



THE UNIVERSITY OF
MELBOURNE

Melbourne Centre
for Cities

Playbook for Urban Biodiversity

A guide to dispelling myths and taking action for urban practitioners

*Incorporating the discussion and recommendations from the Urban Nature:
Urban Myths Symposium (City of Melbourne, May 11 & 12 2023)*



PLAYBOOK FOR URBAN BIODIVERSITY

A GUIDE TO DISPELLING MYTHS AND TAKING ACTION FOR URBAN PRACTITIONERS

| | |
|---|----|
| 1. ACKNOWLEDGEMENT OF COUNTRY | 04 |
| 2. PLAYS FOR URBAN BIODIVERSITY | 06 |
| 3. PLAYS FOR THE GLOBAL SCALE | 07 |
| 4. PLAYS FOR STATE AND NATIONAL SCALES | 09 |
| 5. PLAYS AT THE LOCAL SCALE | 13 |
| 6. KEY PLAY: DISPELLING THE BARRIERS (MYTHS) TO INCREASING NATURE IN OUR CITIES | 30 |
| 7. FULL REFERENCE LIST | 46 |

This Playbook for Urban Biodiversity was produced by the Melbourne Centre for Cities at the University of Melbourne, as a key output from the Urban Nature: Urban Myths Symposium co-hosted with the City of Melbourne - 11 and 12 May 2023.

This Playbook is intended to inform practice and policy on biodiversity in cities, with a particular focus on Melbourne and other Australian cities, using content presented by collaborating authors at the Symposium, supplemented by an extensive literature review. The lead authors have sought to ensure the accuracy of the material in this document, but they, the Centre, and the University of Melbourne will not be liable for any issues incurred through the use of this report.

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Disclaimer

The Plays presented in this Playbook are a collection of ideas, discussions, case studies and resources from the May 11 and 12 Summit. We acknowledge that there might be differing views on some actions and myths, and as such it should not be considered that all contributing authors endorse all of the Plays and myths, rather we offer up the evidence and dialogue to help you make up your mind on how to best bring about more biodiversity in our cities.



Acknowledgement of Country

The University of Melbourne acknowledges the Traditional Owners of the unceded land on which we work, learn and live: the Wurundjeri Woi-wurrung and Bunurong peoples (Burnley, Fishermans Bend, Parkville, Southbank and Werribee campuses), the Yorta Yorta Nation (Dookie and Shepparton campuses), and the Dja Dja Wurrung people (Creswick campus).

The University also acknowledges and is grateful to the Traditional Owners, Elders and Knowledge Holders of all Indigenous nations and clans who have been instrumental in our reconciliation journey.

We recognise the unique place held by Aboriginal and Torres Strait Islander peoples as the original owners and custodians of the lands and waterways across the Australian continent, with histories of continuous connection dating back more than 60,000 years. We also acknowledge their enduring cultural practices of caring for Country.

We pay respect to Elders past and present, and acknowledge the importance of Indigenous knowledge in the Academy. As a community of researchers, teachers, professional staff and students we are privileged to work and learn every day with Indigenous colleagues and partners.



Plays for Urban Biodiversity

Introduction

This Playbook for Urban Biodiversity was produced by the Melbourne Centre for Cities at the University of Melbourne, as a key output from the Urban Nature: Urban Myths Symposium co-hosted with the City of Melbourne - 11 and 12 May 2023.

This Playbook is intended to inform practice and policy on biodiversity in cities, with a particular focus on Melbourne and other Australian cities, using content presented by collaborating authors at the Symposium and supplemented by an extensive literature review.

The Playbook for Urban Biodiversity provides a series of Plays, or actions, for urban practitioners to understand and adopt in their disciplines, in order to address the barriers to implementing urban nature in Australian cities.

The Plays are relevant to different scales, including the global, state and national, and local scale, and are targeted at those who work on projects and policies that involve nature and biodiversity. The biggest Play - is to dispel the myths that often stop biodiversity infused projects in our cities. Using codes (eg G1) we have linked our Global, State, National, and Local Plays to the myths, to illustrate and add to the counter arguments presented. So look for the codes when you get to the myth section of the Playbook.

The Plays presented in the Playbook are not an exhaustive list of actions to implement biodiversity or dispel myths, but rather we offer the current evidence and discussions as a general guide to inspire further action.

We thank our collaborating authors - our symposium speakers and event curatorial teams - for generously sharing their ideas for your consideration. We hope you will find the content useful in deciding how you can help to dispel the myths, and bring more biodiversity to our cities!

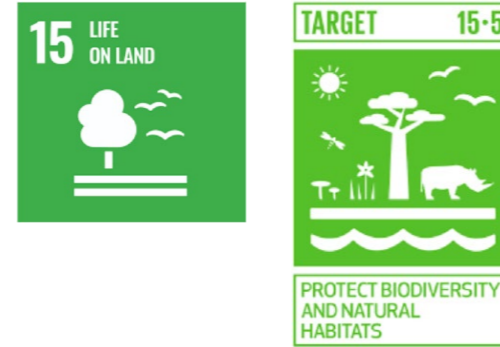
Plays for the Global Scale

This Play (action) is for practitioners at all levels and includes consultants, state governments, federal government, councils who work with them, universities and research institutes, community groups and individuals.

G1. Get informed and involved in global discussions about biodiversity

Here are some ideas about how practitioners, academics and citizens can engage in global considerations and conversations about biodiversity:

1. Understand how other cities, regions and countries incorporate and co-design First Nations communities' knowledges into their biodiversity plans
2. Share your knowledge with other cities, through city networks, online sharing platforms like Cities with Nature, or academic or industry events and conferences
3. Understand Australia's biodiversity comparatively to other countries
4. Consider how your procurement policy supports or hinders biodiversity efforts nationally and globally
5. Consider using the Sustainable Development Goals as a framework to progress biodiversity goals at a local scale
6. Understand how your actions contribute to the Kunming-Montreal Global Biodiversity Framework and Convention on Biological Diversity (CBD) process
7. Get involved in the IUCN Urban Alliance



Source: UN Sustainable Development Goals

Plays at state and national scale

These Plays (actions) are for practitioners at the state and federal level and includes consultants, state governments, federal government, councils who work with them, universities and research institutes and community groups.

S1. Support to advise on caring for Country in urban settings

FOSTERING COLLABORATIVE APPROACHES FOR URBAN DEVELOPMENT: EMPOWERING TRADITIONAL OWNERS IN BIODIVERSITY CONSERVATION AND CULTURAL INTEGRATION

Existing Traditional Owner groups, including Land Councils, have a broad portfolio of interests, and must balance their time and attention across many issues. At the same time, local governments and major developers need to consider the fundamental differences in approach that Caring for Country requires of them, including in relation to biodiversity. Work needs to be undertaken, and opportunities identified to better support Traditional Owners to guide key developments in urban settings. Supporting First Nations biodiversity knowledge holders to not only provide advice on design and maintenance to bring developments into line with local ecosystems, but also in improving the visibility of Indigenous stories and culture in urban landscapes, mindful of cultural load, safety and shared benefits is a critical action at local, state and national scales.

S2. Phase out offsetting - and phase in 'onsetting'

CHALLENGES WITH OFFSET SCHEMES AND EMERGING ALTERNATIVE: ONSETTING AS A NEW APPROACH TO BIODIVERSITY CONSERVATION

Offset schemes have consistently failed to deliver net-positive biodiversity outcomes. This reflects the large areas required to genuinely offset losses of critical habitat¹, as well as various serious administrative challenges, including the difficulty in procuring suitable offsets, verifying that procured offsets are of equivalent biodiversity value, and maintaining offset properties in a way that their conservation value is retained. For example, the offset-funded Western Grassland Reserve in Victoria is around 10% of the size that it was promised to be, and is deteriorating due to inadequate maintenance². Even where schemes are capable of genuinely offsetting habitat, the effect of replacing a nearby biodiverse space with a distant offset property is still a loss in day-to-day access to nature – however equal that substitution may be on paper. This loss is particularly significant in urban areas which already have limited access to biodiverse natural spaces³.

Internationally, numerous policies and approaches present viable alternatives for offset schemes. The concept of 'onsetting' is emerging as a new approach, whereby biodiversity is retained and enhanced on-site, rather than offset. Through the use of biodiversity-sensitive urban design approaches, built environments can be delivered that continue to have habitat value⁴.



Source: Unsplash

S1 EXAMPLE

[Iwi/hapū/whānau consultation](#)

New Zealand's Department of Conservation requires consultation with Maori groups, ensuring cultural landscapes are understood by development applicants.

S2 EXAMPLE

[Green Factor tool, City of Melbourne](#)

A tool for measuring the green infrastructure credentials of a development.



Source: Unsplash

S3. Remove 'minimum patch size' rules for planning schemes and vegetation

SMALL PATCHES OF GREEN SPACE POSSESS GREAT VALUE FOR BIODIVERSITY

Research has shown that small patches of green space can harbour significant biodiversity – even accounting for the challenges of fragmentation and edge effects, many studies have discovered that multiple small patches of equivalent area to a single large green space had greater species diversity. This contradicts mainstream understandings that small patches of green space are less valuable than larger green spaces, which stimulates the importance to review the regulations and policies that protect vegetation and open space. Underestimating the contribution that small habitat patches can make towards urban nature can also result in the misunderstanding of the value of smaller revegetation or restoration interventions. Many studies have demonstrated the contribution of a single garden bed for urban biodiversity, including from within the City of Melbourne⁵.

Consideration of key Victorian legislative instruments is warranted, in particular of the zones and overlays that are enforced in local government planning schemes, to identify biases or exemptions that enable the eradication of small patches. More challengingly, protection of small patches demands an examination of existing norms regarding the use of vegetation and biodiversity regulations set out in planning schemes in the assessment of developments on private land and in the management of public land. Due to the well-established myth that small habitats do not matter, local governments and state officers may currently be sympathetic to arguments that small patches are not significant enough to retain,

protect or apply rigorous enforcement actions in instances of non-compliance.



CASE STUDY

[Large positive ecological changes of small urban greening actions, City of Melbourne](#)

Across our faculties, academic and professional staff are working together to understand how faculties and individuals can contribute to the University's sustainability initiatives.

S4. Develop a metropolitan-wide biodiversity strategy

FOSTERING URBAN BIODIVERSITY THROUGH METROPOLITAN-WIDE STRATEGIES: OVERCOMING LOCAL GOVERNMENT COMPLEXITIES IN MELBOURNE

Local governments are important players in managing public land in cities. There are over thirty local government councils within greater Melbourne, which can generate complexities when coordinating the management of urban biodiversity. Nature is not bound by administrative boundaries; important habitats, watercourses, corridors and threatening processes all demand that we think and work holistically. A metropolitan-wide strategy to guide biodiversity planning can enable actions to occur at a scale that matches the urban ecosystems throughout greater Melbourne.

The strategy would provide approaches for local governments to individually enact on enhancing biodiversity that is aligned to a broader, shared goal to provide metropolitan-wide biodiversity outcomes. For example, habitat connectivity can be restored and enhanced throughout greater Melbourne, whilst key locations that require protection and restoration are identified. This can ensure an environment for human communities to access and enjoy whilst supporting the protection and return of key species.

A metropolitan-wide strategy could provide a basis for securing long-term resources and finance, while highlighting where funds are needed most and at scale. Doing so can mitigate budgetary issues within individual councils that struggle to provide for large-scale restoration actions⁶. Research of existing urban biodiversity plans around the world have highlighted valuable criteria to guide a metropolitan-wide strategy⁷.



Image source: [Melbourne Centre for Cities, City Diplomacy](#)

Plays at the Local Scale

Plays (actions) at the local scale occur in two instances:

- The first Plays are for those working at the local scale, they include opportunities for biodiversity occurring at the local government scale. Involved stakeholders include consultants, municipal councils, universities, community groups, and those alike.
- The second Plays include opportunities for biodiversity occurring at the local community and individual scale, and include actions for residents, businesses and community organisations and groups.

L1. Foster reciprocity and relationships in land management

EMBRACING A HOLISTIC APPROACH TO LAND MANAGEMENT IN PARTNERSHIP WITH TRADITIONAL OWNERS

To date, we have approached council-owned land as a set of property assets – roads, parks and public properties like libraries and community centres. This has been useful, but it also has been a very narrow view of the land, and in many cases we have forgotten that our public assets are unceded Country. Recent science is catching up and learning from and with well-established Indigenous knowledges, to highlight that we are part of our local ecosystems, and when those ecosystems are unhealthy we suffer too. Healthy ecosystems are essential to human and non-human species wellbeing, and vice versa.

Working with Traditional Owners groups, local governments should shift to a management lens that sees all land as Country, and that all Country should be managed respectfully not only for us, but also for the species that form the ecosystems around us. When this is our starting point, our streets, council properties and parks and reserves can shift to biodiverse, healthy components of the local ecosystems that form the Country we all belong to. Build on relationships already in place with Land Councils, or other Traditional Owner groups, to understand their ways of looking after and caring for Country. Develop, maintain and foster relationships based on reciprocity for people and land.



CASE STUDY

Parklands cultural burning in Carriageway Park, Tuthangga, City of Adelaide

Cultural burns, also known as fire-stick farming, have been adopted in Aboriginal culture and are conducted to enable fire to burn slowly and purposefully, in a motion referred to as 'trickling', to cleanse and rejuvenate the land that the fire passes over. The City of Adelaide's Horticulture Team, project managers and members of the Kurna community, workshopped with traditional fire practitioners to become educated on the value of the process of cultural burning and understand the conditions for the right fire for the right country.

L2. Get to know the Country you live on

EMBRACING A HOLISTIC APPROACH TO LAND MANAGEMENT IN PARTNERSHIP WITH TRADITIONAL OWNERS

Do you know which Indigenous country your city belongs to? Do you know which languages are spoken by local Indigenous people? How about the stories of the land where you live, or the names that local groups had for the places you go? Do you know what plants and animals that were common in your urban spaces?

The way that our cities have developed make it difficult to see the land they're situated on as Country. But, the land all Australians live on is a cultural landscape, and Indigenous communities have been custodians of local ecosystems for tens of thousands of years. Learning the true nature of Country in our cities is a big step towards appreciating our biodiversity at a deeper level.

You can learn about the Country you live on by reading Indigenous authors, attending events like cultural tours and yarning circles (for example, at NAIDOC week), and learning – with permission – some local words for places, plants and animals. Seek out the art and music of your Country, and the stories of local places. Encourage your kids to learn along with you, and ask your school if they're teaching children about Country.



Image source: [First Knowledges Plants: Past Present and Future](#)

“Do you know which Indigenous nation your city belongs to?”

RESOURCES

Braiding Sweetgrass, Robin Wall Kimmerer

[First Knowledges Plants: Past, Present and Future](#), Zena Cumpston, Michael Shawn-Fletcher, Lesley Head

L3. Revise design, engineering and maintenance standards to make biodiversity the norm

REVISING COUNCIL STANDARDS TO FOSTER BIODIVERSITY

Council standards provides guidance for many things, and for good reason – they create consistency, reliability and efficiency. They define what plant species are used, how common public infrastructure (like footpaths, tree pits, and kerbs) are designed, and how trees, parks and gardens are maintained. However, when standards aren't designed to support biodiversity, we incrementally produce landscapes that are not biodiverse. This also makes biodiverse design, construction and maintenance difficult, because it is a deviation from normal practice. Councils can fix this by revising these standards to support biodiversity at key project phases.

THREE IMPORTANT EXAMPLES TO INCLUDE:

1. Redefining standard planting palettes used in landscape design to include a broader range of native species in the context of a changing climate.
2. Revising standard landscape and engineering drawings to include understorey and mid-storey plantings.
3. Revising standard maintenance practices and specifications to better align with the needs of layered, diverse planting.

Detail Solution WS2

Solutions for access to water:
Surface Treatment:
WS2: Tree Grate

Pros:

- Minimal nature strip width
- Sufficient circulation space around tree
- Sufficient permeable area per tree

Cons:

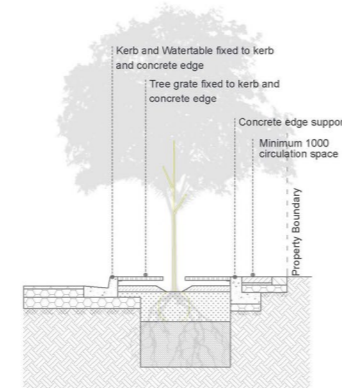
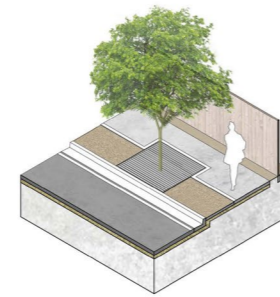
- Small primary soil volume achieved
- Increased cost for concrete support and tree grate

Suitable Application:

- High pedestrian traffic, high amenity situations, very narrow streets



Image source: [Trees in Challenging Spaces Report](#)



Section Detail
1:50 @ A4
Infiltration Area: 2.25m²+
Additional Catchment: N/A

Street Trees in Challenging Spaces | 91



L4. Encourage and support local and large commercial nurseries to supply native plants

CULTIVATING BIODIVERSITY BY ENHANCING NATIVE PLANT SELECTION FOR SUSTAINABLE LANDSCAPES

Nurseries tend to focus on supplying popular, attractive plant species; these are often unrelated to plants found in local ecosystems, and don't offer much benefit for local pollinators and fauna. Sourcing plants that optimally support local ecosystem function is not easy. This reflects a combination of factors - knowledge gaps about plant survival, limited supply chains, and, real or perceived, low consumer demand. When councils are consistent and specific about a palette of native plants, nurseries can more conveniently and reliably accrue stock. This is further reinforced through the practice of plant procurement far in advance from construction phases, providing nurseries with the time to source and prepare healthy plants that meet landscape design.

“ When procurement specifications do not include biodiversity... nature can end up slipping between the cracks.”

L5. Develop templates to ensure biodiversity is firmly and accountably included in procurement processes for design, construction and maintenance

STRENGTHENING BIODIVERSITY ACCOUNTABILITY IN PROJECT PROCUREMENT

It is often difficult to ensure that pro-biodiversity policy is effectively translated throughout the project cycle as it progresses through planning, design, construction and maintenance. In each phase, a procurement or briefing is undertaken to establish a contract regarding delivery of the next phase; often this procurement involves a detailed specification of the required works.

When procurement specifications do not include biodiversity requirements (for example, that a council planting palette is followed closely, or remnant vegetation is retained), nature can end up slipping between the cracks. This can happen even when the right language is included in tenders, but those requirements are not rigorously required in an accountable way. Councils can counteract this by developing standardised 'hard' clauses and metrics for inclusion in procurement.



Source: [westgatebiodiversity.org.au](#)

CASE STUDY

Westgate Biodiversity: Bili Nursery and Landcare, Port Melbourne

Located in Port Melbourne within the Sandbelt region of Melbourne, Bili Nursery and Landcare are a not-for-profit organisation that works with the local community and volunteers, traditional owners, citizen scientists and stakeholders to grow and supply Indigenous plant species, share knowledge and transform Westgate Park into a natural bush-like environment for the community and biodiversity.

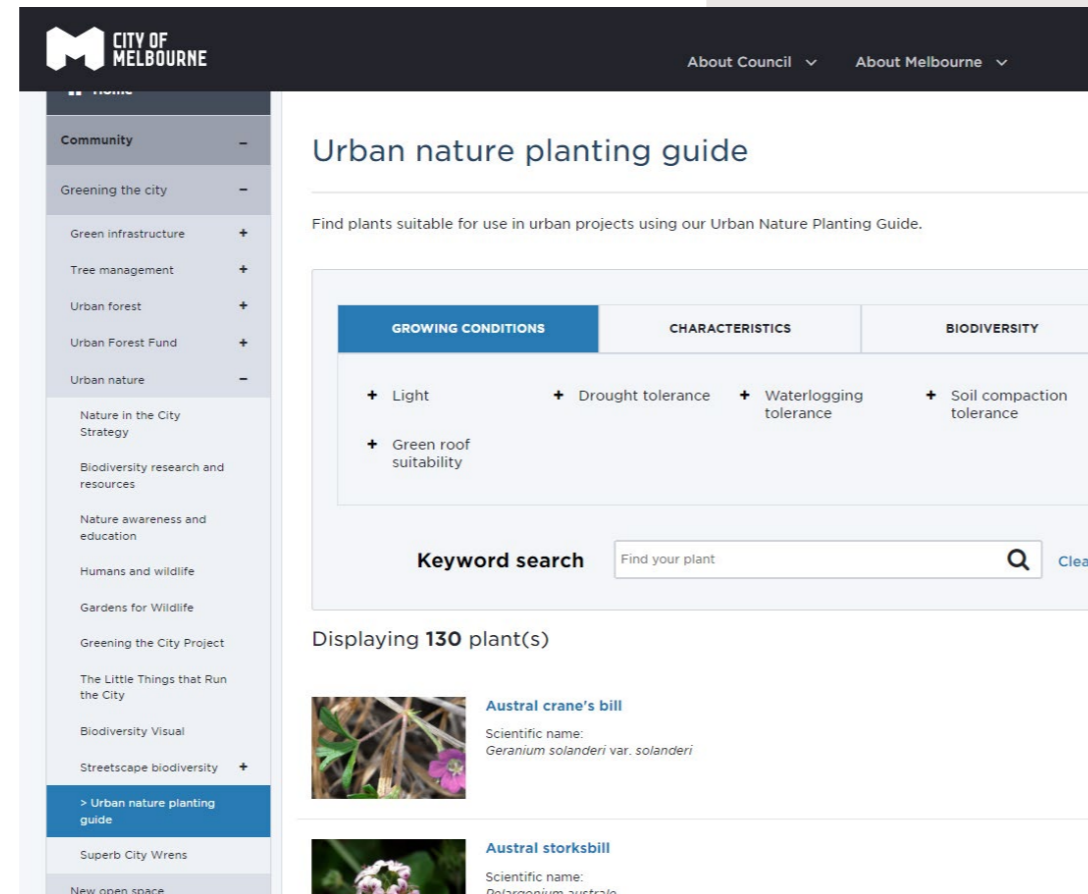


Source: Unsplash

L6. Upskill key staff in designing, building and maintaining biodiverse landscapes - and pay them for their skills

ENHANCING URBAN GREENING PRACTICES: INTEGRATING LOCAL FLORA AND FAUNA EXPERTISE

Key disciplines, including landscape architecture and maintenance, that are associated with urban greening have not always included training in working with local flora or fauna. This can result in a predominance of practices (for example, mowing) that are not supportive of local ecosystem function, or the misuse of native species in landscapes and public open space that have established mainstream approaches that utilise exotic species. Partnering with applied ecologists, horticulturalists and botanists, provides the opportunity for organisations and councils to upskill their staff with knowledge in the design, construction and maintenance of landscapes and enable the knowledge and methodology to apply more effective practices for more successful outcomes. It is also important to apply these skills and norms into the organisation and recognise the knowledge required from technical experts such as ecologists, horticulturalists and botanists, and advocate to ensure that these professions are paid accordingly, which can be based on business cases that articulate how skilled maintenance and plant identification is essential to ensuring biodiversity outcomes.



EXAMPLE

The Urban Nature Planting Guide, City of Melbourne

The Urban Nature Planting Guide is an encyclopedia of plant species that are suitable for use in dense urban areas within the municipality of Melbourne. Normalising the use of these plants is the next frontier.

L7. Make community-led greening easy by removing red tape and solving problems

EMPOWERING COMMUNITIES FOR BIODIVERSITY ENHANCEMENT IN PUBLIC GREEN SPACES

In some communities, there is real appetite for adding biodiverse planting to street verges and parks to improve connections to nature. Street verges can form as much as a third of all public green space, and often are only planted with heavily mowed exotic grasses. Local residents can play a positive role in transforming these spaces by planting native species, thereby enhancing ecosystem connectivity through residential areas even as they build their own connection to their neighbourhoods, and each other.

However, council policies often limit the activity of willing residents, both by imposing detailed permit requirements for simple actions, and prohibition of others. Whilst these controls seek to limit risk and liability, this is often perceived as burdensome as activities are often low risk, including verge gardening. There are more constructive ways to manage risk and solve problems, thus it is important councils and communities work together to determine mutually beneficial approaches to common (and manageable) design challenges, such as mitigation of soil contamination risks, creation of sight lines, utility access and pedestrian clearances, and maintenance of tree health. These should be supported by simple and straightforward processes as well as clear communication. Councils can also support community planting programs by identifying optimal planting locations, conveying greater support in removing tarmac, distributing native plants, and organising community planting days.

In many cases, councils also offer financial support to encourage communities and residents to partake in greening initiatives and create habitat on private land, such as the [Urban Forest Fund](#) by the City of Melbourne.

CASE STUDY

Melbourne Pollinator Corridor, The Heart Gardening Project

The Melbourne Pollinator Corridor is a series of street gardens that will span the 8kms along the Birrarung connecting Westgate Park to Royal Botanic Gardens Melbourne. Focusing on supporting native bees and other native pollinating insects, the Melbourne Pollinator Corridor is community-led, ecology-centred with assistance from over 20 scientists and specialists and has been designed within local council constraints.



Image source: [The Heart Gardening Project](#)

L8. Map the biodiversity you have, could have, and where the key gaps are

ENHANCING BIODIVERSITY CONSERVATION IN URBAN AREAS THROUGH MAPPING AND ANALYSIS

Urban areas play an important role for native species conservation, and council boundaries may be host to significant remnant biodiversity. Surveying and mapping native species and ecosystems provides a valuable knowledge base to enable the protection, expansion and restoration of biodiversity in your local area.

There are a range of mapping techniques that can be used to assess different elements of biodiversity at a landscape level. These methods range from simply visualizing all vegetation, water and other resources, to quantitatively assessing the performance of different areas for specific species. Some ecological metrics can easily be calculated for a government area, allowing comparison of different planning decisions. For example, ecological connectivity analysis quantifies how easily different species can move through the built environment, identifying key habitat patches for protection and areas that could act as future corridors.

CASE STUDY

[Biodiversity Baseline Data Project, University of Melbourne](#)

The Biodiversity Baseline Data Project aims to quantify biodiversity across the University of Melbourne's seven campuses. The project uses seven preliminary biodiversity metrics to measure biodiversity. These metrics include plantable area, number of areas of ecological significance, number of understorey plant species, number of trees and tree species, tree canopy cover and number of fauna and fungi species. Data collected through the project establishes biodiversity baselines for the University to adhere to and improve upon. The project also strategically identifies priority areas for revegetation, informs species selection for campus plantings and provides opportunities for student to contribute towards the University's sustainability commitments.

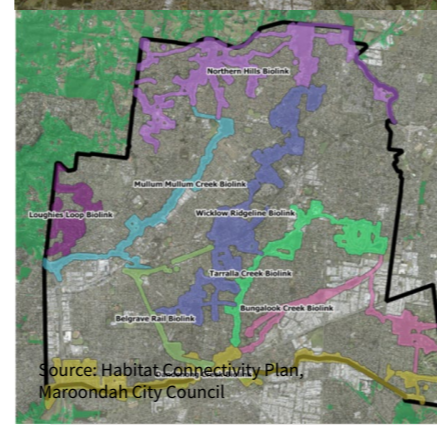
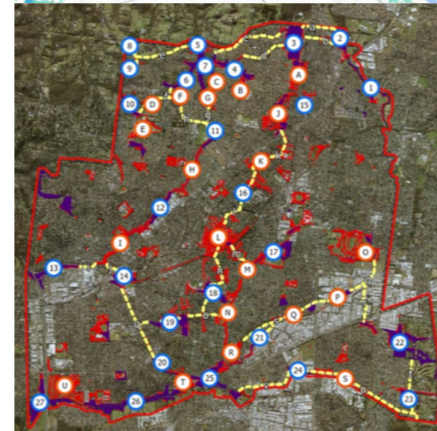
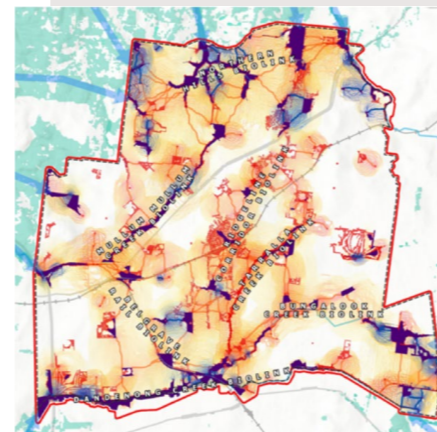
RESOURCE

[Improving connectivity for biodiversity across the City of Melbourne: A framework for evaluating and planning management actions, The Clean Air and Urban Landscapes Hub](#)

This resource provides a report and methodological framework to measure habitat connectivity for a series of key animal groups across an urban landscape.

CASE STUDY

[Habitat Connectivity Plan, Maroondah City Council](#)



Source: [Habitat Connectivity Plan, Maroondah City Council](#)

L9. Choose a target species to enhance their habitat

EMPOWERING BIODIVERSITY BY DEFINING KEY SPECIES IN URBAN ENVIRONMENTS

It can be difficult to look at a built-up area or a very European park design and imagine a biodiverse indigenous landscape. One clever way to kickstart your thinking – and bring your stakeholders along with you – is to work with your community and fellow council teams to define a handful of species that will be brought back or supported by council's actions. Of course, these aren't the only species that matter, but they can help guide narratives and thinking about what the structure, density and composition of your future planting might look like, as well as where you might put it. More broadly, the definition of these species is an exciting, optimistic exercise to participate in, and can help build support for the idea that our streets and open spaces should be designed not only for us, but also for the flora and fauna that belong here too.

Examples of target species within Fishermans Bend:



Superb Fairywren (*Malarus cyaneus*)

Habitat requirements:

- Dense vegetation cover including low shrubs
- Safe spaces for foraging on the ground
- Habitat connected by corridors

Design implications:

- Mid-storey shrubs and ground cover (<200cm high)
- Connections with Westgate Park, along roads
- Place habitat to facilitate human encounters



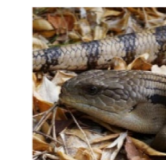
Fungi (various species)

Habitat requirements

- Damp soil
- Eucalyptus trees, fallen logs, dead plant matter/mulch
- Shade

Design implications:

- Contiguous soils with the ability to hold water or reliably damp patches of ground
- Eucalypts
- Capacity to tolerate/embrace leaf litter and fallen vegetation matter on the ground



Blue-tongue Lizard (*Tiliqua scincoides*)

Habitat requirements

- Tussocky grasses
- Leaf litter
- Hiding places (rocks/logs)
- Open ground for basking
- Away from busy roads!

Design implications

- Low-storey (<50cm) vegetation
- Rocks or logs nearby for shelter and nesting
- Road underpasses and/or low traffic roads



White mangroves (*Avicennia marina*)

Habitat requirements

- Clean, saltwater and freshwater, saline mudflats
- Tidal zone allowing for both full inundation and air exposure
- Shelter from waves and root/seedling damage

Design implications

- Edge or inlet tidal wetland areas
- Boat ramps or jetties to protect from disturbance by vehicles



CASE STUDY

[Fishermans Bend Urban Ecology Strategy: Biodiversity Report](#)

"Of the twelve shortlisted species presented at the stakeholder workshop, five were chosen as biodiversity targets to guide biodiversity planning and design. These were superb fairy-wren (*Malarus cyaneus*), growling grass frog (*Litoria raniformis*), blue-banded bee (*Amigella spp.*), brolga (*Grus rubicunda*) and blue-tongue lizard (*Tiliqua scincoides*). Participants also proposed two additional taxa during the workshop: fungi, and white mangrove (*Avicennia marina*). Given these seven species' various resource requirements, their return to and persistence in Fishermans Bend will serve as an indicator that the overall biodiversity objectives have been achieved."

L10. Build a biodiverse green roof or wall at home

UNLOCKING URBAN SPACES: GREENING BUILDINGS FOR BIODIVERSITY

Even on smaller properties that don't have gardens, there are creative ways to make space for nature on your building. Vertical greening can be achieved in many ways – from simple, attractive green facades using creeping or climbing plants, to more technically advanced hydroponic green walls that can be quite spectacular and lush. Rooftops also can be adapted to be inviting to urban nature, and also range from quite lightweight simple green roof systems with shallow soil to more technical, structurally reinforced rooftops with soil deep enough to support trees.

There are some free resources to help you pick the right plants and designs that will grow well and not damage your structure. The [Growing Green Guide](#) is a guide to greening on buildings in Melbourne using native species, and the [Guidelines for Biodiversity Green Roofs](#) can help you make sure your roof offers the best resources possible for local pollinators and birds.

In some areas, funds are available to support proposals for greening. For example, the [Urban Forest Fund](#) is a program which offers matched funding to exceptional greening proposals, large and small, in the City of Melbourne.

CASE STUDY

Burnley Biodiversity Green Roof, University of Melbourne

The Burnley Biodiversity Green Roof is located at the University of Melbourne's Burnley Campus, which is utilised as a research facility and demonstration of a green roof that has a focus on biodiversity. The research that has been undertaken as part of the Burnley Biodiversity Green Roof has informed the Growing Green Guide, and been used to develop green roofs including the Pixel Building, The Venny Community Centre in Carlton and Minifie Park Early Childhood Centre in Balwyn.



Image source: Nicholas S G Williams

RESOURCE

[Growing Green Guide](#),
City of Melbourne
Green Infrastructure
Research Group, University
of Melbourne

[Guidelines for Biodiversity
Green Roofs](#),
City of Melbourne
Green Infrastructure
Research Group, University
of Melbourne

[Burnley Green Roof Plant
Guide](#)
Green Infrastructure
Research Group, University
of Melbourne



L11. Bring your community on the journey with educational events and citizen science

FOSTERING ENVIRONMENTAL EDUCATION AND COMMUNITY ENGAGEMENT IN URBAN BIODIVERSITY

Discovering flora and fauna within local parks, streetscapes and backyards can be enjoyable and socially fulfilling. Opportunities to engage and educate residents and visitors can occur through educational events and citizen science, for example, conducting bioblitzes and using established online tools to aid residents in identifying species within their local area. Ecologists, council officers and Indigenous elders can be engaged as storytellers for educational events including nature walks and public events or in partnership with local schools, community centres, libraries and community groups.

Interpretive materials, both digital and physical, can also be valuable to aid park visitors to understand the species and ecosystems amongst them. Programs with high involvement, including citizen forestry or wildlife gardening, can include educational elements to enrich the connections people have with their ecosystems.

Public education is not exclusively about enriching the lived experiences of residents, but it is a prerogative to ensure that participatory processes are well informed and include all perspectives from the public. Not everyone is supportive of enriching biodiversity in urban environments, some can be opposed and inflexible – sometimes there are 'loud voices' that dominate events and exercise power by directly lobbying councillors. These individuals are not representative of the whole community, and initiatives like bio-blitzes,

representative surveys, educational walks and interpretive materials help make the many quiet supporters of urban nature more visible to decision makers and political leaders.

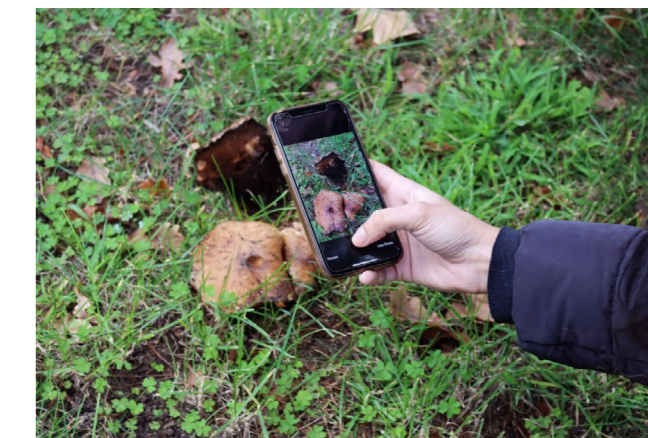


Image source: University of Melbourne - Sustainability Team, 2021

RESOURCES

iNaturalist

A platform of naturalists, citizen scientists and biologists who map and share biodiversity-related observations throughout Australia and the world.

FrogID

An Australian-born project to record and identify frogs.

The Clean Air and Urban Landscapes Hub Urban Wildlife

An app that allows citizen scientists to contribute data to research questions about the distribution and behavior of urban wildlife.

Atlas of Living Australia

An open access biodiversity database for researchers, government and land managers, communities and schools to access and contribute towards.

BioCollect

An accessible data collection tool developed by the Atlas of Living Australia to enable the collection and management of ecological and natural resource management data.

Climate Watch

A national citizen science network and [app](#) for observations of plants and animals that help track how climate change is impacting nature's rhythm.

L12. Plant a wildlife garden

CULTIVATING BIODIVERSITY: YOUR GARDEN'S IMPACT ON LOCAL WILDLIFE

The things we plant in our gardens and balconies are important. Through careful selection of the plants and habitat resources on your property, you are also choosing the species that will visit your home. A layered and diverse set of indigenous species in your backyard can become a haven for birds, butterflies, bees, frogs and lizards.

It can be difficult for fauna species to benefit from a single-species lawn, however, biodiversity benefits can be ascertained with lawns that integrate weeping grasses or wallaby grass. There are many [Gardens for Wildlife](#) programs throughout Melbourne and Victoria that will provide you with the guidance you need to bring nature into your backyard – while meeting neighbours and learning about species native and endemic to your local area. Gardens for Wildlife is located throughout many local government areas in Victoria.

Structural elements of nature – such as fallen logs, tree hollows, rocks, wetlands and other features – are critical for biodiversity. Existing structures should be retained and enhanced, and missing structures added. Structures can also include living elements such as trees, and these can be enhanced through the addition of more habitat, such as [native mistletoe](#), which provide important resources for fauna.

CASE STUDY

Kensington courtyard transformed into a native garden haven, City of Melbourne

Thomas and his family reside in a home with a small inner-city courtyard where concrete and sunshine are plentiful. This typology is typical of many Kensington homes and inner-city dwellings, with space to allow for entertaining, parking and greenery. Thomas applied for and received a Gardens for Wildlife visit, which provided him direction to visit Bili Nursery and redeem his plant voucher for plant seedlings. His garden has transformed since the visit – his new garden is planted in soil with local indigenous species that support local wildlife.

Ann-Sofie's CBD balcony with Gardens for Wildlife, City of Melbourne

Ann-Sofie was greeted by Garden Guides Sam and Charlotte, who provided ideas to transform her CBD balcony. After her visit from Gardens for Wildlife, she visited Bili Nursery, who helped her to select optimal plant species for her balcony. Ann-Sofie's CBD balcony has now been transformed into a 'garden' with small and large potted plants, primarily without flowers. Species include alpine mint, strawberry gum and cinnamon myrtle. Her garden has seen new visitors since her transformation, including from dragonflies, ladybugs and some cricket-like insects.



L13. Join, or start, a community greening group

Whether you would like to green-up your street, grow some vegetables in a community garden, or add biodiversity to a local park or creek-line, there is likely a volunteer group that will welcome you. These groups can offer new social networks and a chance to advance your skills in gardening and planting for biodiversity.

Some local community gardening groups and initiatives:

- Community gardening groups – [Local Food Connect](#) provides a directory of community gardening groups and events, including farmers' markets, food swaps, community gardens and cooking classes.
- [Urban Bushland Initiative](#) is a Naarm-based not-for-profit organisation that revegetates urban spaces with native vegetation, connecting communities and creating habitat for native flora and fauna.
- 'Friends of' groups focus on regeneration of public open space. For example, [Friends of Westgate Park](#) and [Friends of Merri Creek](#)
- Verge gardening groups, including [The Heart Gardening Project](#) or [Brunswick Communities for Nature](#) seek to green nature strips, kerbsides and verges.
- [Citizen Forester](#) and the [City Nature Challenge](#) hosts events for the community to network, learn new skills and build knowledge about green space.
- [Landcare](#), [Victorian Friends of Groups](#) and [Conservation Volunteers Australia](#) provides a directory of community gardening groups and initiatives within greater Melbourne and Victoria.

CASE STUDY

University of Melbourne planting days

The University has organised several planting days since 2022 for students and staff to participate in. From these events, over 1,200 understory plantings and trees have been planted on campus.



Image source: University of Melbourne Sustainability Team, 2022

L14. Ensure that ecology and maintenance specialists are involved in design processes

FOSTERING COLLABORATION FOR BIODIVERSE PUBLIC REALM DESIGN AND MAINTENANCE

Different disciplines, including designers, horticulturalists, maintenance and biodiversity management experts, are involved in different aspects and phases of a project and often have limited interaction. As a result, issues arise where plant species selection may not be appropriate for the region or cannot be maintained effectively. Therefore, it is important for public realm projects to include a biodiversity focus, given that species selection is critical and standard maintenance regimes are not always suitable, and therefore requires careful consideration of operational costs.

There can be differences between industry practice and academia, which may reinforce separations and silos that make biodiverse greening difficult to achieve. However, it is critical to bridge these gaps and ensure that design and maintenance are working closely and respectfully if we seek for a biodiverse public realm.

CASE STUDIES

Woody Meadow Pilot Project, City of Melbourne

These pilot plantings conducted in collaboration with the University of Melbourne, the University of Sheffield, the City of Melbourne and the Royal Botanic Gardens Victoria, investigated the potential to use Australian shrubs in low maintenance landscapes. Woody Meadows are novel low-cost and resilient approach to urban greening, using natural shrublands as templates to create beautiful, diverse plantings of Australian shrubs which are

maintained through coppicing. The Pilot Woody Meadow plantings received positive feedback from the community and councils, government agencies and developers are embracing this idea, with over 6,000 square metres of Woody Meadows currently established around Australia.

Designing and managing biodiverse streetscapes: key lessons from the City of Melbourne

The City of Melbourne and University of Melbourne collaborated to develop a suite of understorey plant species that can increase streetscape biodiversity. Criterion was developed from the Urban Nature Planting Guide to guide the design and creation of streetscape plantings within the City of Melbourne. Further, the process to develop this project enabled the discovery of key lessons, including the importance of soil preparation and weed management prior to planting and the development of a clear, ecologically sensitive management plan. This was made possible by incorporating knowledge from landscape maintenance staff, particularly those with horticultural knowledge and experience working with indigenous and native plant species.



Image source: [Woody Meadow Pilot Project](#)



Source: Pexels

L15. Practicing and promoting responsible pet ownership - keeping cats indoors and controlling dogs around wildlife

PROMOTING RESPONSIBLE PET OWNERSHIP FOR WILDLIFE CONSERVATION IN URBAN AREAS

Zoos Victoria and RSPCA have a joint initiative - 'Safe Cat, Safe Wildlife', that provides many useful resources to build a community of cat owners that can provide their pets with long and happy lives by keeping them indoors. Keeping cats safe indoors protects and allows native wildlife to flourish, whilst also reducing the risk of injury and death of cats from road accidents, fights and disease.

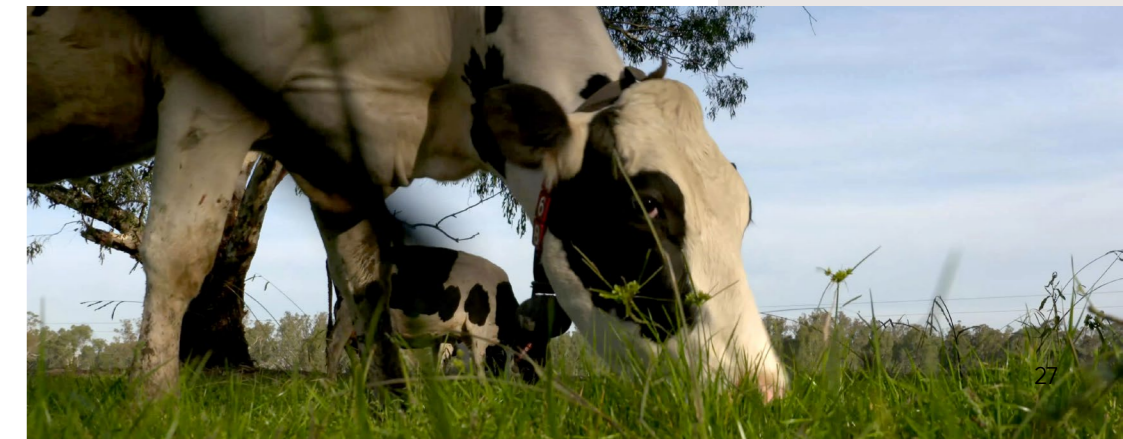
Similarly, keeping your dog on a leash in urban green spaces reduces disturbance for many ground-dwelling urban wildlife and ensures that our local parks are friendlier for those within our communities who are nervous around dogs. Also, don't forget to pick up their poo!

Sign up at [Safe Cat, Safe Wildlife](#)

L16. Adopt biodiversity-friendly product alternatives, including pesticides, rodenticides and algaecides for ponds

FOSTERING BIODIVERSITY-CONSCIOUS PRODUCT ALTERNATIVES IN PEST AND LANDSCAPE MANAGEMENT

Biodiversity-friendly product alternatives for pesticides, rodenticides and algaecides can be adopted at both the community and individual, as well as the organizational and local government scale. [BirdLife](#) has a [campaign](#) that seeks to phase out second-generation anticoagulant rodenticides, and encourages individuals to advocate to their local governments to phase out the use of these rodenticides in the community.



“ Keeping cats safe at home protects and allows native wildlife to flourish

L17. Consider strategies to minimise noise and light pollution

MITIGATING NOISE AND LIGHT POLLUTION IN URBAN DEVELOPMENT FOR WILDLIFE CONSERVATION

Design and construction of infrastructure and public realm projects often culminates in noise and light pollution impacts on the surrounding community. This can result in physiological alterations to wildlife that co-habitate these environments. The [National Light Pollution Guidelines for Wildlife](#) provides guidance and strategies to reduce the impacts of noise and light pollution on fauna species, including birds and insects, which reside in urban environments.

L18. Recognising the value of nature enables greater preservation and allows species to thrive

PLAN AND FACILITATE POSITIVE INTERACTIONS WITH NATURE, FOCUS ON REMOVING NEGATIVE HUMAN-NATURE INTERACTIONS

The value of native trees is important to recognise, as they have considerable impact on native fauna. The significance of mature, native trees, particularly eucalypts, is not often acknowledged, which results in many mature eucalypts to be removed to provide space for new developments. It takes 100 to 200 years for a eucalypt to reach maturity, which can be lost if they are not considered worth saving.

Mature eucalypts can be utilised as support structures, perches and platforms for bird species to construct nests. Cavities within eucalypts can also be used for habitat. Many mature trees also support high concentrations of food for animals that feed on nectar or seed⁸.

It is crucial to acknowledge the importance of mature trees for native fauna, and maintain them to ensure they are made safe for the community.

Finally, more work on quantifying the benefits and value from ecosystem services derived from urban open space is needed.



Image source: [The Conversation](#)



L19. Seek opportunities to enhance native vegetation diversity and structure in urban landscapes

ROAD SPACE, CAR PARKS AND SLIP LANES CAN BECOME SPACES FOR URBAN BIODIVERSITY

Unused space in cities can be converted into new public open and green space, enhancing user experience within the public realm. Council policies and strategies can become the first step to providing this change, and commitment to urban biodiversity can provide the push for processes that enable greener city transformation.

Interventions can be implemented incrementally and at a small scale, providing the flexibility for councils and organisations to green the public realm at a small cost.

CASE STUDY

[Grey to Green, City of Melbourne](#)

The City of Melbourne's Grey to Green program repurposed sites that are owned or managed by Council, including surplus road space, car parks,

slip lanes and maintenance depots. Carparking was removed, streets were closed, adjacent property was acquired and linear street parks were converted into new pedestrian and green space.

The Grey to Green program is cost-effective and environmentally friendly, and can be replicated in any city. The versatility of the program enables it to be undertaken in small or large scales, involving local communities to enhance their city.

The program is research focused and design led, ensuring that the outcomes resulting from the program are documented, and benefits of access to public open and green space, exposure to natural ecosystems and biodiversity are realised. Further, impacts to Urban Heat Island Effect, flooding and biodiversity loss can be realised and measured, and contribute to strategic outcomes outlined by council.



Image source: [Grey to Green](#)



Key Play: Dispelling the myths

Dispelling the barriers (myths) to increasing nature in our cities.

A key play to increasing biodiversity in our cities is dispelling the myths – the barriers – that many practitioners, politicians and individuals experience.

For this Play, we present seven myths that were explored and discussed at the Urban Nature: Urban Myths symposium in May 2023.

The myths were originally determined by the Symposium's scientific organising committee, who included Lee Harrison, Nicholas Williams, Amy Hahs, Kylie Soanes and Cathy Oke.

The myths in the Playbook are a combination of the organising team's initial description, an extensive literature review conducted by Kahlin Lee, contributions from speakers, panelists and audience members who attended the symposium on 11 May, 2023, and all contributing authors of this book.

Disclaimer: While this input represents an extensive process to capture key urban nature myths, it is not an exhaustive process and not a full representation of perspectives and views.

We believe that our collaborative summaries of each myth will enable organisations, community groups and individuals to engage in debates to find a way forward for more biodiversity in our cities.

01

Small habitat patches don't matter

Myth

Small patches of habitat come in many forms including bushland remnants, backyards, nature strips, rain gardens, green roofs and many more. New research quantifying the Single Large or Several Small (SLOSS) debate is turning old ideas about the importance of large patches on their head and showing that cumulative loss or gain of small patches can have far-reaching consequences.

- L5
- L7
- L8
- L11
- L12
- S1
- S2

RELEVANT PLAYS

Myth 01 Small habitat patches don't matter

Challenging traditional perspectives

Diamond⁹ provided original theories on the significance of habitat patch size, denoting that a single large patch of habitat (SL) is better than several smaller habitat patches (SS). It was believed that a SL habitat can host more species, thus mitigating the risk of species extinction. This theory has since been popularised in practice, where large natural areas, for example state and national parks, are prioritised for action and management, whilst smaller habitats are deemed unimportant for conservation¹⁰.

Recent and emerging research has since identified that small habitat patches are in fact important for biodiversity conservation and serve many benefits¹¹. Multiple small habitat patches frequently foster greater species diversity across a wider range of taxonomic groups than a single large patch of equal size¹². Further, migratory birds and pollinating species often benefit from having access to many small patches of habitat^{13, 14, 15}.

Within cities, small persisting habitat patches have been deemed essential for the survival of urban species. Australian cities are biodiversity rich, harbouring greater species diversity and threatened biodiversity than non-urban environments, highlighting the important role these spaces play in saving species from extinction¹⁶. Small patches of remnant habitat are distributed across a landscape of human modified environments, increasing overall landscape diversity and presenting novel habitats to urban species. Evidently, current research highlights the need for policy and practice to shift the focus from minimum patch size and prioritise minimum total area of all patches.

Patch composition, arrangement and distance matter

Although the narrative is changing, habitat composition and distance between patches continue to play important roles when determining habitat value^{10, 17}. Small habitat patches need to be size- and site-specific, for example, grass and vegetation cover, presence of old trees and size of a city square influence the diversity and abundance of urban birds¹⁸. In other taxa groups, insect diversity has been strongly linked to understorey vegetation cover¹⁵. Further, there is evidence suggesting that patches situated within the urban landscape, amongst other patches, has the strongest positive effect on biodiversity^{13, 17}. Therefore, future urban planning should focus, not only on preserving and enhancing small habitat patches, but also in creating a network of corridors with these small patches.

What are these urban habitat patches? And what do they look like?

Urban habitat patches are and can be anything from road verges, median strips, roundabouts, green roofs, backyards, rain gardens, bushland remnants and so forth. As practitioners of the urban environment, it is crucial to expand our knowledge on what we know and believe habitats are and can be, as there is much potential to explore the untapped value of small patches in cities. By identifying these spaces as potential habitat patches, we can then consider the possibility, appropriateness and pathways to transform into a space that species may use.

“Although the narrative is changing, habitat composition and distance between patches continue to play important roles when determining habitat value”

02 Anything green will do

RELEVANT PLAYS

L2

L3

L4

L5

L6

L9

L11

Myth

Many cities were founded in biodiversity hotspots. Melbourne is one of those cities and still retains a lot of biodiversity – for now. The indigenous plant species (not just trees) of our city need to be conserved and actively retained and restored. Furthermore, many of the fauna and other species we value are reliant upon their evolutionary relationships with indigenous plants. If we want to live amongst the unique species we love, we must think carefully about what we plant and protect as a society.

Myth 02 Anything green will do

Changing landscapes

Historically, humans have settled on land with productive soils and favourable climates located along waterways¹⁹. Through urbanisation, new conditions have evolved. Our cities and neighbourhoods have undergone significant change in terms of temperature, climate and hydrology. This has created a myriad of micro-climates, sub-environments and novel ecosystems enabling cities to support a diversity of species, including threatened species²⁰. In the midst of the biodiversity crisis, cities must act to enhance the biodiversity they support through implementing species-specific and evidence-based solutions. We can no longer accept the notion that anything ‘green’ or any action will do.

Species have unique needs, requiring different food and habitat resources. The complexity of species within cities emphasises the need to understand species requirements, both within their natural range and novel urban ecosystems. Urban spaces have been vastly altered and species have responded to this change. For example, in the city of Perth, Carnaby’s black cockatoo relies on an introduced pine plantation, which enable the use of novel food resources in locations where their natural food source has been removed²¹.

Emphasis on indigenous

Many species are still largely reliant on the evolutionary relationships they hold with their Indigenous counterparts. In urban green spaces, indigenous plants are vital for supporting diverse insect communities and species they co-evolved with²². However, vegetation structure also requires consideration. Research has uncovered that vegetative and structural complexity of a plant species, regardless of its origin, is as important in increasing biodiversity²³. Traditional urban management practices have favoured simplistic landscapes with minimal structure, for example grassed lawns with tree canopy, which hinder the potential for urban green spaces to support biodiversity and enable climate change action^{22,24}.

Species’ resource requirements

Management interventions and restoration projects must carefully consider the resource requirements of species. For example butterflies rely on plants for food, and as hosts for the larval stage of their life cycles. Green spaces that are floristically diverse with a wide variety of larval host

plants support greater diversity and abundance of butterflies²⁵. However, resources relevant to one species may not be for another. Large woody trees are optimal habitats for cavity-nesting bees, while patches of bare ground are essential for supporting ground-nesting bees²⁶.

In a world where urban expansion is ongoing and our landscapes are constantly evolving with climate, it is crucial that biodiversity is planned for and present in our cities. Urban practitioners must understand the resource requirements of target species and ensure urban habitats offer a variety of resources to support diverse communities. Carefully curated urban habitats may act as places of refuge during periods of resource scarcity²¹. These spaces will be integral to enhancing the capacity of cities and neighbourhoods to support biodiversity.

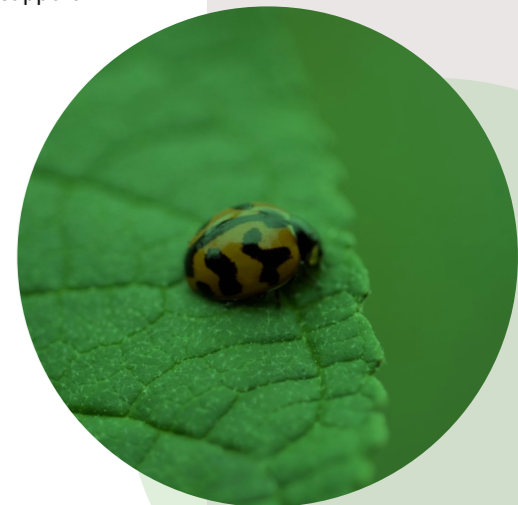
RESOURCES

[NatureKit](#)

[Species and ecological communities under threat](#)

[Which Plant Where](#)

[Indigenous plant use: A booklet on the medicinal, nutritional and technological use of Indigenous plants](#)



03 Green infrastructure will solve the biodiversity crisis in cities

Myth

Most urban green infrastructure projects are not designed to provide habitat as a primary purpose. Yet high level policies and reviews continually lump green infrastructure into solutions to the biodiversity crisis in cities. Green infrastructure such as green roofs, street trees, rain gardens, street gardens and urban parks come in many forms and can create habitat for target species if done deliberately, thoughtfully, and using an evidence-based approach. We need to have a better understanding of the resources required for the species we seek to support, as well as the spatial and temporal scale they operate in, to inform plant selection, design and maintenance of green infrastructure projects.

Source: Getty Images

RELEVANT PLAYS

L2

L3

L4

L5

L6

L9

L11

Myth 03 Green infrastructure will solve the biodiversity crisis in cities

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) conceptual framework recognises that relationships between people and nature exists within three dimensions – “nature, the benefits that people derive from nature and a good quality of life”²⁷. Whilst green infrastructure (GI) is designed to provide multiple benefits, the latter two of the three dimensions are often prioritised, with nature’s intrinsic value being overlooked in policies, strategies and implementation^{28,29}.

Green infrastructure must specifically address biodiversity

An understanding of how ecosystems function is crucial for the appropriate implementation of biodiversity friendly GI design. Scalability is often prioritised in GI projects at the expense of design elements that target local species. Ecosystems and the species they support possess unique qualities and traits. GI projects must therefore incorporate these distinct requirements into designs over broad-brush approaches³⁰.

Failure to consider local ecosystems in GI design can result in unintended consequences, wasted resources and

creation of ecological traps^{31,32}. Ill-informed projects can be disruptive to ecosystems and threaten ecosystem health, where for example the Victorian Volcanic Plains grasslands have different requirements from other urban ecosystems and therefore require appropriate knowledge to care for.

Green infrastructure: A balancing act

Balancing GI’s capacity to sustain vegetation with its ability to support biodiversity is crucial if GI is to solve the biodiversity crisis in cities. While green roofs offer numerous benefits, they are incomparable to ground-level vegetation. Green roofs support species that are mobile, have small body sizes and can complete their life-cycle within the green roof environment^{33,34}. In comparison, species with low dispersal rates that are unable to access the roofs and require deep soils will not benefit from green roofs³⁴.

In similar capacity, residential gardens are more conducive as habitats for small bee species than large bee species as there may be greater overlaps in resources and similar foraging niches available³⁵. Larger and more formal forms of urban green space including parks and golf courses can provide ample habitat for birds, bats and bee species, although this is dependent on the quality and appropriateness of such habitat being provided³⁶.

Green infrastructure to enhance connectivity

Green infrastructure can play an important role in enhancing cities’ capacities to support biodiversity when designed with nature in mind. Strategic implementation of GI can be adopted to form ecological corridors and enhance connectivity of urban landscapes for biodiversity^{36,38}.

CASE STUDY

[Floral resources to encourage colonisation and use of green roofs by invertebrates](#)

“Failure to consider local ecosystems in GI design can result in unintended consequences, wasted resources and creation of ecological traps.”



04 Nature will look after itself

RELEVANT PLAYS

- L2
- L3
- L4
- L5
- L6
- L9
- L11

Myth

Country needs care. Victorian ecosystems have been evolving, adapting and living under the guidance and management by Traditional Owners for thousands of years. European colonisation brought an abrupt and violent end to much of that management. Species and ecosystems that had come to rely on humans and their activities, for example digging for tubers, burning and hunting, are now often threatened or over-abundant due to this lack of management. It is imperative that we invest in appropriate management of biodiversity with deliberate objectives, including in cities.

Myth 04 Nature will look after itself

Mismanagement of nature

Current land management techniques in Australia continue to perpetuate Western ideas that humans are different from nature³⁸. This perspective is prevalent in Australia, a country that has witnessed a rapid loss of biodiversity and ecosystem function.

Present day land management practices in Australia are informed by European and colonial systems that were enforced since the British invasion. This has manifested into the mismanagement of nature and culminated in landscape changes, including the over-irrigation of soil resulting in increased soil salinity, heightened soil erosion and loss of topsoil, uncontrollable fires³⁹, and increased rates of biodiversity and species loss⁴⁰. These resulting consequences and environmental concerns indicate that Westernised land management practices are rather a mismanagement of nature. This begs the question – how was land managed and not destroyed prior to colonization?

Land management practices of Aboriginal Australians

Many Australian landscapes have undergone Aboriginal land management practices for tens of thousands of years, including planned, low-intensity burning, also known as fire-stick farming. This was evidenced by Aboriginal communities in Australia's Wet Tropics, and was utilised to alter flora and fauna communities and enhance biodiversity, control weeds and facilitate hunting^{41, 42}.

These landscapes have sustained for generations, without environmental or ecological destruction. Indigenous land management practices highlight the wealth of knowledge held by Aboriginal and Torres Strait peoples and the imperative to legally recognise and support Aboriginal conservation areas and land management practices⁴³. There is much to be learnt, including Indigenous cultural values and views, which hold equal importance alongside tangible actions³⁸.

Perceptions of human and nature

Motivations to care for nature are shaped by people's emotions, experiences and relationships with nature. Holistic perceptions that humans are a component of and not separate from nature is recently becoming recognized in Western society. In comparison, the concept of totemic species enables Australian Aboriginal people to recognise and relate to a chosen species, forming a mutually beneficial relationship where one looks after the other⁴⁴. A person shows respect for their totem and in return the totem is their protector.

Similar concepts and ideologies have been expressed through the Western lens. Species have been explicitly considered in the design stage of projects, serving as active stakeholders⁴⁵. Stewardship encourages people to actively protect and care for nature, as nature benefits people³⁸. These actions enable a sense of connectedness that can begin to alleviate current mainstream perceptions that humans are unlike nature.



05 Nature doesn't belong in the city

Myth

A common argument against protection or reinstatement of biodiverse spaces in urban areas is that nature does not 'belong' in the city. Cities are perceived as places primarily for humans and places retaining biodiversity values have commonly been discounted as 'under-utilised' by people, and considered a 'waste' of precious space. Do other species deserve space in the city? And if so, to what rights are they entitled? If people cannot experience wild species and natural-looking places in the city – what are they missing out on? And who is missing out the most? What does nature in the city mean to Traditional Owners?

- L3
- L5
- L9
- L10
- L11
- L14
- L17
- S1
- S3
- S4

RELEVANT PLAYS

Myth 05 Nature doesn't belong in the city

Nature and human health and wellbeing

Human beings possess the agency to enhance biodiversity and create opportunities for nature to thrive in our cities. Cities have the capacity to address the biodiversity crisis by implementing targeted actions for biodiversity conservation²⁹. However, we must also welcome nature back into our cities for our own survival and wellbeing.

The benefits of nature for human wellbeing are increasingly being acknowledged. Nature supports the social, emotional and physical development of children and teenagers^{44,45}, increases social connectedness and physical health⁴⁶ and is beneficial for restoring mental health⁴⁷.

Healthy, biodiverse ecosystems are also essential to human health for a wide range of other reasons beyond wellbeing, including nutrient-rich and secure food supplies, medicinal resources, protection and purification of water sources, defending against infectious diseases, and preventing catastrophic cascading effects of ecosystem collapses⁴⁸.

Despite these benefits, attitudes that nature does not belong in the city remains prominent. People are fearful of outbreaks of pest species⁴⁹, believe nature is a 'waste of space' and hold negative perceptions around nature being wild^{14,50}. These attitudes and perspectives limit the

potential for cities to support biodiversity, hindering the subsequent benefits to urban residents.

Tools for changing perspectives

Nature stewardship is a powerful tool for strengthening connections with nature. Stewardship directs people's sentiment and values towards a particular species or ecosystem, to induce care, protection and restoration⁵¹. Values that incite action for biodiversity reinforce perspectives that species can and should co-exist in spaces inhabited by people⁵².

When nature is enhanced and cared for, feelings of connectedness are reinforced. Within Indigenous Australian culture, totemic species encourage individuals to identify and empathise with their chosen species, through a mutually beneficial connection⁵³. Embedding nature through such a perspective has been shown to increase feelings of connectedness with biodiversity in children, reducing behavioural issues and improving cognition and physical health⁴⁴.

Thriving cities

Despite such negative and detrimental perceptions of nature, cities are host to a miscellany of wildlife communities and known to harbour more threatened species than their equivalent non-urban areas⁴. Cities have the potential to support species and enhance biodiversity¹⁶. Such actions not only enhances the availability of food and habitat resources for species but provides opportunities for humans to be exposed to and connect with nature. As is evident, presence of nature is beneficial to people's wellbeing, however, the enhancement of nature to support biodiversity can further enhance feeling of connectedness and reinforce the benefits that nature provides to people.

CASE STUDY

How flower-filled grasslands are finding their way into Melbourne's CBD
[Katherine Horsfall's Parkville experiment: grasslands find their way into CBD.](#)



06 People won't like it

RELEVANT PLAYS

L4

L7

L9

L10

L13

L14

S4

Myth

You can never please everyone all the time. People still ask the question: 'why native plants?', let alone, 'why indigenous plants?' Many still claim native trees 'don't produce shade', 'drop limbs' and are 'messy', while Indigenous tree species are disregarded all together. But how many people truly object to indigenous and biodiverse landscaping, and on what grounds do they object? Is it fear, disgust, civic pride, colonialism or plain old ignorance? What techniques can be used to broaden the appeal of natural-looking spaces and put people at ease so they can enjoy these places? What are the trade-offs and are they worth it?

Myth 06 People won't like it

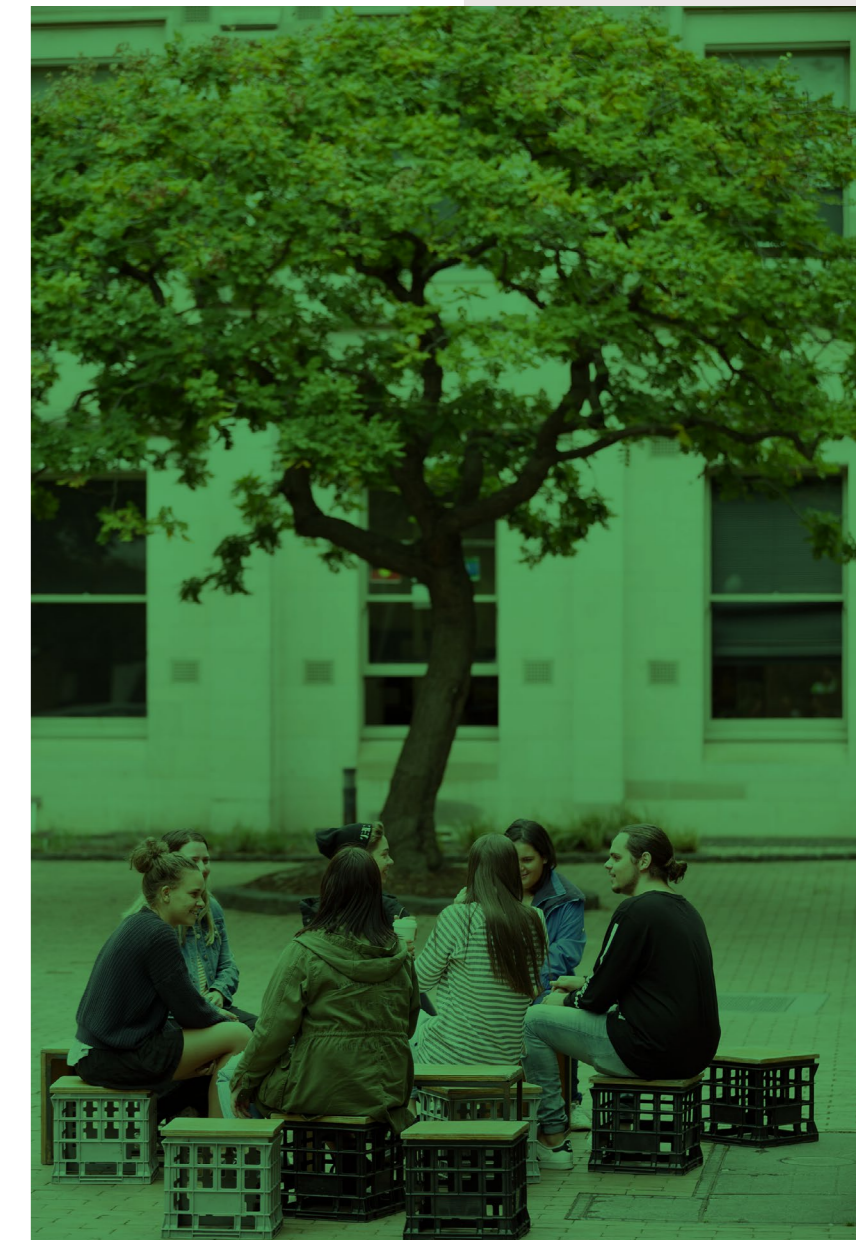
'Nativeness' can be conceptualised from two perspectives – cultural and ecological. Ecology classifies a species as native when it is of indigenous origin⁵⁵. This perspective often influences biodiversity conservation actions and a species' worthiness of being protected⁵⁶. People's attitudes and behaviours towards nature are influenced by their experiences with nature⁵⁵. To 'get people to like it', attitudes and experiences must change.

Nature must be convenient and accessible

For people to experience nature, nature must be convenient. Experiences with nature are largely controlled by the presence of green space within one's surroundings, and their convenience to access such spaces²⁰. Having access to nature builds a sense of place and can even influence people's decisions to plant natives over exotics⁵⁷.

However, greater behavioural change is achieved when practices are convenient to act upon⁵⁸. Native species are often absent from residential gardens due to perceptions that they are time consuming to maintain. Difficulty in obtaining native species from nurseries also hinders native species from being more widely implemented across residential, park and commercial gardens⁵⁸. Further, people's preferences for nature may also derive from the activities that different types of urban green space affords. For example, the English Landscape-style public parks were perceived by respondents as the most preferred, given that they are multi-purpose and convey a sense of safety⁵⁹.

Research also shows that some people do like native plants. Studies that look at different groups within society often find groups with strong, positive preferences for native plants⁶⁰. While there may be a vocal minority articulating a different position, this is mostly not the case.





07 We can't afford it

Myth

One of the most cited reasons for being unable to invest in biodiverse green spaces is the cost of maintaining them. Perhaps a better question is – can we afford not to?

- L2
- L3
- L4
- L5
- L6
- L9
- L11

RELEVANT PLAYS

Myth 07 We can't afford it

Exposure to nature benefits us in a multitude of ways. Spending time in nature increases feelings of connectedness with our local environment and can encourage uptake of environmentally friendly behaviours^{28, 61, 62}. For example, citizen science and the positive connotations that a person associates with nature can bring improvements in wellbeing and foster a closeness with nature⁶³. Ultimately, it should be acknowledged that nature is beneficial to our physical and mental health⁶⁴.

Investing in nature can reduce the costs of health

High quality green spaces have the power to vastly influence people's health and wellbeing by encouraging physical activity, facilitating recreation and connection with friends and family, and stimulating mental health gains through reduction in anxiety and depression. Staying active and accessing nature are crucial to human health, however, nowadays these must be deliberately incorporated into day-to-day activities due to our largely urban and sedentary modern lifestyles. There are great benefits from engaging in physical activity. In Victoria, 265 disability-adjusted life years and 65 incidences of diseases can be prevented for every 10,000 Victorians who become and stay active⁶⁵.

The number of studies examining the links between access to nature and physical and mental health have rapidly increased over the last decade⁶⁶. Studies show a very wide set of benefits from access to nature⁶⁷. These benefits range from the benefits of physical exercise to the improvements in cognition⁶⁸ and reduced anxiety and depression from hearing birdsong⁶⁹. All these benefits have real value to people and to government expenditures but the link between investments in urban biodiversity and savings on health expenditure is not often made. A recent study in South Australia showed that in 2018, approximately \$140 million, or four percent of the total

2018 State healthcare budget, was saved as a result of use of metropolitan parks in South Australia⁷⁰. Further savings are possible if governments choose to improve the quality and accessibility of green spaces⁷¹.

Opportunities for urban green space

Urban green spaces can provide much needed opportunities for mental and physical health recharge. Walking tracks and open spaces that support exercise and physical activity are in high demand in cities⁷². These spaces need to be multifunctional, supporting human activity, urban biodiversity and the provision of ecosystem services. Spaces that foster healthy ecosystems and a complement of urban species will result in further wellbeing benefits and reduce the burden of health costs on State and National budgets.



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