of symbiotic organisms — held in long-term storage for future use. For the purposes of this Strategy, Botanic Gardens of Sydney's living collections include all plants and germplasm that are currently accessioned in databases*.

For visitors to botanic gardens, the living collections and associated interpretation inform their understanding of the role of botanic gardens, providing a tangible representation of the horticulture, science, conservation and education undertaken by these organisations. As such, living collections act as ambassadors for wild and in situ populations, creating unique opportunities for visitors to engage with species and concepts, and inspiring emotional connections to the natural world.

* Please note that the natural areas within Botanic Gardens of Sydney lands will be addressed in accompanying and complimentary environment management plan(s) to be developed in the coming years.

1.2 Why a Living Collections Strategy?

The purpose of the Strategy is to present a 20-year vision and roadmap for the existing and future living collections held by Botanic Gardens of Sydney. It will provide strategic direction across the various gardens and facilities, ensuring that the acquisition, curation and use of the living collections is conducted in a cohesive and coordinated manner to deliver on the intended outcomes.

Botanic gardens globally are undergoing a transformation of purpose. Traditionally, botanic gardens were seen as places for pleasure and enjoyment, though nowadays botanic gardens internationally are multifaceted organisations contributing to global biodiversity conservation and education efforts, while giving due consideration to appropriate and respectful cultural recognition.

Botanic Gardens of Sydney will use this Strategy to provide meaningful and valued contributions to local, national and global efforts to conserve and understand our flora, improving opportunities for the people of New South Wales (NSW) and beyond, to engage with and learn about plant conservation. The Strategy, in combination with the Living Collections Policy, and other relevant policies and procedures, will enhance curation methods and the use of the collections, ensuring compliance with all relevant legislation and respect for cultural lore.

1.3 Outcomes, Strategic Goals and Action Plan

Botanic Gardens of Sydney will use the Living Collections Strategy to achieve the following outcomes and strategic goals. An Action Plan developed in close consultation with staff will guide implementation, and will be finalised within the first year of the Strategy. Figure 2 illustrates how the Action Plan will underpin the strategic goals and outcomes of the Strategy, supporting the realisation of Botanic Gardens of Sydney's vision.

Deliver living collections that are comprehensive, representative, resilient and expertly curated across Botanic Gardens of Sydney, and available to support conservation, research, education and cultural connections at a local, national and global level.

Mount Dangar Wattle (*Acacia dangarensis*). J. Plaza

LIVING COLLECTIONS



Outcome Statement

Deliver living collections that are comprehensive, representative, resilient and expertly curated across Botanic Gardens of Sydney, and available to support conservation, research, education and cultural connections at a local, national and global level

Figure 2
The strategic framework that will underpin the acquisition, curation and use of Botanic Gardens of Sydney living collections.

Outcomes

Strong foundation for long term change

Driving generational change

Global recognition through impact, leadership and world class operations

Reconciliation

Collections Resilience

Connections and influence in biodiversity conservation

Global legacy from community, science and conservation impact

Strategic Goals

Empower staff to deliver exemplary custodianship, curation and display of comprehensive and diverse living collections that are held in trust for future generations

Champion the significant horticultural, scientific and cultural values of the living collections by facilitating appropriate use by a diversity of stakeholders

Provide sustainable solutions for managing living collections in the face of climate change and other environmental threats through conservation horticulture, and using our information, expertise and technology

Implement a robust Living Collections Policy and associated methodologies and procedures that underpin operations, to facilitate appropriate and beneficial acquisition and future use of living collections

Deliver world-class and widely-sought specialist horticultural, botanical and scientific services and expert advice, facilitating conservation of local and global species, including metacollection development

Create globally recognised and inspirational botanic gardens, facilities and public spaces, that support community health and well-being, and inform and motivate people to support the conservation and sustainable use of plants

Celebrate and embed First Nations cultural protocols, knowledge and perspectives in all aspects of the organisation's living collections activities

Lead through the delivery of best-practice data curation, labelling and interpretation and support multi-naming capabilities for culturally significant species in the living collections, enabling greater cultural connections at a local, national and global level

Safeguard the long-term resilience of living collections to ensure they thrive under future environmental changes, embedding resilience as a key consideration across all aspects of the organisation including resourcing, asset design and management, succession planning, integrated irrigation and water management, education and engagement, and staff development

Secure major digital advances and requisite technology to support innovation in living collections management, and maintain long-term systems resilience to support diverse, comprehensive and representative living collections

Curate a representative collection of all New South Wales native plant species, optimising genetic diversity to support their future conservation and restoration in the wild

Use the living collections to support the management of natural areas for regional biodiversity conservation, and as a resource to facilitate ecological restoration

Build and maintain accessible collections that support the functions of Botanic Gardens of Sydney, including contemporary and future science and horticulture requirements, and the conservation of local and global species

Horticulture

Agents of change: Elevating the influence of local, national and global botanic gardens by exemplifying best practice nursery operations; living collections curation, display, exhibition and interpretation; records management; and material and knowledge exchange

Reconciliation and lifelong learning

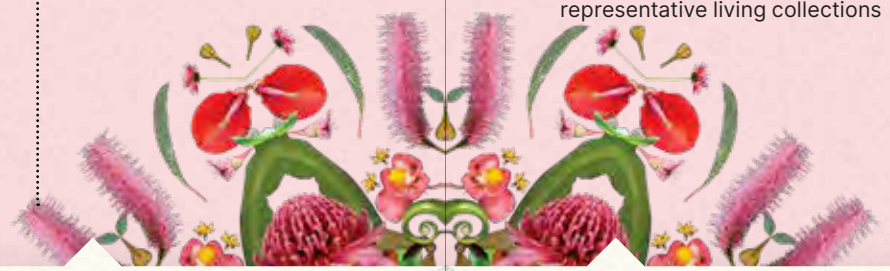
Inspiring visitors and stakeholders by embedding traditional knowledge that makes connections to Country through interpretation, education and engagement

Science

Major contributions to knowledge, understanding and documenting of plants through the Australian Institute of Botanical Science

Conservation

Proactive and responsive to species at threat: helping mitigate risks of extinction with long term species conservation plans and strengthening of healthy and resilient populations and ecosystems, through conservation horticulture, provision of plants and/or associated knowledge, and detecting new incursions of invasive species and pathogens



Priority Actions

To be developed as part of the Action Plan during year one of the Living Collections Strategy



LIVING COLLECTIONS

1.4 Responsibilities and Accountabilities

The Living Collections Strategy underpins the operations of Botanic Gardens of Sydney as they relate to the living collections held across the three Botanic Gardens, The Domain and PlantBank. While the Chief Executive and the Royal Botanic Gardens and Domain Trust's Board of Trustees are accountable for the Strategy's implementation, the Director of Horticulture and Living Collections will be responsible for its execution.

The Manager, Living Collections and Conservation, will guide implementation in collaboration with the curators and managers of horticulture, science, conservation, education, interpretation and engagement, including the teams that support them. Advice on implementation will be sought from the Australian Institute of Botanical Science Advisory Committee when required.

A Living Collections Working Group, in addition to associated governance procedures and approaches to support the Action Plan, will be developed during year one of Strategy implementation.

The delivery of the Strategy will be achieved within the context of the existing legislation, policies and procedures of Botanic Gardens of Sydney, with special consideration of the Living Collections Policy.

1.5 Monitoring, Evaluation and Reporting

The success of the Living Collections Strategy will be contingent on the effective implementation of the Action Plan and an understanding of the Strategy's impact on the sourcing, management and use of living collections across the organisation. A monitoring, evaluation and reporting framework will be developed during year one of the Strategy to help ensure it adequately enables the organisation to deliver on its purpose. It will apply a theory of change to support the identification of key collections, implementation of actions, empower leadership and retain agility in the delivery of the Strategy.



The Palm collection at the Royal Botanic Garden holds an important selection of threatened species that are Critically Endangered or Extinct in the Wild, including *Dypsis ambositrae*. J. Plaza

CONTEMPORARY CONSIDERATIONS

Destined for rewilding or ex situ conservation, threatened species including this Vulnerable (EPBC Act) *Macrozamia conferta* are propagated at the Australian Botanic Garden nursery. J. Plaza

The importance and impact of Botanic Gardens of Sydney will escalate over the coming decades. There is a sense of urgency that has not been seen on this scale before, and the destabilisation of natural systems and processes will continue to challenge, direct and inform the work of Botanic Gardens of Sydney and the Australian Institute of Botanical Science.

Denise Ora, Chief Executive

The Proteaceae collection is harvested to create inspiring floral displays in the Blue Mountains Botanic Garden Visitor Centre. J. Plaza

CONTEMPORARY CONSIDERATIONS

2.1 Australia's First Peoples

Botanic Gardens of Sydney recognises that Australia's understanding of plants and their environments is informed by tens of thousands of years of knowledge embedded in the culture and lore of Australia's First Peoples. This includes the cultural understanding of plant taxonomy, ecology and ecosystem engineering, and how these have influenced the management and maintenance of our landscapes.

The three Botanic Gardens and The Domain are sites that hold deep significance for local Aboriginal communities. With this in mind, Botanic Gardens of Sydney is committed to reconciliation through embedding Aboriginal and Torres Strait Islander cultural protocols, knowledge and perspectives in all aspects of its business activities, and through encouraging and facilitating interactions between staff, volunteers, and visitors, and First Nations peoples and cultures.

The First Nations Engagement Strategy and the Innovate Reconciliation Action Plan (RAP) highlight the commitment to meaningful and authentic avenues for learning, collaboration and support of all First Nations communities, cultures and Country.

The organisation is committed to the major shift required to decolonise botanical science and support First Nations' narratives and communications. This work will require deep discussions and negotiations, leading to the evolution of a reconciliation pathway that draws strength from different cultural, conservation, and scientific concepts, provides for meaningful access and benefit sharing arrangements, and enables Botanic Gardens of Sydney to be recognised for the value it contributes to the Australian and global community.

2.2 New South Wales

Botanic Gardens of Sydney is a major contributor to the State's agenda on science, conservation and biodiversity management, biosecurity, climate change, reconciliation, tourism and education, in addition to city greening and community health and well-being. The organisation is responsive to the needs of society, using its internationally recognised expertise to influence, advise and inform government and non-government policies and priorities, including those pertaining to local, state, national and global matters.

The organisation intends that its information, knowledge and collections be discoverable globally, so it can enrich and support research, land management, conservation and learning for communities internationally as well as locally. It aims to achieve this by integrating its unique data holdings and enabling far-reaching benefits to be derived from the sharing and use of its collections, in line with culturally and legislatively appropriate considerations. Rapid changes in technology can easily outpace available investment for information technology systems in public institutions. A contemporary and future challenge for Botanic Gardens of Sydney will be to ensure it has the most appropriate and up-to-date technology support systems to facilitate the organisation's core functions and ensure broad accessibility to its botanical resources.

The three Botanic Gardens and The Domain provide important ecosystem services to the surrounding local government areas and provide exemplary green public spaces. Through their tree canopy and green cover, the Royal Botanic Garden and The Domain contribute to offsetting the heat island effect of the City of Sydney. Similarly, the Australian Botanic Garden, through its vast garden and landscape, contributes to offsetting the seasonal heat stress characteristic of south-west Sydney. These ecosystem services will need to be maintained and further enhanced during the succession planning of existing living collections, and the planning and development of new living collections.

As the organisation evolves, it will need to increase its investment in maintaining and improving existing staff skills and capacity, while attracting new capabilities and expertise to meet its future aspirations and requirements as a global leader in living collections curation, development and use.

CONTEMPORARY CONSIDERATIONS

2.3 National and International Collaborations

Botanic Gardens of Sydney works collaboratively with many organisations and partners to support plant conservation and research.

Nationally, the organisation invests expertise and resources in support of the Australian Network for Plant Conservation, the Australian Seed Bank Partnership, Botanic Gardens Australia and New Zealand, the Council of Heads of Australasian Herbaria, and the Council of Heads of Australian Botanic Gardens. These all contribute to the understanding and use of ex situ living collections through funded projects and ecological and other biological research, while also improving capacity and capability across the botanic gardens and seedbanking sector.

Internationally, Botanic Gardens of Sydney supports Botanic Gardens Conservation International and the Millennium Seed Bank Partnership. Additional targeted collaborations with individual botanic gardens, seedbanks and research institutions contribute substantially to global efforts to build capacity and improve plant conservation outcomes under the Global Strategy for Plant Conservation.

Collaborations at the national and international levels assist Botanic Gardens of Sydney to make new acquisitions of key taxa to incorporate into the living collections. They also provide opportunities for Botanic Gardens of Sydney to distribute accessions of priority living collections to local and overseas botanic gardens and seedbanks for research, or as an added insurance for their long-term conservation.

2.4 Australian Legislation and International Conventions

Botanic gardens are responsible for holding documented collections of living plants for the purposes of scientific research, conservation, display and education. With these collections come responsibilities for ensuring appropriate sourcing, management, and use. Australian native plants, and legislatively listed threatened species in particular, require careful consideration and preparations prior to their inclusion in any living collection. Relevant permissions, and access and benefit sharing arrangements, are required from land managers such as First Nations Peoples, as well as governments, with strict conditions governing the collection of plant germplasm and other material. The way in which Botanic Gardens of Sydney utilises and shares these collections ensures that any benefits arising are appropriately shared.

The health and resilience of the environment is a major driver for the international science and conservation agenda of contemporary botanic gardens. Over the past thirty years, through the United Nations and other instruments, guiding conventions have evolved to attempt to address global priorities and concerns. The various instruments that guide the custodianship and development of botanic gardens' living collections will be outlined in detail in the Living Collections Policy.

The unique ecologies of Botanic Gardens of Sydney's natural areas are protected through biosecurity measures including restricted access and hygiene protocols. J. Plaza



CURRENT LIVING COLLECTIONS

Coolgardie Gum (*Eucalyptus torquata*). J. Siemon

3.1 Collections Overview

For over two centuries, Botanic Gardens of Sydney has led new research and horticultural understandings about plants and their conservation, including the curation of accurate documentation and data.

Consequently, the organisation has a portfolio of mature and diverse collections across three Botanic Gardens as well as The Domain and PlantBank. These sites are in iconic and unique places — adjacent to Sydney Harbour, within the Blue Mountains World Heritage Area that contains the Blue Mountains Basalt Forest Endangered Ecological Community, and at Mount Annan, in an area that contains significant remnants of several endangered ecological communities, including the Cumberland Plain Woodland, a listed Critically Endangered Ecological Community. The living collections across these sites engage a diverse public audience, showcasing the organisation's work and expertise in horticulture, science, conservation, restoration, culturally appropriate practices, and lifelong learning and education opportunities.

The collections of living plants and living plant material are curated across 732 hectares at the Royal Botanic Garden Sydney (30 ha), Australian Botanic Garden Mount Annan (416 ha, including 130 ha of remnant natural bushland), Blue Mountains Botanic Garden Mount Tomah (18 ha of curated garden and 234 ha of natural areas and open spaces) and The Domain (34 ha).

The plant collections across the three Gardens are predominantly made up of a mix of temperate and sub-tropical species, with some cooler climate, sub-alpine species. PlantBank holds primarily native seeds from every state and territory across Australia. The facility has a floor space of 3,000 m² accommodating seed-cleaning and research laboratories, including a temperature-controlled seed-vault with a capacity of 190 m³ to accommodate a constantly growing collection.

3.2 Collections Themes

The living collections are held as garden plantings, nursery plants, tissue culture or as seeds, and are curated according to a specific theme or purpose. An 'in garden' collection can comprise seeds or tissue culture in PlantBank, plants growing together in a garden as part of a theme, or spread across different sites within an individual garden, or across more than one of the three Botanic Gardens, The Domain and PlantBank.

The living collections are currently classified in a broad sense under one or more of the following five themes:

Conservation and Research* — identified taxa known to be of conservation concern at local, state, national or global levels which require ex situ conservation and have the potential to raise awareness of the threats and consequences of loss, and to contribute to in situ conservation through translocation or other conservation efforts

Economic and Ethnobotanical — plants that are used by a particular culture or peoples, and those used, directly or indirectly, for the benefit of humankind

Plant Communities and Morphological — plants that can be organised in the living collections based on the plant communities they may be associated with, or based on their morphological characteristics

Heritage and Ornamental — plants or plantings that have an intrinsic historical/heritage or horticultural value such as the heritage camellia collection, or plants or planting displays for visitor engagement or aesthetic purposes

Taxonomic and Evolutionary — taxa that share common characteristics morphologically or genetically, or that demonstrate evolutionary change and adaption within a particular taxonomic group, e.g. genus/family/division.

* Research collections may be curated for a range of internal and external stakeholders including staff, students, honorary research associates and staff from other botanic gardens or scientific institutions.

Thematic collections held across the sites are currently recognised as having a strong bias towards the Taxonomic and Evolutionary theme. Throughout the implementation of this Strategy, Botanic Gardens of Sydney will focus on refining the representation of other themes, in particular the Economic and Ethnobotanical theme, to ensure adequate consideration is given to collections that hold significance to First Nations Peoples, including the way these are recorded, displayed and utilised.

Potential future collection themes that may be identified as priorities could include, among others yet to be identified:

Educational collections — developed with the core purpose of curriculum-based education, engagement and lifelong learning

Cultivars (horticultural 'varieties') — with characteristics that are unique to cultivation and serve important research, horticultural and educational roles

Dedicated trees — for collections that commemorate individuals, diverse events, or specific community or cultural dedications

Geographical/Ecological — taxa originating from a defined geographical area, or a particular ecological community, or which grow in a climatically aligned zone (i.e. a place that has similar temperature and rainfall patterns).



The extensive *Acacia* collection at the Australian Botanic Garden holds over 6,000 plants in themed garden plantings. J. Plaza

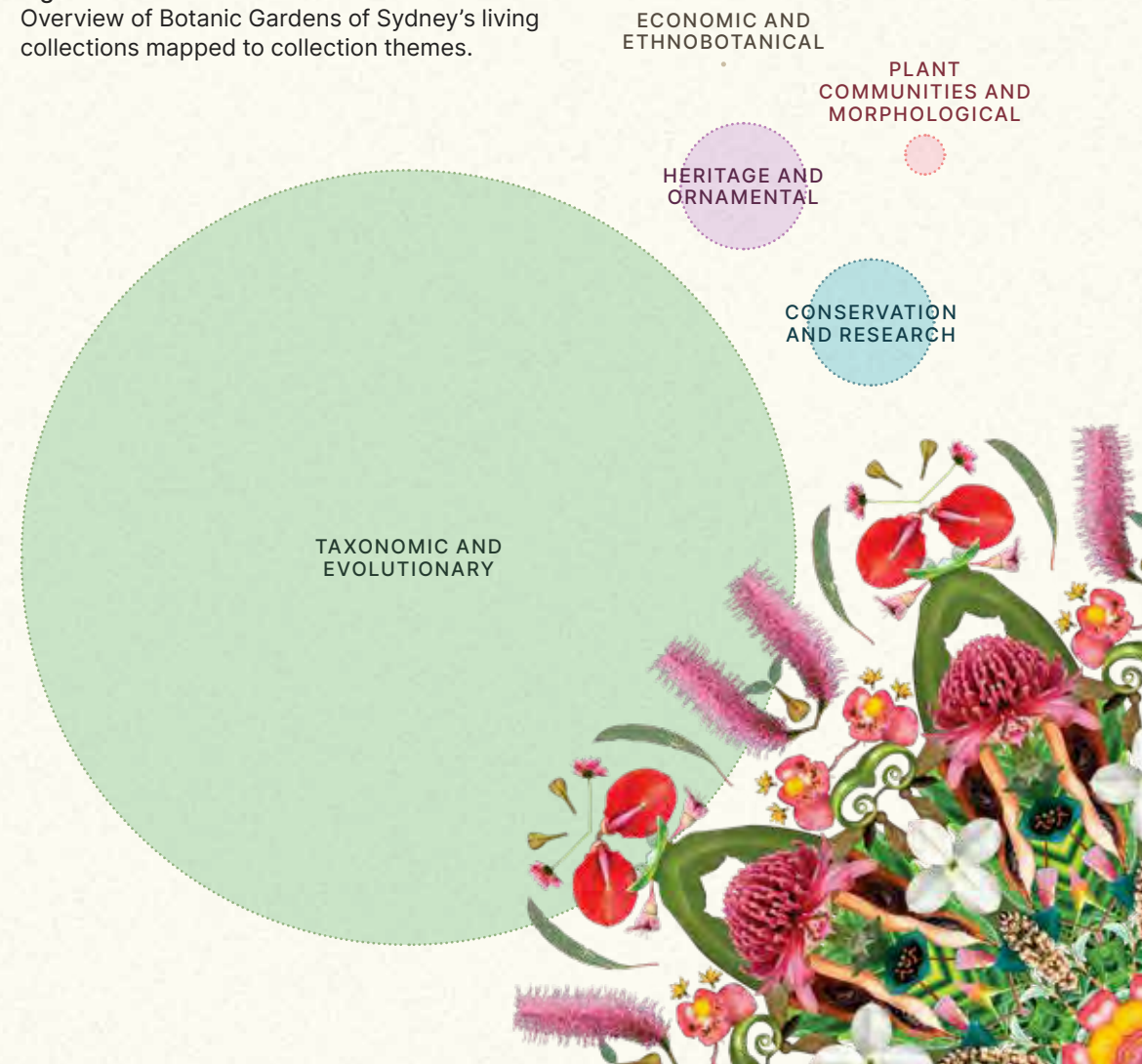
CURRENT LIVING COLLECTIONS

The great majority of key collections sit within the Taxonomic and Evolutionary theme, reflecting the importance placed on systematic botany in the principle objects of the *Royal Botanic Gardens and Domain Trust Act 1980*. The lower counts across the other identified themes, including the significant gap in collections identified as Economic and Ethnobotanical, is illustrative of the information recorded for key collections in IRIS BG. During implementation of the Strategy, Botanic Gardens of Sydney will focus on improving recognition and documentation of collections across the various identified themes to improve the accuracy of this data.

The importance of current and accurate data to the curation and use of our living collections cannot be understated. The risk of not prioritising our data and its curation is significant, as without it, the scientific and conservation value of our living collections can no longer be quantified.

A key priority for the organisation under this Strategy is to ensure that the data we collect and curate is comprehensive, correct, culturally safe, fit for purpose and taxonomically accurate. This can only be achieved by ensuring staff receive comprehensive training, have access to the latest scientific advances and horticultural practices, and are adequately supported by the most appropriate digital infrastructure.

Figure 3
Overview of Botanic Gardens of Sydney's living collections mapped to collection themes.



Australian PlantBank staff hand-pollinate flowers of the Vulnerable (EPBC Act) Blotched Butterfly Orchid (*Sarcochilus weinthalii*). K. Thomson.



The Strategy is fundamental to how Botanic Gardens of Sydney understands and curates its remarkable living collections. It will shape the maturity, diversity and direction of the living collections we hold, strengthen the expertise of our highly skilled and talented Conservation Horticulturists, and establish policies that drive and deliver outcomes for plant conservation.

John Siemon, Director, Horticulture & Living Collections

This Tallowwood (*Eucalyptus microcorys*) forms part of The Domain arboretum, a vital green space adjacent to the Sydney CBD. J. Plaza

3.3 Botanic Gardens of Sydney Living Collections

The 92 living collections are curated across Botanic Gardens of Sydney's three Botanic Gardens, The Domain, glasshouses, nurseries or PlantBank. These collections were identified through a review of Botanic Gardens of Sydney's IRIS BG database, alongside an audit of 'in-ground' collections, and in consultation with the Curator Managers across each of the three Botanic Gardens. These 92 collections have evolved over many decades and are the result of multiple influences, including the purpose of each individual Botanic Garden and PlantBank. Other factors that have influenced the development of the collections include providing visual amenity through horticultural display, scientific research, conservation, targeted and opportunistic acquisition of specimens through fieldwork, or donations made to the organisation. Of these, 24 are described as key collections (Appendix 1).

Key collections are defined as those identified as having significance to the organisation, the people of Australia and/or the international community for botanical, historical or cultural/heritage reasons, or for conservation and research purposes.

Figure 4
Top ten families represented in Botanic Gardens of Sydney's living collections, by number of accessions (Table 1).



The documented collections across all locations (as at 14 March 2023) contain 11,800 unique species comprising 75,588 accessions, and representing 12,573 taxa (Table 3). Some 2,716 species are represented in more than one of the sites (including The Domain and PlantBank), either due to their suitability across a range of climates or horticultural conditions, for research and conservation, or as a test or display of their environmental resilience and adaptability.

Figure 5
Top ten genera represented in Botanic Gardens of Sydney living collections, by number of accessions (Table 2).

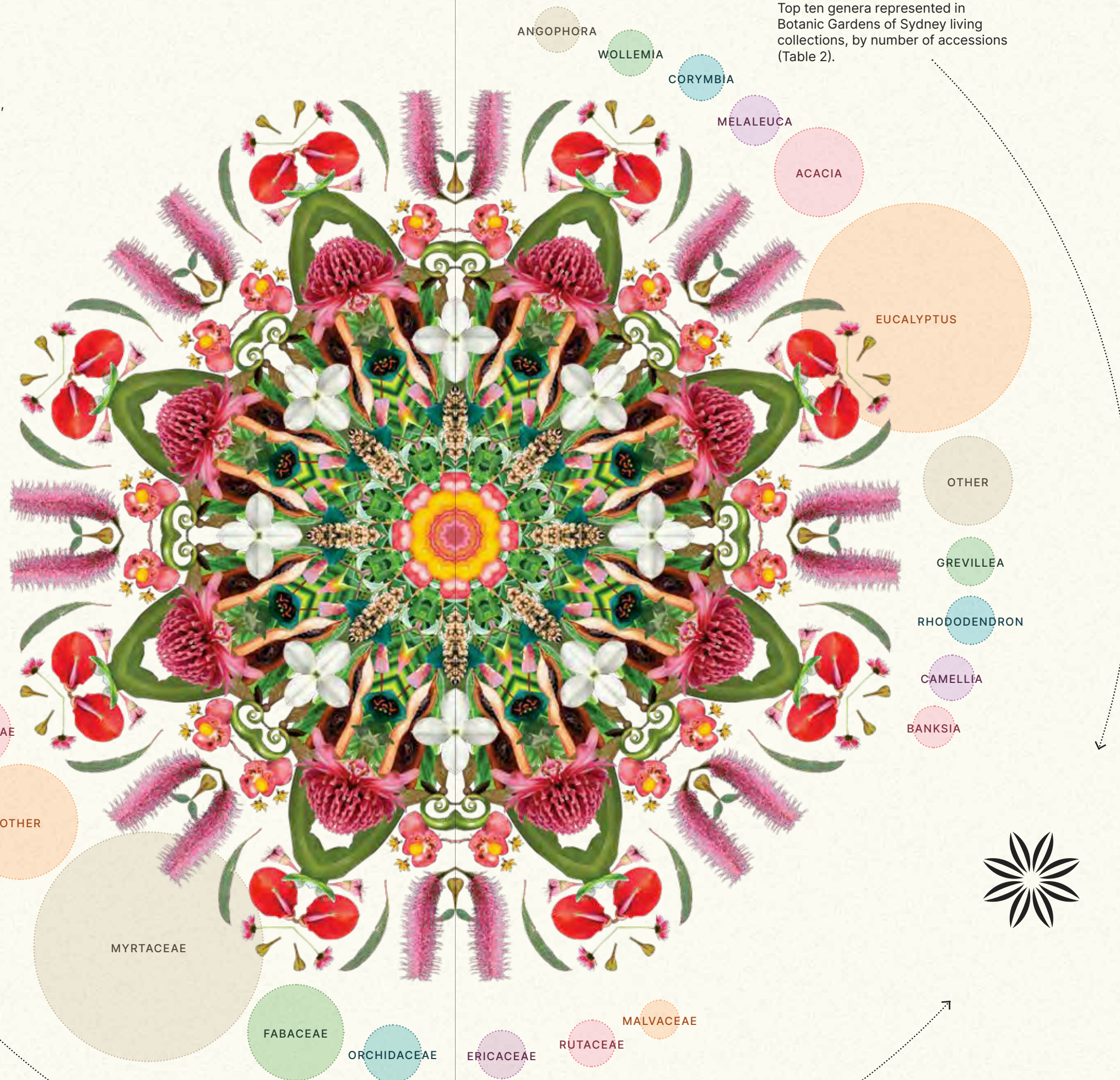


Table 1
Top ten families represented in Botanic Gardens of Sydney's living collections, by number of accessions (Figure 4).

Total accessions across sites

Myrtaceae
14,813

Fabaceae
9,214

Proteaceae
3,828

Orchidaceae
2,001

Asteraceae
1,583

Ericaceae
1,419

Arecaceae
1,407

Rutaceae
1,096

Lamiaceae
1,069

Malvaceae
921



Genetically diverse Wollemi Pines (*Wollemia nobilis*) are propagated and distributed across the globe, creating a meta-collection to secure the future of this Critically Endangered (IUCN Red List) species. J. Plaza

Royal Botanic Garden Sydney

Arecaceae
1,208

Orchidaceae
1,112

Myrtaceae
576

Bromeliaceae
552

Asparagaceae
441

Proteaceae
425

Lamiaceae
415

Theaceae
399

Fabaceae
311

Araceae
309

The Domain Sydney

Myrtaceae
234

Proteaceae
194

Lamiaceae
87

Arecaceae
78

Fabaceae
68

Asparagaceae
61

Asteraceae
59

Asphodelaceae
43

Rutaceae
43

Moraceae
42

Australian Botanic Garden Mount Annan

Myrtaceae
9,218

Fabaceae
6,435

Proteaceae
1,785

Araucariaceae
485

Malvaceae
455

Rutaceae
441

Meliaceae
385

Casuarinaceae
290

Goodeniaceae
246

Scrophulariaceae
203

Blue Mountains Botanic Garden Mount Tomah

Myrtaceae
951

Ericaceae
939

Amaryllidaceae
623

Proteaceae
498

Asteraceae
374

Iridaceae
366

Sapindaceae
286

Asparagaceae
261

Theaceae
254

Hydrangeaceae
253

Australian PlantBank

Myrtaceae
3,834

Fabaceae
2,224

Proteaceae
926

Asteraceae
740

Orchidaceae
726

Rutaceae
342

Casuarinaceae
249

Poaceae
241

Malvaceae
234

Solanaceae
189

Table 2
Top ten genera represented in
Botanic Gardens of Sydney's living
collections, by number of accessions
(Figure 5).

Total accessions
across sites

Eucalyptus	8,580
Acacia	7,631
Melaleuca	1,635
Grevillea	1,473
Corymbia	882
Rhododendron	824
Angophora	767
Banksia	664
Camellia	636
Wollemia	590

Glorious autumn colour at the Blue Mountains
Botanic Garden featuring Dawn Redwoods
(*Metasequoia glyptostroboides*) and Northern
Red Oak (*Quercus rubra*). J. Plaza

Royal Botanic Garden Sydney	The Domain Sydney	Australian Botanic Garden Mount Annan	Blue Mountains Botanic Garden Mount Tomah	Australian PlantBank
Camellia	Banksia	Acacia	Eucalyptus	Eucalyptus
391	126	6,160	775	2,137
Rhododendron	Eucalyptus	Eucalyptus	Rhododendron	Acacia
249	80	5,539	556	1,317
Dendrobium	Grevillea	Melaleuca	Narcissus	Melaleuca
225	46	1,100	501	437
Grevillea	Angophora	Grevillea	Acer	Hakea
198	45	984	281	274
Rosa	Acacia	Corymbia	Camellia	Leptospermum
179	43	666	239	267
Bulbophyllum	Ficus	Angophora	Hydrangea	Allocasuarina
174	42	655	177	218
Neoregelia	Howea	Melia	Paeonia	Banksia
159	34	374	129	192
Begonia	Lomandra	Brachychiton	Veronica	Corymbia
150	33	365	126	172
Salvia	Leptospermum	Wollemia	Erica	Grevillea
141	25	349	124	168
Aloe	Salvia	Callistemon	Dahlia	Solanum
138	25	294	112	154

Table 3
Summary of Botanic Gardens of Sydney's living collections (as at 14 March 2023). Table excludes 'Least Concern' and 'Data Deficient' species. *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) and NSW Threatened Species Scientific Committee numbers are based on the lists available on the Species Profile and Threats Database managed by the Australian Government (accessed on 14 March 2023).

Categories	Royal Botanic Garden Sydney	The Domain Sydney	Australian Botanic Garden Mount Annan	Blue Mountains Botanic Garden Mount Tomah	Australian PlantBank	Total including Australian PlantBank
Recognised number of living collections	46	2	77	57	N/A	182
Living taxa	4,939	568	2,563	3,207	5,387	12,573
Living families	238	103	136	206	183	300
Living genera	1,640	338	559	1,045	1,055	2,629
Living species (excl. cultivars)	4,795	520	2,563	3,058	5,028	11,800
Cultivars	2,390	315	684	2,872	8	5,608
International Union for Conservation of Nature – Red List of Threatened Species	372	25	224	134	276	796
EPBC List of Threatened Flora	80	4	218	46	318	425
(NSW) Threatened Species Scientific Committee – List of Threatened Species	51	6	204	58	433	480
Total living accessions	12,405	1,409	39,253	9,349	13,172	75,588
Total living specimens (i.e. number of individual plants)	65,617	11,058	155,748	68,111	excluded from total: 206,697,302	300,534
Wild Origin	2,102	229	34,299	2,996	12,506	69% of all accessions: 52,132
Garden Wild Origin	74	0	521	36	303	1.2% of all accessions: 934
Garden Origin	7,640	679	3,629	5,154	129	22.8% of all accessions: 17,231
Unknown Origin	2,589	501	789	1,163	234	7% of all accessions: 5,276

CURRENT LIVING COLLECTIONS

The areas known as the Royal Botanic Garden and The Domain are located on the land of the Gadigal people, containing sites of great cultural and historical significance. The recorded foundation date of the Royal Botanic Garden is 13 June 1816, making it the oldest botanic garden in Australia and the third oldest in the southern hemisphere. Both the Royal Botanic Garden and The Domain are listed on the NSW State and National Heritage Registers.

Royal Botanic Garden Sydney

Following colonisation, the Royal Botanic Garden was used initially as an acclimatisation garden and is the birthplace of Australia's European-style agricultural and horticultural practices. Since this time, the Garden has also played a critical role in distributing Australian flora for use in other collections worldwide. Botanic Gardens of Sydney acknowledges that First Nations Peoples nurtured and managed the land, sea and sky for thousands of years prior to colonisation.

The Royal Botanic Garden covers an area of 30 hectares and is dominated by an extensive tree canopy which accounts for 39% of the collections. The remaining collections are located in full sun or in specimen plantings in open lawns and open spaces. The heavily planted areas dominate the middle gardens, leading out to larger borders and shrubberies nearer to Sydney Harbour and The Domain, surrounding the southern and eastern sides of the Garden.

A key horticultural feature of the Royal Botanic Garden is The Calyx, one of the largest vertical gardens in the southern hemisphere. The Calyx is regularly transformed to showcase native and exotic species, using sensory experiences tied into a central theme to engage and educate visitors about the importance of plant science and conservation.

The Royal Botanic Garden has 46 defined living collections, of which seven are key collections. Five of these are based on taxonomic themes: begonia, ferns, orchids, palms and Zingiberales. Cycads are held under the 'Conservation and Research' theme and the camellia collection within the 'Heritage and Ornamental' theme (Figure 3, Appendix 1).

The Domain Sydney

The Domain is a 34 hectare, heritage-listed public space. Like the Royal Botanic Garden, The Domain's heritage listing determines various considerations regarding its management, including several of relevance to this Strategy and future living collections development, for example:

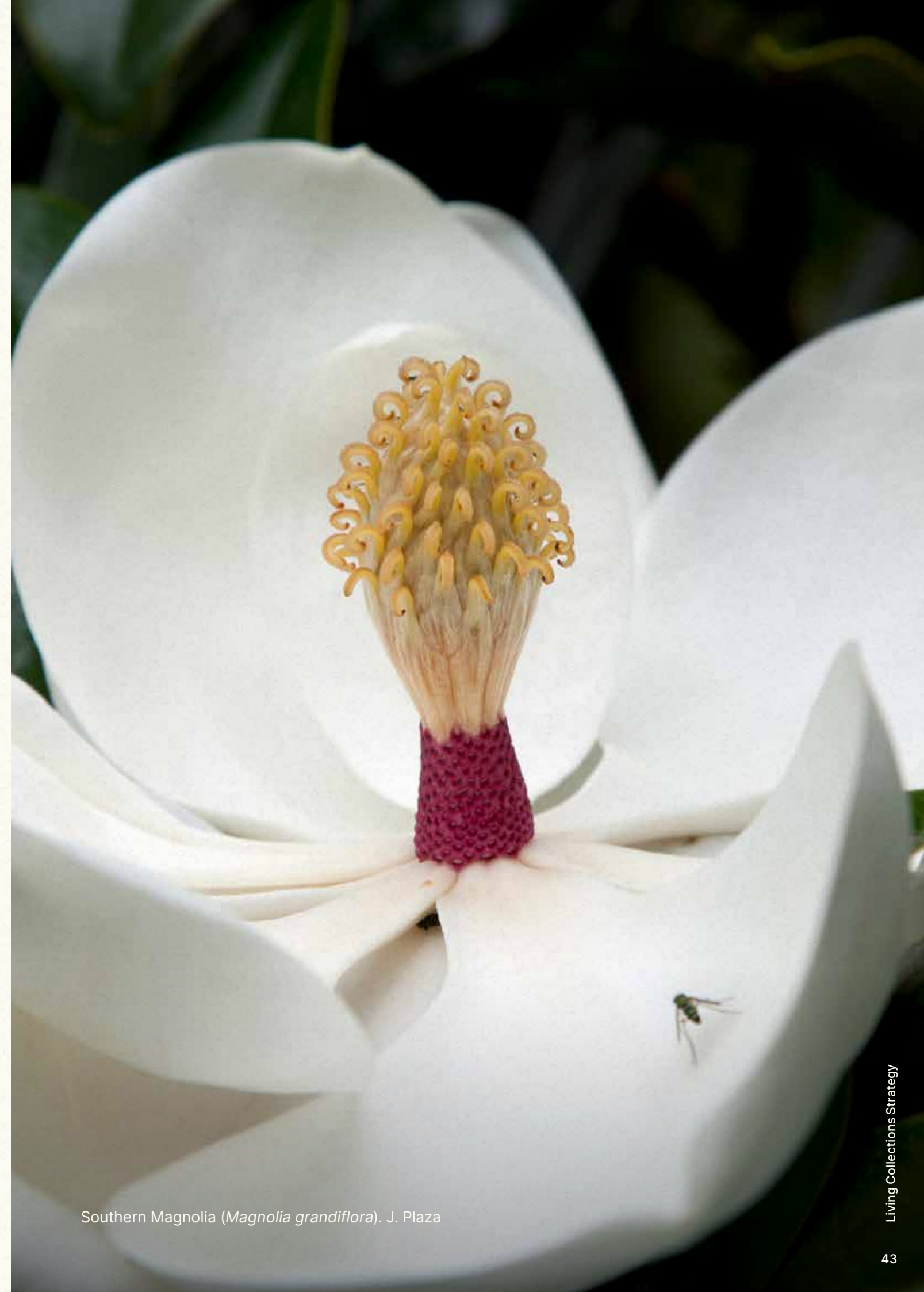
.....
the minimisation of any impact on views from the higher areas of The Domain and Art Gallery of New South Wales
.....

.....
the preservation of views that connect the area to precincts beyond the boundaries, from the upper Domain levels down to Woolloomooloo and Woolloomooloo Bay
.....

.....
the enhancement of views across The Domain from St Mary's Cathedral.
.....

The character of The Domain is primarily shaped by plantings of large evergreens trees such as Moreton Bay Fig (*Ficus macrophylla*), Australian Teak (*Flindersia australis*), Canary Island Date Palm (*Phoenix canariensis*) and Hoop Pine (*Araucaria cunninghamii*) that collectively form part of its heritage significance. Many of the trees are native to New South Wales and date back to the 1800s, when they were planted on an experimental basis. A feature of The Domain's tree collection is its diversity — featuring 159 species including 17 species of palms. Overall, The Domain has 2,430 specimen trees, including several individuals thought to be remnant of the original pre-European vegetation of the site. More than one third (35.5%) of The Domain's tree collection is sourced from known wild provenance.

The Domain has one key collection; The Domain Arboretum (Appendix 1). The Domain Rewilding is an initiative under active development, aiming to achieve regeneration of an area using wild provenance material, and to showcase the original flora of the Sydney Harbour foreshore bushland community. A decision on how this area will be managed in relation to the living collection will be made in year one of the Strategy's implementation.



Southern Magnolia (*Magnolia grandiflora*). J. Plaza

Visitors can engage in recreation and explore the diverse living collections and beauty of the natural and cultivated landscapes.



Grass Parrot (*Psephotus haematonotus*) among Annan Stars (*Rhodanthe anthemoides* 'Annan Star') and Cut Leaf Daisy (*Brachyscome multifida* 'Metallic Blue') at the Australian Botanic Garden. G. Smith

CURRENT LIVING COLLECTIONS

Australian Botanic Garden Mount Annan

The Australian Botanic Garden was officially opened in 1988 and, at 416 hectares, is the largest botanic garden in Australia. The garden sits on the culturally significant lands of the Dharawal people.

The undulating landscape comprises curated horticultural displays of Australian flora, swathes of grasslands, remnant woodlands and a distinct arboretum collection used for research, conservation and education. Plant conservation is at the heart of the Garden and this is supported by:

.....
'in-garden' living collections
.....

a dedicated nursery to support plant production for the living collections, conservation and urban greening
.....

the National Herbarium of New South Wales
.....

the Australian PlantBank
.....

The Garden features entirely Australian native plants and the landscape is intersected by 130 ha of remnant natural bushland that attracts a very rich local fauna with several migratory bird species. These remnant bushland sites are made up of Cumberland Plain Woodland, River-Flat Eucalypt Forest, Moist Shale Woodland, Western Sydney Dry Rainforest and Swamp Oak Floodplain Forest. In addition, the Garden is home to the world's largest scientific collection of Wollemi Pines (*Wollemia nobilis*).

The Australian Botanic Garden encompasses 77 living collections including ex situ conservation collections, of which ten are key collections (Appendix 1). Nine of these are based on taxonomic themes, namely Asteraceae, conifers, Fabaceae, Ficus, Malvaceae, Myrtaceae, Poales, Proteaceae and Lamiaceae. The remaining collection, cycads, has been placed in the 'Conservation and Research' theme (Figure 3).

CURRENT LIVING COLLECTIONS

Blue Mountains Botanic Garden Mount Tomah

The Blue Mountains Botanic Garden comprises 28 hectares of curated collections and a further 234 hectares of 'wilderness' surrounded by the Greater Blue Mountains World Heritage Area. The Garden and natural areas are on land that is significant to the Darug people, the traditional custodians. The Garden includes a basalt peak summit 1,000 m above sea level, a spur of sandstone extending north into the World Heritage Area, properties to the south, east and west off Bells Line of Road and a portion of Old Bells Line of Road.

The Garden's collections feature cool climate plants, particularly those of the southern hemisphere, with extensive collections from South Africa, South America and smaller plantings from the northern hemisphere's temperate regions. Alpine and subalpine species — that cannot effectively be displayed in the other two Gardens — thrive in the basalt soil profile of rich, acid clay-loam.

There are eight key collections, namely *Acer*, *Camellia*, conifers, heath and heather, *Narcissus*, *Puya*, *Rhododendron* and Wollemi Pine (Appendix 1).



The Heath and Heather Garden at the Blue Mountains Botanic Garden holds a spectacular display of Ericaceae species. J. Plaza



Tissue culture is part of the conservation strategy for Sweet Myrtle (*Gossia fragrantissima*) and other recalcitrant rainforest species heavily impacted by Myrtle Rust. J. Plaza

CURRENT LIVING COLLECTIONS

Australian PlantBank

The PlantBank, at the Australian Botanic Garden, has an important role as a centre of research, plant conservation, germplasm collection and storage. The largest facility of its type in the southern hemisphere, PlantBank has the central purpose of conserving threatened species for NSW and beyond, as well as safeguarding the State's plant diversity for future generations.

The collections of seeds, symbiotic organisms, tissue cultures and cryopreserved germplasm are used to safeguard native plants from extinction and are a resource for the translocation and reintroduction of threatened plant species. These collections are also a resource for research within the Australian Institute of Botanical Science and the wider science community.

One of the central tenets of the scientific value of the collection is that each accession is vouchered by physical collections lodged in the collection of the National Herbarium of New South Wales with extensive associated data (e.g. population numbers, habitat, location and collection date). This means that the seed collection program is critical to collecting wild data on species, especially threatened ones. This data is made freely available to researchers, government agencies and landowners through online data-aggregating portals such as Australasia's Virtual Herbarium, the Australian Virtual Seedbank and NSW BioNET.

PlantBank seed and other germplasm collections are a primary source of wild-provenance material to support the living collections and restoration of natural areas across Botanic Gardens of Sydney.

The organisation has led a significant plant conservation program for more than twenty years and, since 2013, this has been supported through the state-of-the-art PlantBank facility. Botanic Gardens of Sydney will continue to lead ex situ conservation in Australia and enable other organisations to duplicate Australian native collections held in PlantBank to spread the holdings across facilities and minimise risks.

Duplicates of some of the seed collections from Botanic Gardens of Sydney are deposited in the Millennium Seed Bank (Royal Botanic Gardens, Kew) in the United Kingdom. These collections are used to further scientific knowledge on the ex situ conservation of species. In particular, these duplicate collections assist in improving our shared understanding of the storage requirements for orthodox species, including 'exceptional' or 'recalcitrant' species (e.g. many rainforest or mesic species whose seeds cannot tolerate drying and/or freezing). These collections also aid in a diversified research program that is helping to identify alternative conservation methods such as tissue culture and cryostorage. This research and collaborations with other facilities is crucial to achieve the organisation's goal of holding representative collections of all NSW species for the future.

The collection targets for PlantBank's program are to secure a representative collection of all NSW native plant species, with sufficient genetic diversity to support their future conservation and restoration in the wild.

PlantBank collections represent:

5,387
Total living taxa

183
Living families

5,028
Living species
(exc. Cultivars)

13,172
Total living accessions

94.9%
Wild Origin

CURRENT LIVING COLLECTIONS



Cinnamon Wattle (*Acacia leprosa* 'Scarlet Blaze'), A. Orme

Horticultural and Conservation Nurseries

Botanic Gardens of Sydney operates horticultural and conservation nurseries at each of its three Gardens. The nurseries underpin the ability to propagate and grow plants for research and conservation, as well as to educate and inform the community about plants and their diversity.

The nurseries are a production hub for the operations, providing quarantine facilities and an extensive range of controlled environments, and a repository of rare and endangered living collections (including long-term potted collections). These facilities enable active research and conservation initiatives — a core objective of the Australian Institute of Botanical Science.

The nurseries also support Growing Friends Plant Sales (a volunteer program of Foundation and Friends of the Botanic Gardens) which support Botanic Gardens of Sydney. These facilities also house collections that require controlled environments, such as the iconic Corpse Flower (*Amorphophallus titanum*).

Royal Botanic Garden Sydney

The nursery is 4,250 m² and consists of 11 glasshouses, shade structures, full sun areas, a propagation facility, potting and storage sheds, and office space. Currently the nursery holds approximately 8,000 plants, a number that fluctuates due to plant material entering and leaving the facility.

The role of the nursery is to support the maintenance and display of living collections held at the Royal Botanic Garden. These include curating material for use as in-ground living collections, in addition to temporary, seasonal and permanent potted collections, and those used in The Calyx — the Garden's signature horticultural showcase. The nursery also maintains temporary collections during garden redevelopment, for scientific research or quarantine purposes, and for education and engagement activities.

Blue Mountains Botanic Garden Mount Tomah

The nursery is the smallest in the organisation, occupying 1,130 m² and comprising two glasshouses, a shade house and 63 benches for holding nursery material. While mostly used to quarantine and house new acquisitions, this facility also incorporate a propagation house, and one for rare potted collections.

The nursery's primary function is to maintain and propagate the rare and short-lived plants for the outdoor living collection and to propagate material from external sources to be accessioned into the collection. The Blue Mountains Botanic Garden's existing collection is safeguarded by the nursery's propagation of rare and conservation priority plants, to be used for successive plantings into the Garden's in-ground collection.

In an average year approximately 600 accessions of some 10,000 specimens of perennials, trees and shrubs are introduced into the collection via the nursery, which can hold around 5,000 items at full capacity. As part of this work, the nursery propagates 100 genera, with upwards of 4,000 propagules (such as cuttings), sourced from existing collections annually, to either go back into the collection or to sales via the Growing Friends Plant Sales program.

Australian Botanic Garden Mount Annan

This plant production nursery is the largest of the three nursery facilities, comprising 514 benches, six shade houses, five poly-houses and two glasshouses across 9,545 m². In 2021, a 7,000 m² redevelopment of the nursery was undertaken to facilitate the construction of the new National Herbarium of New South Wales.

This nursery supplies material for scientific research and conservation horticulture, in addition to plants for the living collections across the three Gardens, producing approximately 43,000 individual specimens annually. Representatives of 2,600 species, on average, are held in the nursery at any one time, including over 1,000 individual specimens that form the permanent or long-term potted plant collection, held for conservation, research and ornamental display.

This nursery facility also support the Growing Friends volunteer group, with 645 m² of stock beds allocated to support the propagation of material for sale by Foundation and Friends of the Botanic Gardens to raise funds in support of the Botanic Gardens of Sydney. Growing Friends produces around 9,000 plants annually through this nursery facility. In addition, the Australian Botanic Garden nursery provides contracted services for the propagation of threatened species for conservation projects in collaboration with external agencies.

The Botanic Gardens of Sydney has a vision for this nursery's expansion to increase capacity for plant propagation and conservation research through modular, climate-controlled nursery infrastructure that enables enhanced quarantine and biosecurity functions.



CURRENT LIVING COLLECTIONS

3.4 Collections Quality

The quality of a living collection depends not only on the maturity of an organisation's horticultural expertise, but also the curation of any associated collections data. At Botanic Gardens of Sydney, the curation of living collections data includes databasing, gardens-wide mapping and individual plant labelling.

In 2023, Botanic Gardens of Sydney completed its first comprehensive stocktake across each of the three Botanic Gardens, providing a current and accurate reflection of the living collections held. This geo-referenced collection data is critical in developing a baseline for the management of living collections across the organisation into the future. It also provides plant-specific location data via the three 'Gardens Explorer' portals available for use by staff and visitors through Botanic Gardens of Sydney's website.

Regular on-ground audits will be central to ensuring the organisation is responsibly curating its collections, further enabling it to meet its purpose and vision. Maintaining accurate and current collections data will also assist to facilitate opportunities for local, national and international collaborations with other botanic gardens and conservation programs. By understanding the breadth and diversity of species, genera and families held in the collections (including hybrids and cultivars), Botanic Gardens of Sydney will be better placed to undertake gap analyses that will, in concert with those done by other gardens, inform future acquisitions, plant exchanges and conservation programs.

The following criteria were selected for a rapid assessment of the quality of the living collections:

Taxonomic diversity — with such a large variety of unique flora in Australia, and specifically in NSW, diverse collections underpin the science, conservation and educational activities of Botanic Gardens of Sydney. The documented collections currently contain representatives of 11,800 species from 2,629 genera within 300 plant families. There are holdings of 12,573 unique subgeneric and subspecific taxa (Table 3).

Biogeographical diversity — Botanic Gardens of Sydney has wild provenance collections drawn from 95 countries. While most accessions originate from Australia (Figure 7), the collections have particularly good representations of species native to New Zealand and Oceania; Sub-Saharan Africa; eastern and south-eastern Asia; as well as the east coasts of the Americas (Figure 6). Many historical collections are documented as being of wild origin, however, specific location data was not captured when some of the predominantly historical collections were originally accessioned.

CURRENT LIVING COLLECTIONS

The collections contain a significant representation of native Australian flora with 8,962 accessions being wild-sourced. The wild provenance accessions originate from 70 of 89 (78.65%) bioregions identified under the Interim Biogeographic Regionalisation for Australia (IBRA) (Figure 7). Importantly, Botanic Gardens of Sydney's collections broadly represent flora from across Australia's landscapes, consisting of large geographically distinct bioregions and characterised by common climate, geology, landform, native vegetation and species.

Wild Origin — across the living collections the majority (69%) of all accessions are of wild origin, with 23% of garden origin, 1% from garden wild derived origin and 7% of unknown origin (Table 3). The Australian Botanic Garden has the highest proportion of wild origin collections (78%). The Blue Mountains Botanic Garden has approximately one third (32%) of its accessions sourced directly from the wild, while the Royal Botanic Garden (16.9%) and The Domain (16.3%) have significantly fewer wild origin collections. These variations strongly reflect the contrasting histories of the three Gardens.

Extinction risk — conservation collections at Botanic Gardens of Sydney are significant and collections are categorised as threatened according to legislation and systems (Table 3; Appendix 1). There are 796 species in the collections that are included on the International Union for Conservation of Nature (IUCN) Red List of Threatened Plant Species. Seven of these species are of international origin and are listed as extinct in the wild. In addition, the collections contain 425 of the 1,411 (30.1%) nationally listed plant species under the Commonwealth's *Environment Protection and Biodiversity Act 1999* and 480 of the 679 (70.7%) plant species listed under the NSW *Biodiversity Conservation Act 2016*. These ex situ collections are made up of planted collections, as well as the germplasm collections in PlantBank.

Seedbanking — the majority (94.9%) of the banked seed collections are of wild origin, with 2.3% being from garden plants of known wild origin, 0.9% garden origin and 1.7% of the collection from unknown origin. Some 276 species in the banked collections are on the IUCN Red List of Threatened Plant Species. In addition, the collections contain 318 of the 1,411 (22.5%) nationally listed plant species under the Commonwealth's *Environment Protection and Biodiversity Act 1999* and 433 of the 679 (63.8%) plant species listed in the NSW *Biodiversity Conservation Act 2016*.

There is ongoing research required on orthodox seeds with complex dormancy and germination requirements. In addition, there are collections of native species with non-orthodox seed, particularly from Australian rainforest habitats, that require alternative methods of conservation such as tissue culture, cryopreservation or maintenance in potted or in-ground collections. Botanic Gardens of Sydney currently holds 32 non-orthodox species in tissue culture and six species as potted plants. Cryogenic storage is currently an area of research for future conservation of non-orthodox species and is also being utilised to preserve 10% of all new collections of orthodox species.

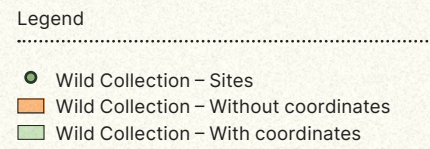
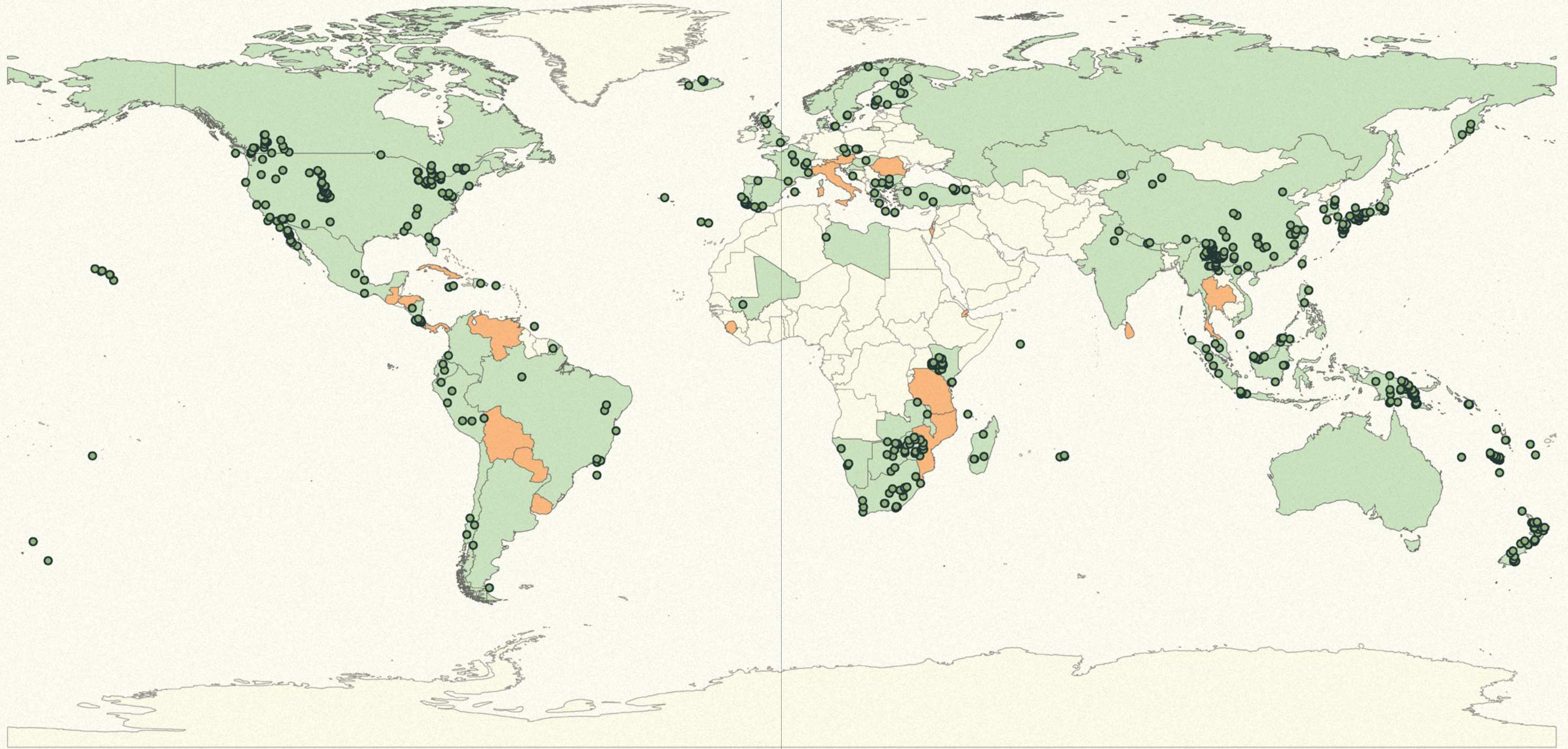
Provenance — the provenance of Botanic Gardens of Sydney's collections is recorded in association with individual accessions. Some 7% of all accessions are of unknown provenance across the organisation's estates and facilities (Table 3). The Royal Botanic Garden and The Domain have 20.9% and 35.5% (respectively) of accessions that are of unknown origin – reflective of these sites being developed from the early 1800s through times when plant collectors, in general, employed varying degrees of record-keeping and rigour around provenance. By contrast, only 4% of accessions are from unknown provenance at the Australian Botanic Garden and just 1.7% at PlantBank. At the Blue Mountains Botanic Garden, some 12.4% of the collection is of unknown provenance.

Data — the quality of living collections is dependent on the existence of comprehensive accession data aligned to collection standards. As Botanic Gardens of Sydney reports on the implementation of this Strategy, metrics on the breadth of our data will be reported and used for continual improvement of data quality and curation.

Throughout the implementation of this Strategy, the assessment methodology will be further refined to improve the ability to ascertain and evaluate the quality of the collections.

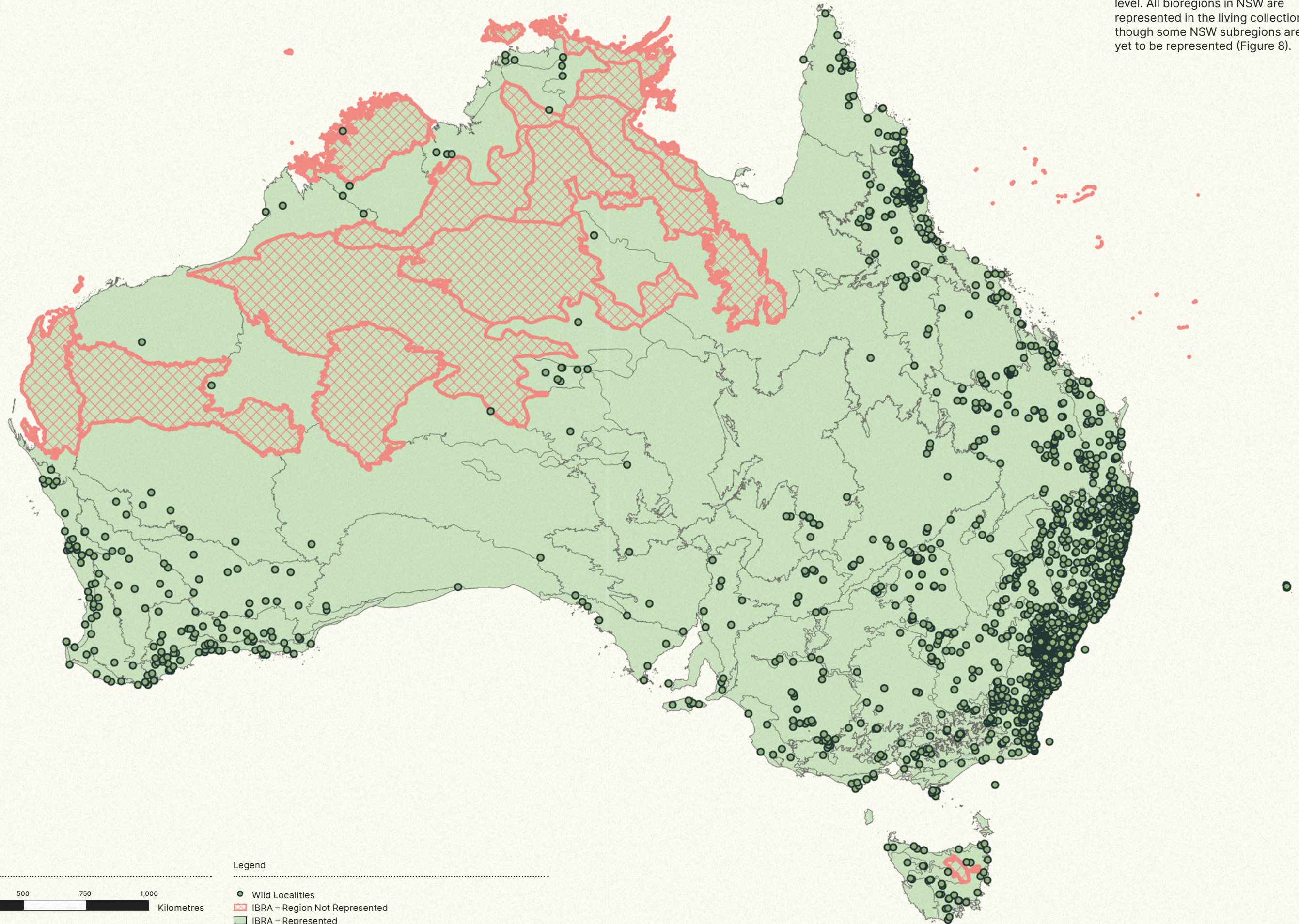
GLOBAL REPRESENTATION

Figure 6
Global representation of the origin
of current living collections.



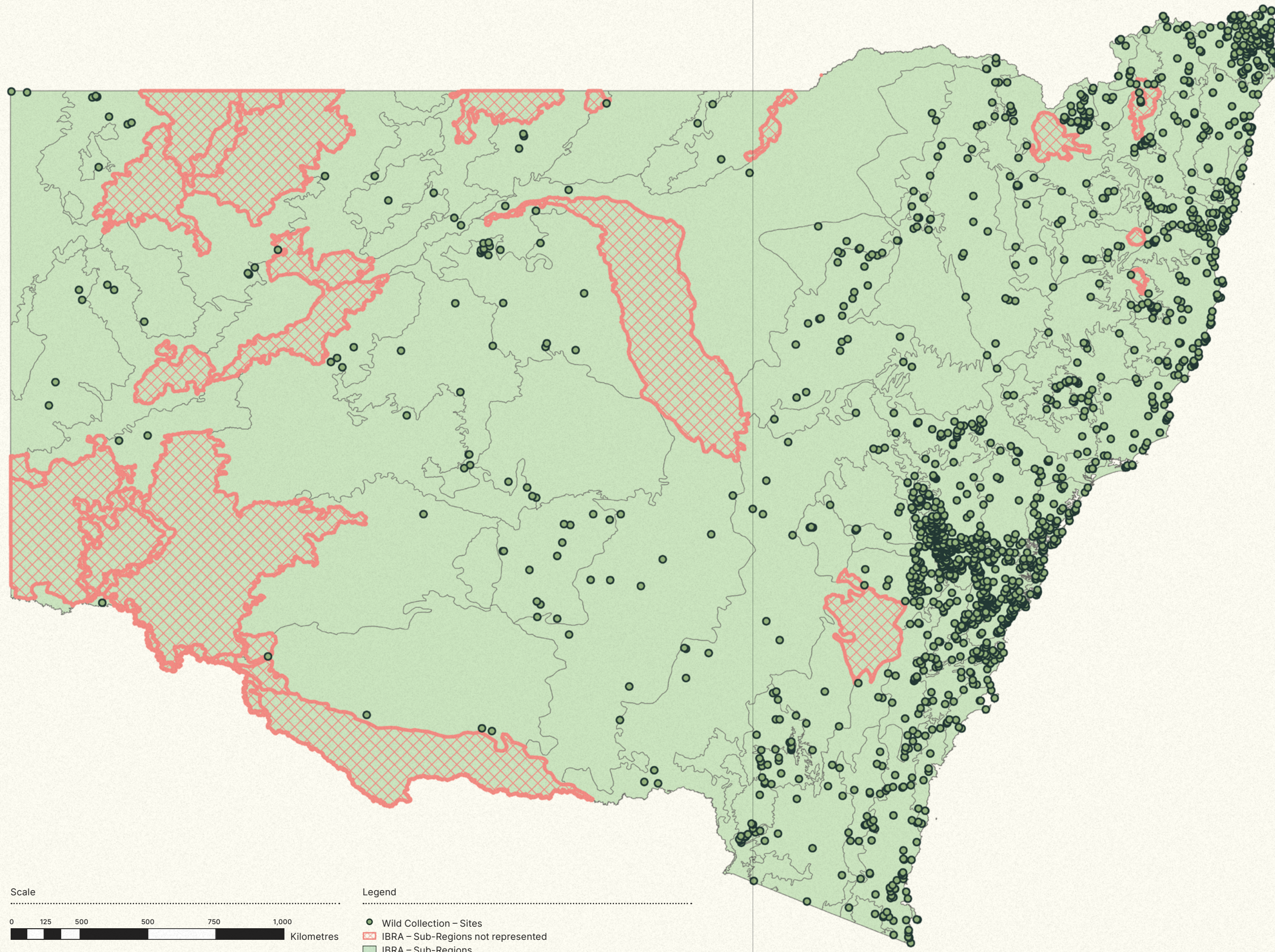
INTERIM BIOGEOGRAPHIC REGIONALISATION FOR AUSTRALIA [IBRA VERSION 7.0]

Figure 7
National representation of the origin of living collections at the bioregion level. All bioregions in NSW are represented in the living collections, though some NSW subregions are yet to be represented (Figure 8).



INTERIM BIOGEOGRAPHIC REGIONALISATION FOR AUSTRALIA [NSW SUBREGION IBRA VERSION 7.0]

Figure 8
State representation of the origin of living collections at the subregion level as at 14 March 2023. All bioregions in NSW are represented in the living collections (Figure 7).



COLLECTIONS

PRIORITIES



COLLECTION PRIORITIES

This section outlines some of the future directions for the principal Botanic Garden functions.

4.1 Science and Research

Major pressures confronting the Australian environment include climate change, shifts in land-use, habitat fragmentation and degradation, and invasive species. Research and development addressing these key threatening processes are central to Botanic Gardens of Sydney priorities, now and into the future. The Australian Institute of Botanical Science brings together the collections, research, services and facilities across the organisation's directorates, led by expert staff, to address environmental challenges. The research and development focuses on seed science, germplasm research, conservation of ecosystems, species, populations and genetic diversity, and pathology services, as well as providing exemplars of best practice in restoration and seed production. Importantly, training and academic studies are also supported.

Considering the current state of the environment reports from the NSW and Australian Governments, Botanic Gardens of Sydney must effectively manage risk to its public 'living' assets and associated services by aligning with government instruments such as the NSW Climate Change Policy Framework and the NSW Biosecurity and Food Safety Strategy 2022-2030, and continuing to document biodiversity and informing rehabilitation and restoration efforts as part of State and Australian Government priorities.

It will also contribute to the international agenda being driven through the Convention on Biological Diversity's Global Strategy for Plant Conservation, supported by the Global Partnership for Plant Conservation, and in particular, Botanic Gardens Conservation International (BGCI).

Staff, honorary research associates and students at Botanic Gardens of Sydney share their knowledge in many ways, primarily through the publication of peer-reviewed scientific publications, as well as through development of best-practice guidelines such as those published by the Australian Network for Plant Conservation (Martyn Yenson et al. 2021) and the Florabank Consortium (Commander et al. 2021). These guidelines are evidence-based, accessible and available for free download to support plant conservation and restoration activities both within and outside of botanic gardens across Australia and overseas. The guidelines are also increasingly recognised in policy at a state and national level and are internationally regarded as benchmarks for good conservation practice.

The Living Collections Strategy, including the prioritisation of collections and the management of priority plants, will align with the strategic aims of the Science and Conservation Strategy.

Table 4
Botanic Gardens of Sydney visitation for 2022-23 financial year.

Royal Botanic Garden Sydney	The Domain Sydney*	Australian Botanic Garden Mount Annan	Blue Mountains Botanic Garden Mount Tomah
4,441,201	6,227,398	964,910	196,295

* Visitation to The Domain is an estimate and is calculated using a visitation ratio compared to gate-counter data from the neighbouring Royal Botanic Garden Sydney, plus data from sports bookings and organised public events.



A Giant Water Gum (*Syzygium francisii*) is transformed into the Neon Tree, part of the Lightscape installation at the Royal Botanic Garden in July 2023. S. Daniel



The potted collections of threatened Myrtaceae species are held in the Australian Botanic Garden Nursery as insurance against extinction. J. Plaza

As the world faces a climate and biodiversity crisis of unparalleled proportions, it is clear that plants will be a critical component in combatting these issues and overcoming these threats to life on Earth. Science and research are fundamental elements of Botanic Gardens of Sydney and the complementary knowledge and expertise generated by our scientists and horticulturists will guide our approaches and responses to these dilemmas. We champion cutting-edge scientific analysis and conservation horticulture, as well as the fundamental research needed to better understand the biology and ecology of our native flora. We are committed to continuing to substantially enhance our science and horticultural capabilities to ensure this Strategy can deliver the conservation outcomes we need for the living collections, for the flora of NSW and for our national and international collaborations.

Prof. Brett Summerell, Chief Scientist & Director of Science, Education and Conservation

COLLECTION PRIORITIES

The organisation's living collections are a significant local, national and global resource that supports diverse functions. These must be considered when planning future living collection priorities. During the implementation phase of the Strategy, the organisation will develop a prioritisation framework to support the evaluation of existing collections, and their significance in relation to the identified living collections themes.

4.2 Visitor Experiences and Education

The living collections and landscapes enable and support all aspects of the organisation's visitor experiences and education services, including those associated with driving patronage, revenue generation and commercial activities. Currently, Botanic Gardens of Sydney sites attract more than eleven million annual visits (Table 4).

The collections inspire and inform, and are used to facilitate significant community engagement, volunteering, school education and life-long learning. The next 20 years are predicted to see major societal changes so the living collections, and how they are used, will continue to evolve to meet society's needs. The implementation of the Living Collections Strategy, including the prioritisation of particular collections, will align with the strategic aims of the Education and Engagement Strategy of Botanic Gardens of Sydney.

4.3 Accessibility

Facilitating access to our collections and associated collection data for advancing knowledge that benefits biodiversity conservation and botanical science will continue to be important.

Quality data systems are critical to accessibility and ongoing management of living collections. Digital transformation is a priority and will be required to integrate the significant number of disparate data holdings across Botanic Gardens of Sydney in order to improve accessibility and discoverability, and mitigate any potential threats to the integrity of these scientific collections.

During the implementation of the Strategy, the organisation will evaluate the digital capabilities required to underpin robust and sustainable living collections acquisition, curation and exchange into the future. These actions will identify and prioritise short-, medium- and long-term digital transformation requirements, providing an implementation pathway for the proactive maintenance of existing digital systems, and the adoption of new technologies to support improved knowledge sharing and access to collections data.

Accessibility is also improved through such measures as plant tags, labels and interpretive signage. A fundamental criterion for defining botanic gardens, they provide the general public with important foundational information on the living collections.

4.4 Capability

The capability required to manage Botanic Gardens of Sydney's living collections depends on a collaborative working model across multiple disciplines including landscape horticulture, nursery management, arboriculture, turf management, plant taxonomy and systematics, seed biology, germplasm conservation, information management, conservation management, and restoration ecology and ecosystem services. These specialised capabilities exist within the organisation or come through partnership contributions across the botanic garden, conservation, research and industry sectors.

More recently, the organisation has strategically realigned its capability to strengthen current and future efforts in diverse education services and opportunities. It also contributes knowledge to the botanical sciences, delivering effective conservation outcomes aligned to the United Nations Sustainable Development Goals, the Global Strategy for Plant Conservation, and national and state priorities. More specifically, it has enhanced its expertise in genetics and genomics, pathology, germplasm conservation and reproductive biology. This expertise is used to inform conservation collections, along with advances in technology, so the organisation can further refine its scientific work in order to be efficient and cost-effective, while remaining influential.

To support the implementation of the Living Collections Strategy there is a need to increase capability in specialisations that will support future planning, research and management of living collections. This will involve support for existing staff within the organisation to upskill and further develop their capabilities. In addition, to complement existing strengths, the organisation will provide support for aspiring horticulturists, scientists, First Nations staff and those from other disciplines to reskill and pursue a career in support of plant conservation.



Purple Fountain Grass
(*Cenchrus setaceus* 'Rubrum'). J. Plaza



VISION FOR THE FUTURE

PlantBank's living collection holds more than two hundred million seeds, representing over 5,500 Australian native taxa including Strangler Fig (*Ficus henneana*). J. Plaza

VISION FOR THE FUTURE

Under the *Royal Botanic Gardens and Domain Trust Act 1980* (NSW), the organisation has a responsibility to maintain, assemble and improve its living collections and use them for documenting plants and scientific research with respect to botany and ornamental horticulture. These collections are prized assets and highly valued by diverse stakeholders for display, research, conservation, education and at times, product development, such as pharmaceuticals and botanically-infused products.

As the leading plant conservation organisation in NSW, Botanic Gardens of Sydney is committed to its responsibility to focus its unique capabilities and deliver long-term conservation of the biological diversity it holds, particularly in relation to those species and ecological communities that are readily accessible within the State.

The organisation will concentrate efforts on ensuring its living collections continue to demonstrate cultural, conservation, scientific and horticultural value. Building diversity and resilience into the collections will provide avenues for future use that help deliver on these values. Through its implementation, the Strategy will provide Botanic Gardens of Sydney with opportunities to review its collections, including key collections, and refine its protocols and procedures to ensure the collections are adequately evaluated, are fit for purpose, and are supported by robust justifications for why they remain as part of the living collections over the long-term.

The Australian Institute of Botanical Science has a vision to use its world-leading research and collections to advance fundamental knowledge of plants and drive effective conservation to ensure the survival of plants and all life forms that depend upon them. This vision will be a primary driver for the future use of living collections under this Strategy over the long term. As the diversity of the living collections continues to improve, both within and across species, Botanic Gardens of Sydney will elevate its support for restoration efforts in situ, informed by robust scientific evidence and underpinned by exceptional conservation horticulture, in order to facilitate the conservation of Australia's rich biodiversity.

As part of the Australian Institute of Botanical Science, the Research Centre for Ecosystem Resilience will continue to provide genetic expertise and evidence-based information to restore, repair and protect native ecosystems confronted by climate change, degradation and the impacts of invasive species and pathogens. Further development and diversification of the living collections, particularly seeds, will be central to supporting future work in ecosystem research and restoration.



Seed and pappus of Common Everlasting (*Chrysocephalum apiculatum*). S. Cottrell

VISION FOR THE FUTURE

Non-commercial scientific study of the plant collections and access to plant materials for reputable research and learning will continue to be facilitated internally and with external conservation and research partners. The Living Collections Policy, and associated Material Transfer Agreements (MTAs) will guide appropriate access to the collections and ensure consistent procedures and protocols for managing requests for material and the establishment of metacollections for conservation and research.

Within the living collections are plants that may have potential for benefitting humankind, such as in the development of bush foods, new plants for horticulture and agriculture, and sources of new medicines (see *Botanic Gardens of Sydney Strategic Plan 2021-2026*). The commercialisation of collections material will continue to be guided by the Convention on Biological Diversity (CBD) provisions on access to genetic resources and benefit-sharing, with consideration of the necessary controls and management of collections under relevant State and Australian Government laws and policies, including Botanic Gardens of Sydney's Living Collections Policy. The Nagoya Protocol on access to genetic resources and benefit-sharing, a supplementary agreement to the CBD, contributes additional requirements for compliance with State laws and providers' terms, including the need to monitor the use of genetic resources.

While Australia has not ratified the Nagoya Protocol, it has existing domestic measures in place through Commonwealth, Queensland and Northern Territory legislation that are consistent with the Nagoya Protocol and its intent. Importantly, Australia's stance on the Nagoya Protocol may present future challenges for Botanic Gardens of Sydney when trying to develop collections involving the transfer of plants internationally.

The organisation records and maintains files on the transfer of material to third parties. Its Material Transfer Agreement (MTA) outlines the need for recipients' obligations to be compliant with the CBD, the Nagoya Protocol and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It also outlines the caveats pertaining to any potential commercialisation of a product that incorporates the material, consistent with the permit, licence or conditions under which the material was originally obtained. Throughout the implementation of this Strategy, the organisation will regularly review and update these agreements to ensure they continue to be fit for purpose and deliver the most efficient and effective approach to how the collections are shared and used.

Botanic Gardens of Sydney will remain focused on its vision, directing efforts and expertise to identify solutions to existing and emerging environmental challenges. It will prioritise conservation and restoration, and support the community to advance its understanding of the value of plants. It will work to influence policy and decision-making at all levels through evidence-based science and innovative approaches to learning.

The organisation will continue to focus its efforts through various strategies and action plans that aim to guide the implementation of its diverse and complex operations, including but not limited to its Reconciliation Action Plan, Education and Engagement Strategy, and Science and Conservation Strategy. During the implementation of the Living Collections Strategy, Botanic Gardens of Sydney will ensure close alignment is maintained between the various documents and associated action plans to maximise complementarity of effort and reduce duplication.

The living collections will be a link across our organisation, enabling us to achieve our vision together, and contribute to local, national and global efforts to conserve our unique and precious flora.

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Ex situ collections of Critically Endangered (EPBC Act) species such as Scrub Stringybark (*Rhodamnia rubescens*) provide material for ongoing conservation research into the effects of Myrtle Rust. J. Plaza



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APPENDICES

The Growing Friends volunteers propagate plants from the living collections for sale to the public. This is an important fundraising activity of the Foundation and Friends of the Botanic Gardens. J. Plaza

APPENDIX 1

Australian Botanic Garden Mount Annan — Key Collections Snapshot (1 of 2)

Snapshot of the 25 Key Collections in Botanic Gardens of Sydney

Asteraceae	Fabaceae	Ficus	Lamiaceae
Description			
Members of the Asteraceae family	Members of the Fabaceae family	Members of the <i>Ficus</i> genus	Members of the Lamiaceae family
Location			
The Asteraceae collection is predominantly displayed in the Connections Garden, with small pockets planted around the Herbarium and PlantBank buildings.	Featured throughout the Garden, with a high diversity found in the Wattle Garden, and a large number represented in the Greening Our Cities sites and in various arboreta.	The main <i>Ficus</i> collection is found in the Ficus Arboretum with a secondary collection displayed in the Connections Garden.	Displays of Lamiaceae can be found within Connections Garden and along the Mount Annan Drive Entrance.
Statistics			
Accessions: 193	Accessions: 6,435	Accessions: 87	Accessions: 199
Specimens: 13,197	Specimens: 17,387	Specimens: 178	Specimens: 5,218
Species: 51	Species: 267	Species: 12	Species: 61
Families: 1	Families: 1	Families: 1	Families: 1
Genera: 25	Genera: 43	Genera: 1	Genera: 15
Origins			
Wild Origin: 39.4%	Wild Origin: 95.3%	Wild Origin: 96.1%	Wild Origin: 40.4%
Garden Wild Origin: 7.3%	Garden Wild Origin: 0.4%	Garden Wild Origin: 0	Garden Wild Origin: 14.7%
Garden Origin: 52.8%	Garden Origin: 3.9%	Garden Origin: 2.2%	Garden Origin: 5.8%
Unknown Origin: 0.5%	Unknown Origin: 0.4%	Unknown Origin: 1.7%	Unknown Origin: 39.1%
Wild Sourced Geographic Representation			
New South Wales, South Australia	Western Australia, New South Wales, Queensland, Victoria, Northern Territory, Tasmania, South Australia	New South Wales, Queensland	New South Wales, Northern Territory, Queensland, Victoria, South Australia
Threatened data			
IUCN Red listed species: 0	IUCN Red listed species: 2	IUCN Red listed species: 0	IUCN Red listed species: 0
EPBC listed species: 3	EPBC listed species: 21	EPBC listed species: 0	EPBC listed species: 11
BCA listed species: 5	BCA listed species: 28	BCA listed species: 0	BCA listed species: 9

Australian Botanic Garden Mount Annan — Key Collections Snapshot (2 of 2)

Malvaceae	Myrtaceae	Poales	Proteaceae
Description			
Members of the Malvaceae family	Members of the Myrtaceae family	Members of the Poales order	Members of the Proteaceae family
Location			
Specimens have been planted throughout the Australian Botanic Garden landscape, with the largest collection in the Kurrajong Arboretum.	Plants in the Myrtaceae family are common throughout the landscape, with notable collections in the Bottlebrush Garden and the Eucalypt Arboretum.	Strong representation is found in the Connections Garden and the beds surrounding PlantBank and the Herbarium. Displays can also be found around the Southern Loop.	A diverse collection of Proteaceae is planted throughout the Connections Garden and along the Mount Annan Drive entrance. Main genera groupings can be found on the Southern Loop displayed in the Grevillea and Banksia Gardens.
Statistics			
Accessions: 455	Accessions: 9,218	Accessions: 137	Accessions: 1,784
Specimens: 2,707	Specimens: 25,545	Specimens: 21,614	Specimens: 11,585
Species: 48	Species: 670	Species: 51	Species: 460
Families: 1	Families: 1	Families: 4	Families: 1
Genera: 16	Genera: 49	Genera: 37	Genera: 22
Origins			
Wild Origin: 71.2%	Wild Origin: 81.6%	Wild Origin: 77.4%	Wild Origin: 50.7%
Garden Wild Origin: 0.2%	Garden Wild Origin: 0.6%	Garden Wild Origin: 6.6%	Garden Wild Origin: 5.7%
Garden Origin: 22.9%	Garden Origin: 12.6%	Garden Origin: 12.4%	Garden Origin: 42.3%
Unknown Origin: 5.7%	Unknown Origin: 5.2%	Unknown Origin: 3.6%	Unknown Origin: 1.4%
Wild Sourced Geographic Representation			
Queensland, Phillip Island, Tasmania, New South Wales, Western Australia	New South Wales, Queensland, Victoria, Western Australia, Northern Territory, South Australia, Tasmania	New South Wales, Victoria, Western Australia, South Australia, Northern Territory	Western Australia, Queensland, New South Wales, Victoria, South Australia, Northern Territory
Threatened data			
IUCN Red listed species: 0	IUCN Red listed species: 62	IUCN Red listed species: 0	IUCN Red listed species: 134
EPBC listed species: 3	EPBC listed species: 55	EPBC listed species: 0	EPBC listed species: 46
BCA listed species: 2	BCA listed species: 43	BCA listed species: 1	BCA listed species: 34

Blue Mountains Botanic Garden
Mount Tomah — Key Collections Snapshot

Wollemi Pine		Narcissus		Heath and Heather		Acer		Puya		Rhododendron	
Description											
<i>Wollemia nobilis</i>		Members of the genus <i>Narcissus</i>		Members of the tribe Ericaceae (Ericaceae family) and commonly co-occurring taxa		Members of the <i>Acer</i> genus		Members of the <i>Puya</i> genus		Members of the <i>Rhododendron</i> genus	
Location											
Wollemi Pines are located along the Gondwanan Walk and into natural areas. A significant potted collection is held in the Nursery.		Narcissi bulbs are planted throughout the Brunet Lawn, providing an annual display during Spring.		The main collection is displayed across the Heath and Heather Beds. Smaller collection can be found in the African Rock beds.		Prominent displays are dispersed throughout the Garden.		<i>Puya</i> can be found in the Chilean Bed and surrounds.		Specimens are displayed throughout the Garden, with the most notable collections found within the <i>Rhododendron</i> species beds.	
Statistics											
Accessions:	349	Accessions:	501	Accessions:	246	Accessions:	281	Accessions:	15	Accessions:	556
Specimens:	621	Specimens:	15,983	Specimens:	2,685	Specimens:	412	Specimens:	176	Specimens:	1,154
Species:	1	Species:	21	Species:	69	Species:	38	Species:	15	Species:	132
Families:	1	Families:	1	Families:	13	Families:	1	Families:	1	Families:	1
Genera:	1	Genera:	1	Genera:	31	Genera:	1	Genera:	1	Genera:	1
Origins											
Wild Origin:	97.4%	Wild Origin:	0%	Wild Origin:	31.0%	Wild Origin:	7.1%	Wild Origin:	6.7%	Wild Origin:	16.2%
Garden Wild Origin:	1.1%	Garden Wild Origin:	0%	Garden Wild Origin:	1.2%	Garden Wild Origin:	0.7%	Garden Wild Origin:	0	Garden Wild Origin:	0%
Garden Origin:	1.4%	Garden Origin:	98.6%	Garden Origin:	61.2%	Garden Origin:	75.8%	Garden Origin:	26.7%	Garden Origin:	64.6%
Unknown Origin:	0	Unknown Origin:	1.4%	Unknown Origin:	6.5%	Unknown Origin:	16.4%	Unknown Origin:	66.7%	Unknown Origin:	19.2%
Wild Sourced Geographic Representation											
Australia (New South Wales)		Nil		Australia, United Kingdom, Ireland, Spain, South Africa, Greece, Turkey, France, South Korea		Canada, Vietnam, U.S.A., China, Switzerland, Japan, South Korea, Germany		Chile		Bhutan, China, Georgia, Hong Kong, India, Japan, Myanmar, Nepal, New Zealand, Papua New Guinea, Philippines, South Korea, Taiwan, U.S.A., Vietnam	
Threatened data											
IUCN Red listed species:	1	IUCN Red listed species:	1	IUCN Red listed species:	0	IUCN Red listed species:	2	IUCN Red listed species:	4	IUCN Red listed species:	1
EPBC listed species:	1	EPBC listed species:	0	EPBC listed species:	0	EPBC listed species:	0	EPBC listed species:	0	EPBC listed species:	0
BCA listed species:	1	BCA listed species:	0	BCA listed species:	0	BCA listed species:	0	BCA listed species:	0	BCA listed species:	0

APPENDIX 1

Royal Botanic Garden Sydney — Key Collections Snapshot

Begonia		Ferns		Orchids		Palms		Zingiberales	
Description									
Members of the <i>Begonia</i> genus		Members of the Polypodiopsida class		Members of the Orchidaceae family		Members of the Arecaceae family		Members of the Zingiberales order	
Location									
The main collection is concentrated in the Middle Garden, with a secondary collection in the Palace Garden.		The Fernery houses the main collection, with additional ferns represented throughout the Garden.		Specimens are found throughout the Royal Botanic Garden, with notable collections in the Nursey, Middle Garden and tropical horticulture beds.		Although found throughout the Royal Botanic Garden, the most notable collections are in the Middle Garden and near the main pond.		Specimens are spread throughout the Royal Botanic Garden with the more notable collections in the tropical horticulture beds and Middle Garden.	
Statistics									
Accessions:	150	Accessions:	420	Accessions:	1,112	Accessions:	1,208	Accessions:	306
Specimens:	628	Specimens:	2,522	Specimens:	1,526	Specimens:	2,641	Specimens:	1,718
Species:	57	Species:	176	Species:	520	Species:	390	Species:	130
Families:	1	Families:	23	Families:	1	Families:	1	Families:	7
Genera:	1	Genera:	64	Genera:	119	Genera:	75	Genera:	29
Origins									
Wild Origin:	4.9%	Wild Origin:	12.5%	Wild Origin:	8.5%	Wild Origin:	12.3%	Wild Origin:	9.7%
Garden Wild Origin:	0%	Garden Wild Origin:	0.2%	Garden Wild Origin:	0%	Garden Wild Origin:	0.1%	Garden Wild Origin:	0%
Garden Origin:	92.4%	Garden Origin:	74.8%	Garden Origin:	78.3%	Garden Origin:	55%	Garden Origin:	72.5%
Unknown Origin:	2.7%	Unknown Origin:	12.5%	Unknown Origin:	13.2%	Unknown Origin:	32.6%	Unknown Origin:	17.8%
Wild Sourced Geographic Representation									
Brazil, China, Papua New Guinea		Australia (New South Wales, Queensland, Victoria and Lord Howe Is.), China, Cook Is., Costa Rica, Cuba, Ecuador, Fiji, Tahiti, Japan, Kenya, Malaysia, Netherlands, New Caledonia, New Zealand, Panama, Papua New Guinea, Philippines, Solomon Is., Sri Lanka, U.S.A. (Hawaii), Vietnam		Australia (New South Wales, Queensland and Lord Howe Is.), China, Honduras, Indonesia, Malaysia, Panama, Papua New Guinea		Australia (New South Wales, Northern Territory and Queensland), Brazil, China, Cuba, Greece, Guatemala, Honduras, Madagascar, Malaysia, Mexico, New Caledonia, New Zealand, Panama, Papua New Guinea, Seychelles, Spain, Thailand, U.S.A., Venezuela, Vietnam, Zimbabwe		Australia (New South Wales and Queensland), China, Costa Rica, Ecuador, Indonesia (Sumatra), Japan, Malaysia, Philippines, Taiwan, Vietnam	
Threatened data									
IUCN* Red listed species:	0	IUCN Red listed species:	0	IUCN Red listed species:	15	IUCN Red listed species:	118	IUCN Red listed species:	2
EPBC+ listed species:	0	EPBC listed species:	0	EPBC listed species:	8	EPBC listed species:	1	EPBC listed species:	0
BCA** listed species:	0	BCA listed species:	3	BCA listed species:	1	BCA listed species:	0	BCA listed species:	0

Some statistics in the following tables do not equal 100 per cent due to rounding to a single decimal place.

* IUCN – International Union for Conservation of Nature
 + EPBC – Environment Protection and Biodiversity Conservation Act 1999
 ** BCA – Biodiversity Conservation Act 2016

The Domain —
Key Collections Snapshot

The Domain Arboretum	
Description	
Diverse and highly significant tree collection, with remnant and heritage trees well represented.	
Location	
These are found throughout The Domain, with notable collections on the north and south islands of the Mrs Macquaries Road loops.	
Statistics	
Accessions:	580
Specimens:	2,430
Species:	159
Families:	41
Genera:	80
Origins	
Wild Origin:	35.5%
Garden Wild Origin:	0%
Garden Origin:	15.8%
Unknown Origin:	48.7%
Wild Sourced Geographic Representation	
Australia (New South Wales, Northern Territory and Queensland), Brazil, China, Greece, New Caledonia, Spain (Canary Is.)	
Threatened data	
IUCN Red listed species:	16
EPBC listed species:	0
BCA listed species:	0

Across Botanic Gardens of Sydney estates —
Key Collections Snapshot

Camellias	Cycads	Conifers
Description		
Members of the <i>Camellia</i> genus at Royal Botanic Garden and Blue Mountains Botanic Garden	Members of the Cycadales order at Royal Botanic Garden and Australian Botanic Garden	Members of the Pinopsida class at Australian Botanic Garden and Blue Mountains Botanic Garden
Location		
Specimens are found throughout the Royal Botanic Garden, with notable collections near the Woolloomooloo Gate and Rathborne Lodge. At the Blue Mountains Botanic Garden they are displayed mainly around the Residence Garden and throughout the Explorers Walk areas. The Blue Mountains Botanic Garden Nursery holds a large potted collection.	Main collections at the Royal Botanic Garden are in Yurong Precinct and Palace Precinct's dual rainforest beds. The Australian Botanic Garden cycad collection is found throughout the Connections Gardens.	Conifers are displayed across the Blue Mountains Botanic Garden site, with numerous plantings in the dedicated Conifer Species bed and the Eurasian, North American and Southern Hemisphere Woodlands. The Australian Botanic Garden showcases conifers in the Connections Garden, Eastern Ridge and Callitris Arboretum.
Statistics		
Accessions: 629	Accessions: 420	Accessions: 1,117
Specimens: 3,043	Specimens: 1,438	Specimens: 3,644
Species: 53	Species: 152	Species: 230
Families: 1	Families: 2	Families: 7
Genera: 1	Genera: 10	Genera: 56
Origins		
Wild Origin: 1.9%	Wild Origin: 47.6%	Wild Origin: 62.7%
Garden Wild Origin: 0%	Garden Wild Origin: 0%	Garden Wild Origin: 0.4%
Garden Origin: 95.4%	Garden Origin: 41.4%	Garden Origin: 23.9%
Unknown Origin: 2.7%	Unknown Origin: 11%	Unknown Origin: 13.0%
Wild Sourced Geographic Representation		
China, Thailand, Vietnam	Australia (New South Wales, Northern Territory, Queensland and Western Australia), China, Columbia, Costa Rica, Ecuador, Fiji, India, Indonesia, Japan, Malaysia, Mexico, New Caledonia, Papua New Guinea, Philippines, Solomon Is., South Africa, Thailand, Tonga, U.S.A., Vanuatu, Vietnam	Australia (New South Wales, Queensland, Tasmania and Victoria), Austria, Azerbaijan, Brazil, Canada, Chile, China, Cuba, Fiji, Guatemala, Indonesia, Japan, Kenya, Mexico, Nepal, New Caledonia, New Zealand, Norway, Papua New Guinea, Russia Federation, South Africa, South Korea, Spain (Canary Is.), Taiwan, U.S.A., Vietnam
Threatened data		
IUCN Red listed species: 16	IUCN Red listed species: 90	IUCN Red listed species: 42
EPBC listed species: 0	EPBC listed species: 12	EPBC listed species: 3
BCA listed species: 0	BCA listed species: 2	BCA listed species: 4

Glossary and Acronyms

Glossary

Accessioning — the process by which plants or groups of plants (including seeds, ramet or other living material) are given a unique accession number. This number is used to record information associated with that accession in the plant records database. Plants that are acquired for inclusion in living collections or used for more than one growing season are given an accession number and recorded in IrisBG. Annuals and other plants treated as such are not accessioned.

Accession number — a unique number given to each specimen and/or collection (of plants, seed, ramet or other living material from the same taxa) that links the plant to its digital records. In this context, the term collection refers to specimens that have been 'acquired' (i.e. collected, donated or purchased) on the same date from the same origin (donor, supplier or collection trip number). Most Botanic Gardens of Sydney accessions have multiple specimens recorded under the accession, and in this case all the specimens have the same accession details.

Acquisition — the physical entry of biological material into the organisation's collections.

Australian Institute of Botanical Science — comprises the physical and virtual scientific collections, research, services and facilities, and scientific staff at the Royal Botanic Garden Sydney, Australian Botanic Garden Mount Annan, Blue Mountains Botanic Garden Mount Tomah, the Australian PlantBank, and the National Herbarium of New South Wales.

Australian Plant Census (APC) — contains the accepted names used in Australia endorsed by the Council of Heads of Australasian Herbaria (CHAH) (<https://biodiversity.org.au/nsl/services/search/taxonomy>).

Australian Plant Name Index (APNI) — a list of plant names (<https://biodiversity.org.au/nsl/services/search/names>).

Botanic Gardens of Sydney — trading name of the Royal Botanic Gardens and Domain Trust, incorporating the three Botanic Gardens, The Domain Sydney, The Australian PlantBank and the Australian Institute of Botanical Science.

Collection — a group of accessions organised into a selected category or theme for curatorial, education, research, display or other uses. A collection does not have to be physically grouped together, and a single accession can be part of multiple collections. A collection may also refer to a field collection of plants, cuttings, seeds or other germplasm that may be added to the living collections, or used for research or other conservation purposes.

Collection themes — living collections in the gardens, nurseries and PlantBank are arranged according to one or more themes, such as Conservation and Research, Economic and Ethnobotanical, Heritage and Ornamental, Plant Communities and Morphological, and Taxonomic and Evolutionary. Additional living collections themes may be identified throughout the implementation of this Strategy.

Cryogenic storage — the preservation of germplasm by storing it at very low temperatures in or over liquid nitrogen (usually <-130 °C).

Cultivars — plants raised in cultivation that differ sufficiently from their wild ancestors or, if taken into cultivation from the wild, are deemed worthy enough of distinction from wild populations for horticultural purposes to merit a special name. Their naming is governed by the International Code of Nomenclature for Cultivated Plants (ICNCP).

Curate/curation/curatorial — the task of developing and managing collections. The key elements of curatorial practice include; governing collections (policy, manuals and plans), building collections (acquisition of new plants), documenting collections (according to accepted professional standards), preserving collections through adequate management, researching collections, and public programs (these programs should be based on collections and also inform collection development and management).

Documentation — the formal records of data and information relating to an individual plant or germplasm that is accessioned within the living collections. May include herbarium specimens, field data or other collection-specific information. Documentation is a key differentiator of botanic gardens, separating them from parks and other gardens and public spaces. Without proper documentation, botanic gardens have little reference, scientific or conservation value.



Cutting-grown Wollemi Pines (*Wollemia nobilis*). S. Cottrell

Database — the digital software Botanic Gardens of Sydney uses to store current and past accession documentation associated with its living collections.

Deaccessioning — the process of removing a living specimen from the collection. This process does not include the removal of any information records related to that accession. The associated information records are modified to indicate that it no longer forms part of that collection. Deaccessioning decisions are made through a recommendation by escalation to the Director, Horticulture & Living Collections.

Exceptional species — plant species that require alternative conservation approaches because they cannot be effectively and efficiently conserved long term ex situ under the conditions of conventional seed banking. They include species with few or no seeds available for banking, species with seeds that are intolerant of desiccation, species with seeds that are short-lived in conventional storage (i.e., that lose ≥ 50% viability within 20 years of storage at -18 to -20 °C), and species with seeds that are deeply dormant.

Germplasm — encompasses living tissue from which new plants can be grown and genetic material that carries the heritable characteristics of an organism (e.g. cells, seed and plants).

Key collections — those collections of national or international significance, on which the organisation largely builds its reputation.

Living collection — a group of plants* or germplasm curated for a defined purpose, including for reference, research, conservation, education or ornamental display. At Botanic Gardens of Sydney, living collections refer to all living plant material that is currently accessioned, including some priority plants that have been accessioned within its natural areas and threatened ecological communities across its lands.

Material Transfer Agreements — contractual documents used for the acquisition of various biological and research materials between two organisations.

Metacollections — collections shared with other botanic gardens. These are genetically informed collections where the diversity of the taxa is captured to mitigate risk of extinction and secure diversity through sharing plant material across networks, and reducing management input, particularly with threatened species (also known as 'dispersed collections').

Priority plants — plants that Botanic Gardens of Sydney determines are a priority for it to work with based on its agreed strategic focus areas through the Australian Institute of Botanical Sciences.

* This also includes associated biota – e.g., in situ microscopic soil flora and ex situ management of mycorrhizal fungi.

APPENDIX 2

Glossary and Acronyms

Provenance — known location from where living plants, seeds or other plant material are sourced. There are several commonly used categories to describe the provenance of Botanic Gardens of Sydney material:

Unknown — the source and provenance of plant material is unknown and recorded as such in the plant records system

Garden Origin — plant material from a cultivated plant not of known wild origin

Cultivated Known Wild Origin — plant material from a cultivated plant descended from one of known wild origin

Wild Origin — plant material directly collected from the wild in an area where it naturally occurs (the origin is known and documented)

Cultivar — cultivars or hybrids of wild origin, or cultivars or hybrids that can be linked directly to their originator or source, and which reflect the development of plant breeding or selection.

Royal Botanic Gardens and Domain Trust — legal name of Botanic Gardens of Sydney, incorporating the three Botanic Gardens, The Domain Sydney, The Australian PlantBank and the Plantbank and the Australian Institute of Botanical Science..

Seedbank — a collection of dried seeds stored at low temperature and used for a variety of purposes including plant propagation, conservation and research.

Species — the basic unit of classification describing one kind of plant within a genus.

Subgeneric taxa — taxa within the taxonomic group directly below the rank of genus.

Taxon/Taxa — taxon (plural taxa) is the name designating a taxonomic grouping, such as species, genus, order, or division, of either living or extinct plants. For the purposes of this strategy, taxon refers to species, subspecies and varieties, but excludes cultivars.

Thematic Plan — as part of a planning hierarchy, this plan sits under the Living Collections Policy and outlines the plants that are to be planted in designated locations within a Botanic Garden.

Threatened species — species that have been assessed and listed as having some degree of threat in the wild under the *Biodiversity Conservation Act 2016* (NSW), *Environment Protection and Biodiversity Conservation Act 1999* (Cth) or IUCN Red List of Threatened Species.

Tissue culture — the cultivation of plant parts under sterile conditions in synthetic media (used as a method of plant propagation and used in conjunction with specific fungi for growing orchids).

Acronyms

APC:
Australian Plant Census

APNI:
Australian Plant Name Index

BCA:
Biodiversity Conservation Act 2016

CBD:
Convention on Biological Diversity

CITES:
Convention on International Trade in Endangered Species of Wild Fauna and Flora

EPBC:
Environment Protection and Biodiversity Conservation Act (1999)

IBRA:
Interim Biogeographic Regionalisation for Australia

IUCN:
International Union for Conservation of Nature

MTAs:
Material Transfer Agreements

STEAM:
Science, technology, engineering, the arts and mathematics.



Soft Tree Fern (*Dicksonia antarctica*) growing at the Blue Mountains Botanic Garden. J. Plaza

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THE LIVING COLLECTIONS KALEIDOSCOPE TAXONOMY



Homoranthus thomasi
A. Orme



Puya x berteroniana
J. Plaza



Acacia covenyi
S. Cottrell



Erythrina crista-galli
S. Cottrell



Telopea speciosissima
C. Offord



Argyrodendron sp.
J. Plaza



Eucalyptus moluccana
S. Daniel



Eucalyptus fergusonii
A. Orme



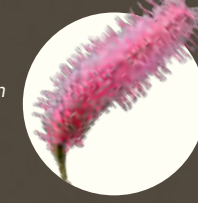
Rhodanthe chlorocephala
J. Plaza



Sarcopteryx stipata
R. Johnstone



Asplenium australasicum
J. Plaza



Grevillea petrophiloides
J. Plaza



Grevillea wilkinsonii
A. Orme



Mitrasacme latiflora
V. Barrett



Chamaedorea metallica
J. Plaza



Eucalyptus tricarpa
J. Plaza



Eucalyptus dawsonii
A. Orme



Eucalyptus copulans
A. Orme

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