

Biodiversity Sensitive Urban Design: How to build biodiversity into our urban landscapes

Factsheet

Nature is in decline throughout the world, and cities are increasingly recognised for their importance as refuges for wildlife.

This factsheet helps you find out how you can use **Biodiversity Sensitive Urban Design (BSUD)** to build nature into your project and create a nature positive development.

BSUD encompasses a set of principles and a process that can be applied to make a positive, on-site contribution to biodiversity while meeting other urban greening and development outcomes.



Windsor Street Biodiversity Linear Reserve (City of Unley)

Why protect and grow biodiversity?

Biodiversity is the variety of all living things on Earth, including plants, animals, fungi and micro-organisms. Biodiversity within cities is fundamental for human health and well-being, and delivers a wide range of critical ecosystem services.

For people, exposure to nature in urban areas can help reduce stress, lower mortality rates and improve cognitive development in children. It can also contribute to a sense of place, identity, and physical and mental wellbeing.

Biodiversity in our suburbs has also been shown to enhance visual amenity, support pollination, control pest insects, increase soil health, protect waterways and drainage systems, provide cooling and reduce energy consumption.

For wildlife, urban areas can provide important habitat, including for threatened species. Biodiversity can be supported and protected through thoughtful planning and design, innovation and stewardship.

BSUD recognises the critical value of nature in urban areas and demonstrates how to offer habitat and resources for native wildlife within the built environment, while providing many benefits for the community.

“Australian cities support substantially more nationally threatened animal and plant species than all other non-urban areas on a unit-area basis.”

Cities are hotspots for threatened species (Ives et al., 2026) ⁱ

What are the principles of BSUD?

BSUD is underpinned by 5 key principles:

- **Maintain and create habitat** – prioritise protection of existing vegetation, planting native species, and design to meet the food, water and habitat needs of target species and ecosystems.
- **Facilitate dispersal** – improve connectivity to facilitate the movement of target species through public and private land.
- **Minimise threats and disturbances** – mitigate the threats presented by an urban environment, such as noise and light pollution, vehicle strike, weed dispersal and feral predators.
- **Enable natural ecological processes** – maximise ecosystem services and processes such as enhancing pollinator habitats through blue and green spaces that offer food, shelter and breeding sites.
- **Foster positive human-nature interactions** – support local stewardship of biodiversity by providing 'cues-to-care', and creating opportunities for positive interactions with nature. ⁱⁱ

BSUD principles can be applied anywhere – from gardens and open space, to streetscapes and master-planned developments (like the [Breakout Creek / Purruna Pari Redevelopment](#) or [Fisherman's Bend Redevelopment](#)), to large-scale infrastructure projects such as transport corridors.

BSUD can focus on individual species, groups of species and/or entire ecosystems. Small-scale, community-based projects, when connected across larger areas, can create landscape-scale changes and linkages (such as the [Glenelg Golf Club Biodiversity Projects](#)).

While BSUD can be applied at any step of a project or development process, it is best to integrate it early when developing project objectives, planning or design.



Yellowish Sedge-skipper reintroduction site (City of Salisbury)



Blue banded bee with dianella flowers (B Doyle)



Biodiverse green roof at Adelaide Zoo

Tips for integrating BSUD principles into your project

Plants and animals depend upon each other to thrive and achieve a healthy natural balance. They also depend upon healthy soil and water, with all elements working together in an intricate web of life.

BSUD takes into consideration both traditional conservation and novel new approaches to providing healthy habitat and resources for wildlife.

Selecting between conservation and novel design solutions will largely depend on the context of the site, and the specific biodiversity and other objectives identified for the site.

Some general guidance includes:

- **Protect remnant vegetation and native ecosystems.**
Intact and largely intact native ecosystems are functionally irreplaceable. Wherever possible protect or restore them, even in small patches.
- **Retain and protect old, large trees.** It typically takes eucalypts 120 to 150 years to develop hollows large enough support nests for native wildlife.
- **Integrate indigenous flora and fauna into design.**
Design to include a variety of locally native plants including in novel ways. Provision of habitat and resources for native wildlife are enhanced when locally native plant species are prioritised.
- **Embrace novelty but use it strategically.**
When locally native species are not suitable, consider native species from more distant (and climatically suitable) provenances, or exotic plants that provide ecosystem services such as shade, flowers and protection from predators. Be careful not to introduce unsuitable, toxic or invasive species.
- **Enhance vegetation structure and diversity.**
Where appropriate create structurally diverse layers including canopy, under-storey, mid-storey and ground cover vegetation layers. In many cases a more diverse species mix can deliver greater valuable biodiversity benefits.
- **Allow the land to breathe and absorb water.**
Retain water on site where possible and minimise hard, impervious surfaces to allow absorption of water in the soil. Plants require aerated soil so roots can absorb water and nutrients effectively.



Hollows are important to wildlife such as birds (M Stokes)

Selecting target species for your BSUD project

In identifying the biodiversity objectives of your project, you might consider bringing back or enhancing populations of one or more particular species to the site.

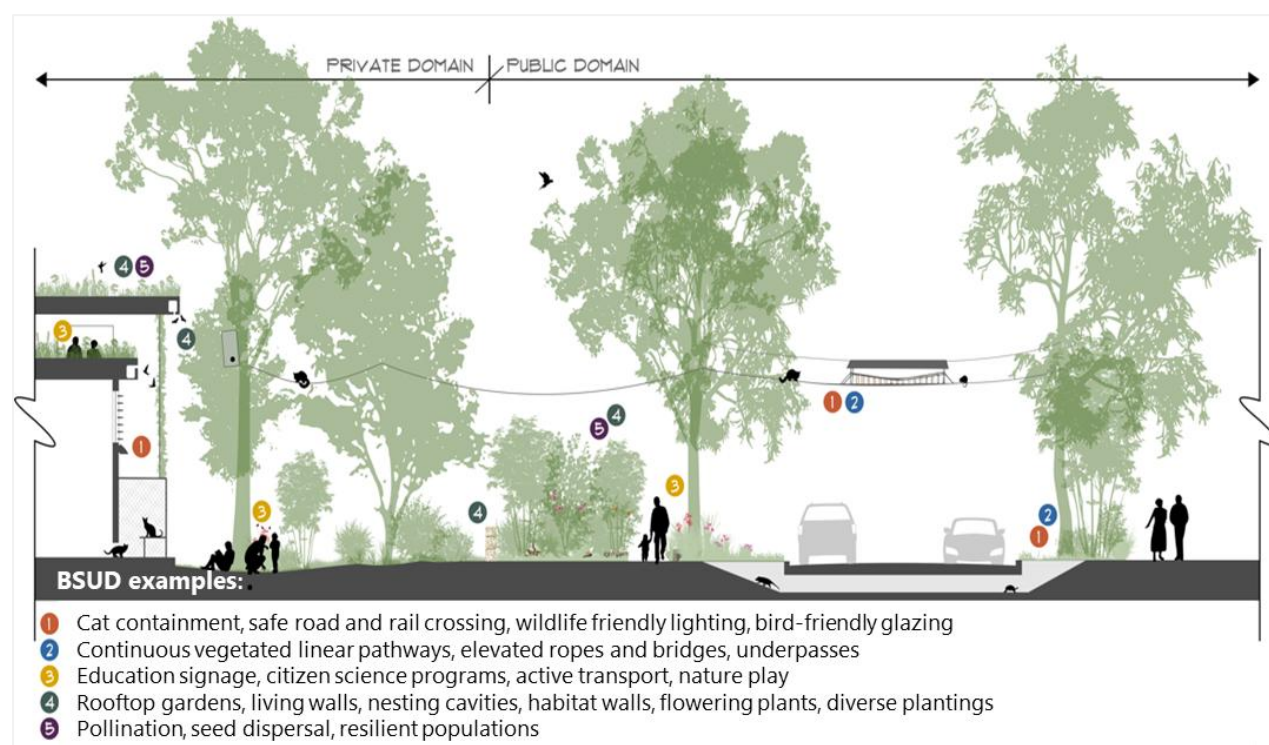
When selecting target species for your BSUD project, the following characteristics can be factored into your decision:

- **Ecological or conservation value of the species** – will providing habitat and resources for this species benefit its conservation status, and will it deliver benefits to other species?
- **Cultural value of the species** – is the species indigenous to the area? Is it of particular significance to Traditional Owners or the culture of Aboriginal people?
- **Ecological feasibility** – is it reasonable to expect that the requirements of the species can be provided within the urban environment?
- **Economic feasibility** – what are the costs and benefits of bringing this species into the area?
- **Social acceptability** – does the species represent a specific threat, how well will it be accepted and is there potential opportunity for community engagement? ⁱⁱⁱ

Examples of target species for BSUD projects

Species	Ecological Requirements
Superb Fairy Wren  (M Stokes)	Dense understory vegetation for protection from predators, including low shrubs such as the Grey Saltbush (<i>Atriplex cinerea</i>) Safe open spaces for foraging on the ground Suitable habitat patches connected by corridors to allow movement throughout the area Cats can be a problem for Superb Fairy-wrens, as they build their nests in low shrubbery
Blue-Banded Bee  (M Stokes)	Diverse mid-story flowering vegetation (with some blue flowers ideally, including native <i>Dianella</i> sp.) Vegetation placed in sheltered, sunny areas Long-stemmed plants for 'roosting' Nesting areas of soft sandstone, mud-brick or mortar
Eastern Banjo Frog  (M Stokes)	Ponds or creeks with still or slow-moving fresh water that is free of pollutants Dense overhanging vegetation such as grass and sedges around the water's edge Burrows in loamy soil on riverbanks Vulnerable to predation from cats, foxes and dogs

Refer to the diagram below for examples of BSUD actions in a streetscape and adjacent building.



Example of BSUD principles applied across a streetscape (Visintin et al., 2025) ^{iv}

Benefits of BSUD

Incorporating BSUD into private and public spaces, including major developments, can make a positive contribution in multiple and important ways.

Some of the benefits include:

Community: sense of place, enhanced amenity, social cohesion and wellbeing

Recreation & amenity: availability of healthy and attractive public green space for play, recreation and enjoyment

Culture: cultural connections including with First Nations stories, knowledge and practices

Health: physical, mental and social health outcomes through easy access to biodiverse green space for physical activity, relaxation, restoration and connection with nature

Water: improved water retention for soil health, vegetation growth and wildlife resources, with decreased impervious surfaces and reduced risk of flooding

Climate: improved cooling of both private and public places and reduced heat island effects

Habitat: habitat for a range of wildlife including plants and animals, healthy water and soil, functional ecosystems

Marketability: attractive, healthy and liveable places where families thrive in connection with nature

Pollution: reduced light and noise pollution, improved air and water quality



Biodiverse and structurally diverse plantings at the Windsor Street Linear Reserve, Unley (G Garrad)

Successful examples of BSUD in action

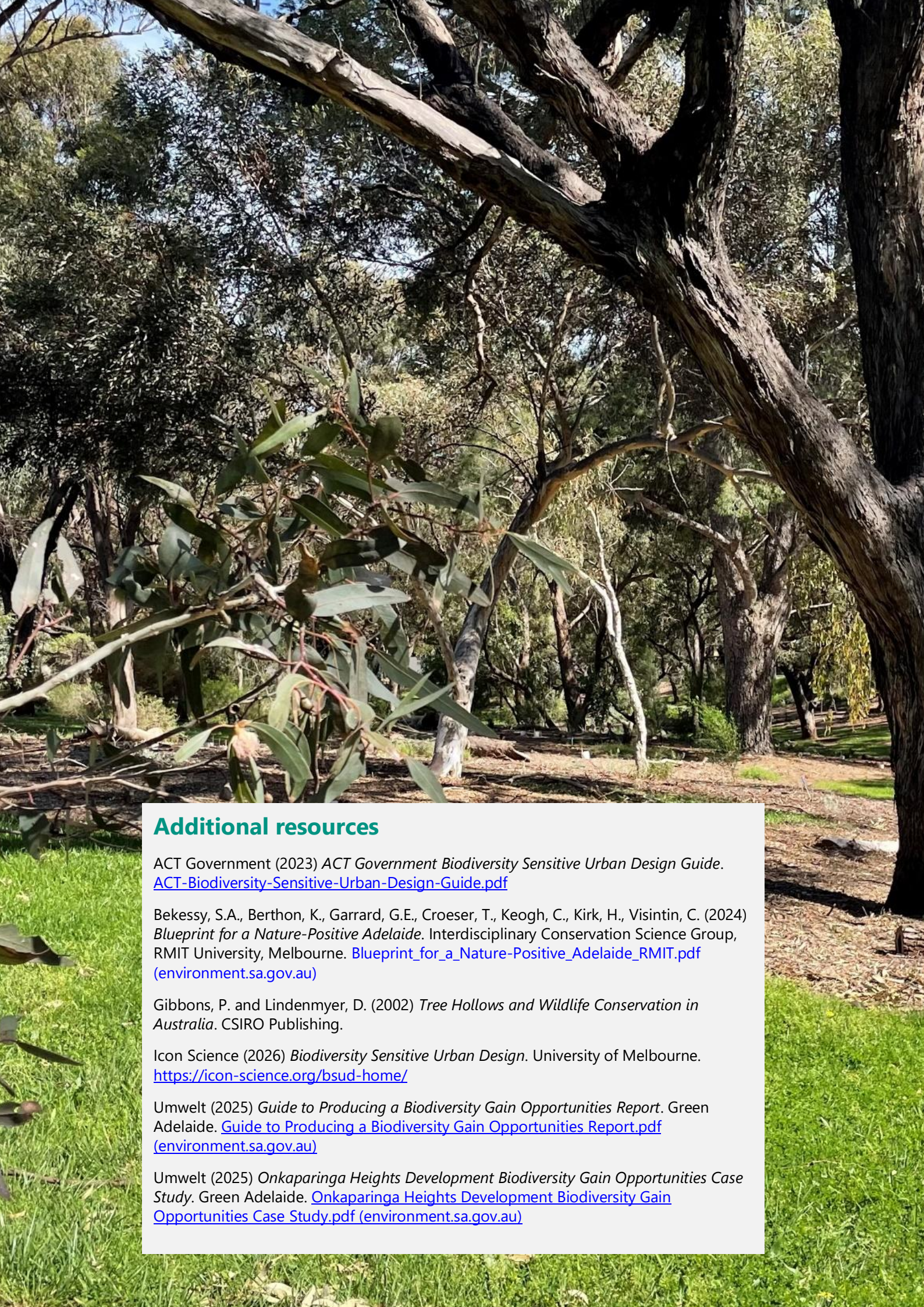
While BSUD is still a relatively new concept it is already being applied around Australia.

Examples of BSUD inspired projects in the Adelaide region are outlined below:

Examples of Adelaide biodiversity projects at various scales and contexts with a BSUD lens applied		
Context	Case Study Project	Scale
 Parks	Victoria Park / Pakapakanthi (Park 16) Grasslands (City of Adelaide)	Neighbourhood
	Alan E Cousins Reserve (City of Burnside)	Local
	Butterfly Reintroductions (City of Salisbury)	Neighbourhood
	Sturt River / Warriparri Biodiversity Corridor (City of Holdfast)	Local
 Linear Corridors	Virginia Grove Linear Corridor (City of Playford)	Neighbourhood
	Dry Creek Linear Park (City of Tea Tree Gully)	Neighbourhood
	Sturt River BSUD Plan – Warriparinga Wetlands (City of Marion)	Neighbourhood
 Streetscapes	Windsor Street Linear Reserve (City of Unley)	Local
	The Meadow – Port Road at Woodville (City of Charles Sturt)	Local
 Small infrastructure	Glenelg Wastewater Treatment Plant (SA Water)	Site
	Dover Square Raingarden – South Brighton (Dover Square Tennis Club)	Site
	Adelaide Zoo vertical garden and green roof (Adelaide Zoo)	Site
 Large infrastructure	Breakout Creek Stage 3 (Green Adelaide)	Regional
	Northern Connector (Department of Infrastructure and Transport)	Regional

Acknowledgements: Thank you to the above organisations for sharing these case studies.

For further information read the [Blueprint for a Nature-Positive Adelaide Report](#) (PDF). The report includes further detail about the BSUD process, opportunities and case studies throughout Adelaide and in Melbourne.



Additional resources

ACT Government (2023) *ACT Government Biodiversity Sensitive Urban Design Guide*. [ACT-Biodiversity-Sensitive-Urban-Design-Guide.pdf](#)

Bekessy, S.A., Berthon, K., Garrard, G.E., Croeser, T., Keogh, C., Kirk, H., Visintin, C. (2024) *Blueprint for a Nature-Positive Adelaide*. Interdisciplinary Conservation Science Group, RMIT University, Melbourne. [Blueprint_for_a_Nature-Positive_Adelaide_RMIT.pdf](#) ([environment.sa.gov.au](#))

Gibbons, P. and Lindenmyer, D. (2002) *Tree Hollows and Wildlife Conservation in Australia*. CSIRO Publishing.

Icon Science (2026) *Biodiversity Sensitive Urban Design*. University of Melbourne. <https://icon-science.org/bsud-home/>

Umwelt (2025) *Guide to Producing a Biodiversity Gain Opportunities Report*. Green Adelaide. [Guide to Producing a Biodiversity Gain Opportunities Report.pdf](#) ([environment.sa.gov.au](#))

Umwelt (2025) *Onkaparinga Heights Development Biodiversity Gain Opportunities Case Study*. Green Adelaide. [Onkaparinga Heights Development Biodiversity Gain Opportunities Case Study.pdf](#) ([environment.sa.gov.au](#))

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References

- ⁱ Ives, C.D., Lentini, P.E., Threlfall, C.G., Ikin, K., Shanahan, D.F., Garrard, G.E., Bekessy, S.A., Fuller, R.A., Mumaw, L., Rayner, L., Rowe, R., Valentine, L.E. & Kendal, D. (2016) 'The importance of cities for threatened species'. *Global Ecology and Biogeography*. 25: 117-126.
<https://doi.org/10.1111/geb.12404>
- ⁱⁱ Garrard, G.E., Williams, N.S.G., Mata, L., Thomas, J. & Bekessy, S.A. (2018) 'Biodiversity sensitive urban design'. *Conservation Letters*. 11: e12411.
<https://doi.org/10.1111/conl.12411>
- ⁱⁱⁱ Mata, L., Ramalho, C.E., Kennedy, J., Parris, K.M., Valentine, L., Miller, M., Bekessy, S., Hurley, S., Cumpston, Z. (2020) 'Bringing nature back into cities'. *People and Nature*. 2(2): 350-368.
<https://doi.org/10.1002/pan3.10088>
- ^{iv} Visintin, C., Garrard, G.E., Weisser, W.W., Baracco, M., Hobbs, R.J., & Bekessy, S.A. (2025) 'Designing cities for everyday nature'. *Conservation Biology*. 39: e14328. <https://doi.org/10.1111/cobi.14328>

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