Designing Cities for Everyday Nature

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RMIT UNIVERSITY | Centre for Urban Research

ICON SCIENCE INTERDISCIPLINARY CONSERVATION

The Ian Potter Foundation

https://www.sbs.com.au

https://www.dailymail.co.uk

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HO

THE FUTURE OF LIVEABLE CITIES DEPENDS ON NATURE

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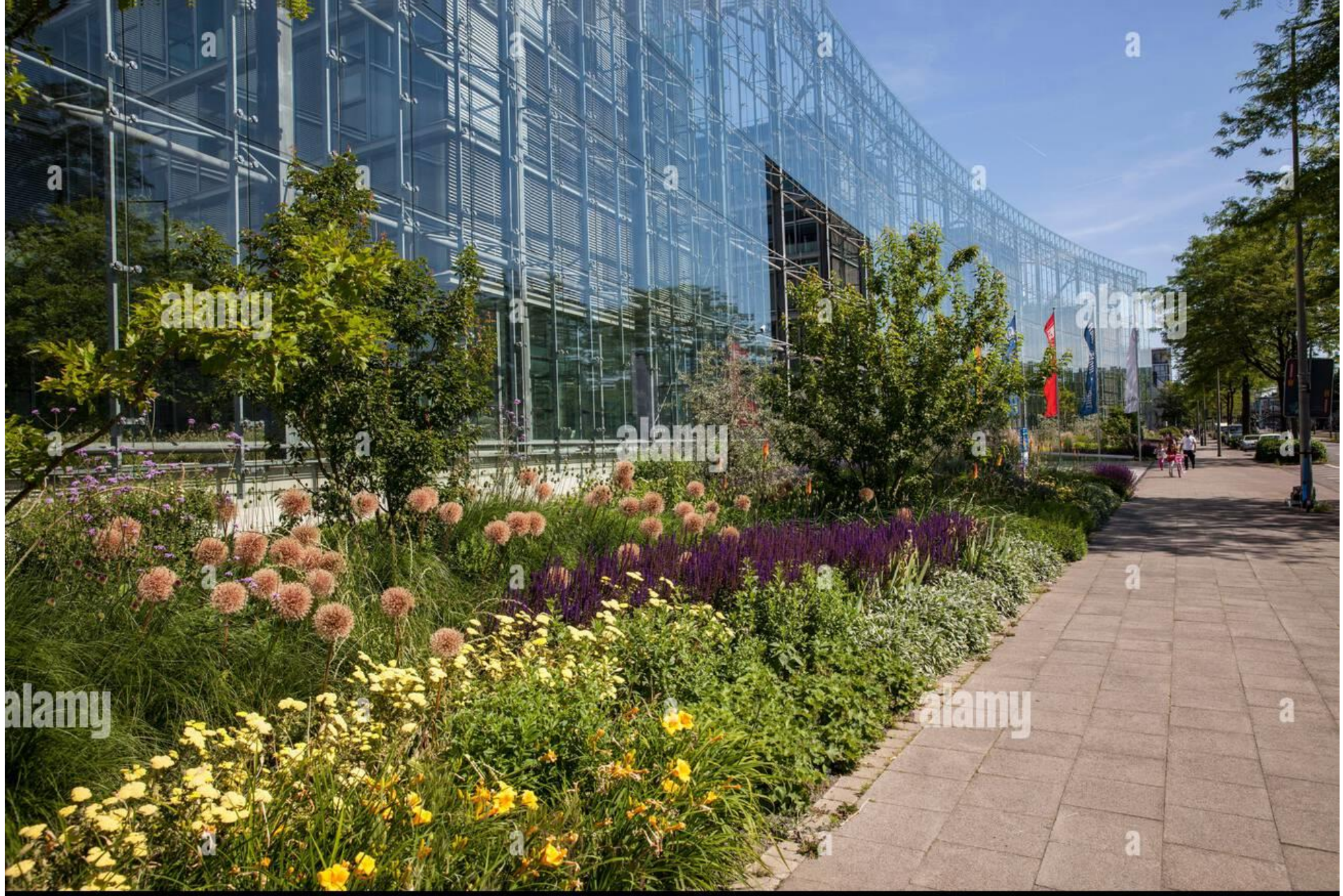
Reduces stress
Enhances self-discipline
Improves surgical recovery time
Promotes sense of community
Contributes to sense of place
Improves mood
Provides opportunities for reflection
Less likely to die from heart disease, diabetes or cancer
Improves cognitive functioning in children
Reduces aggressive behaviour
Reduces mental fatigue
Reduces crime
Promotes social interaction
Contributes to identity
Alleviates attention-deficit/hyperactivity disorder


alamy
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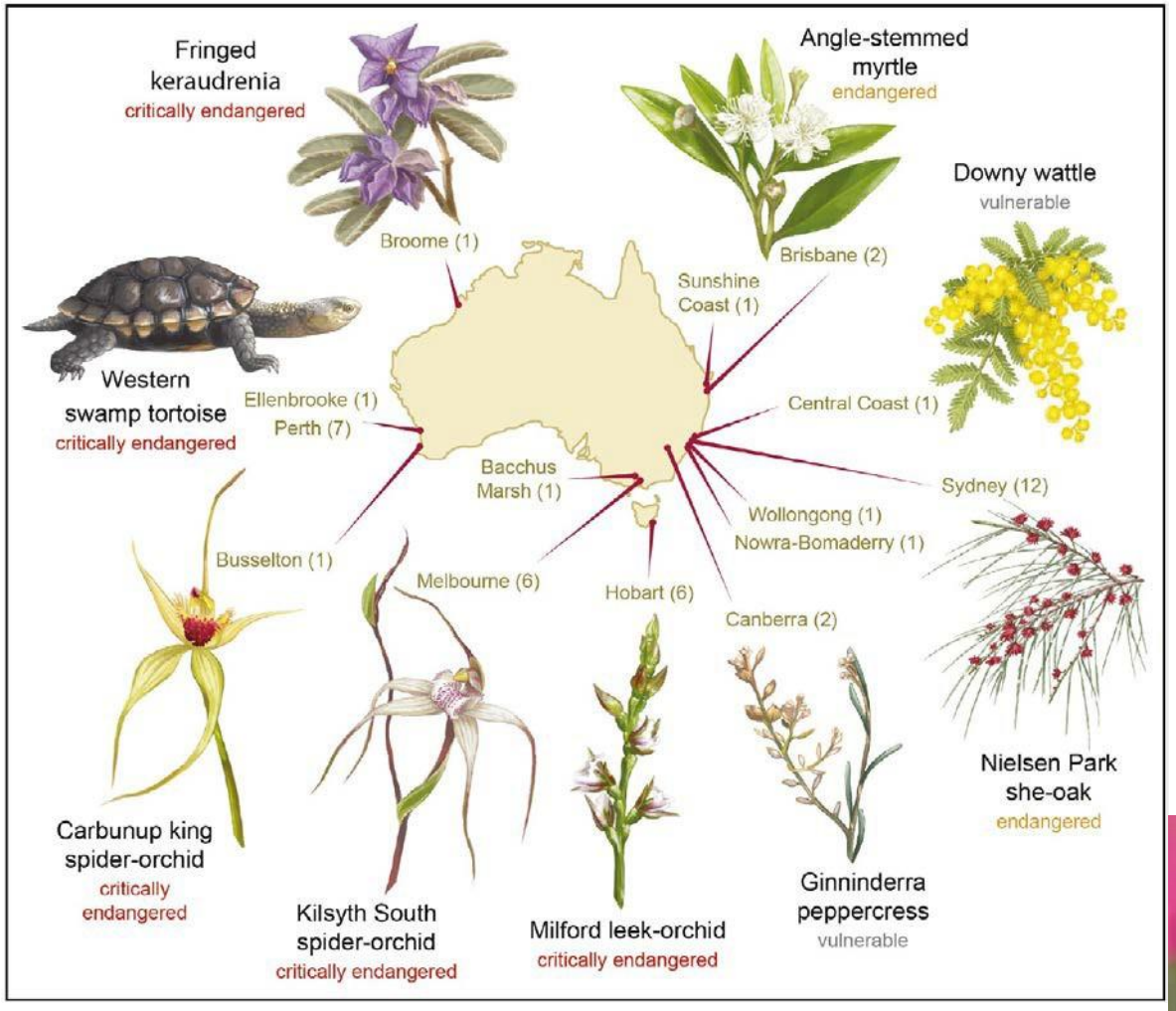
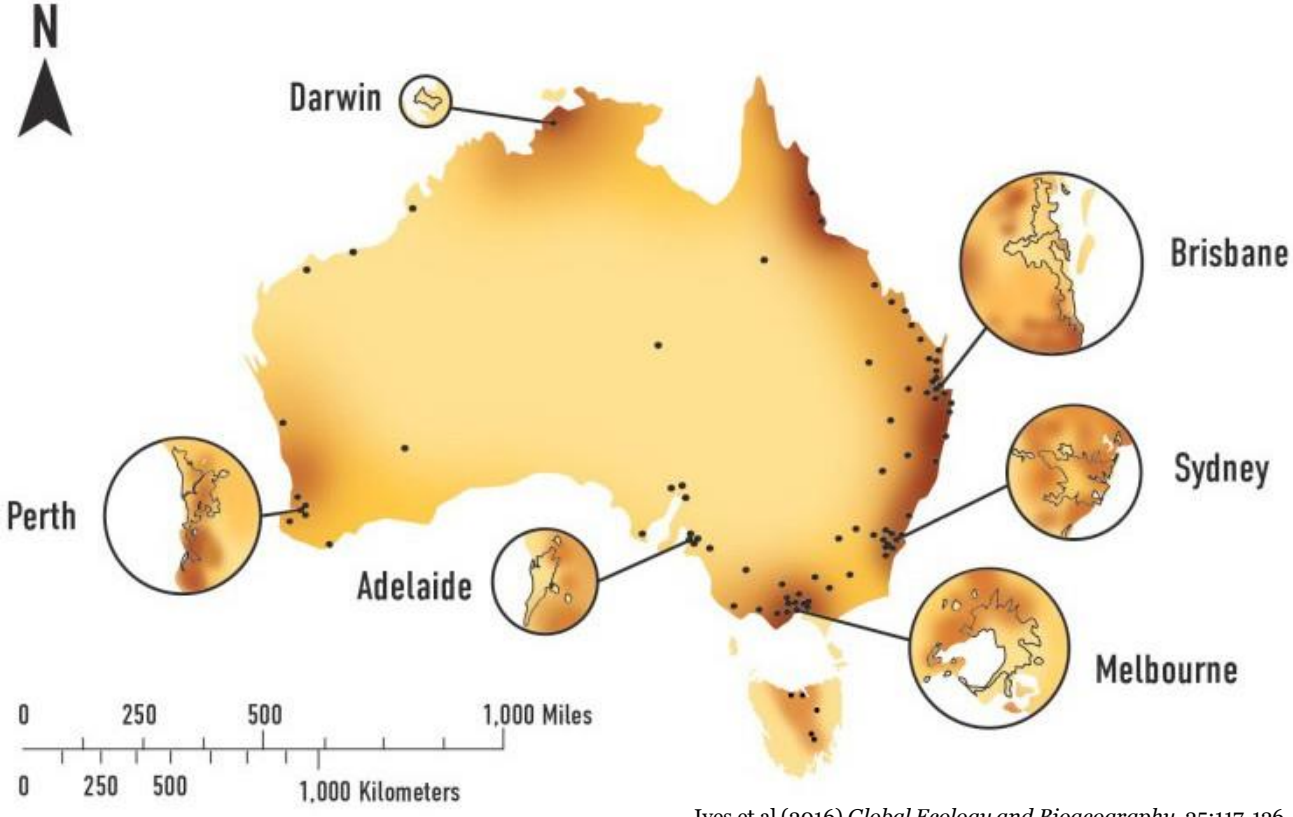
www.alamy.com

Photo: John Tann

Cities are biodiversity hotspots



Ives CI., 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., Kendall, D. (2016) Cities are hotspots for threatened species. Global Ecology and Biogeography. 25: 117-126

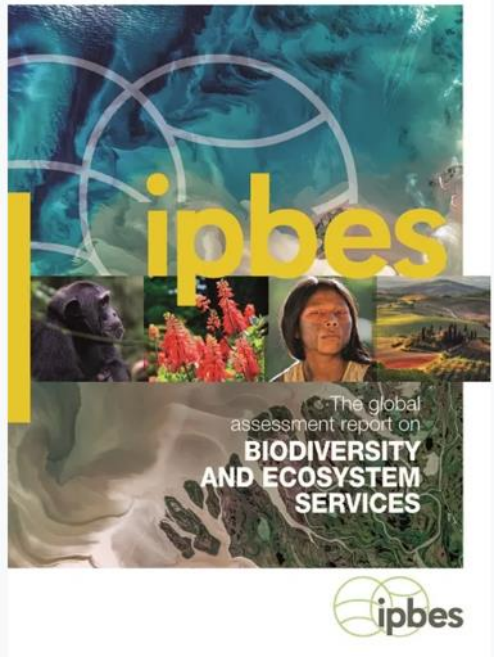


Ives et al (2016) *Global Ecology and Biogeography*. 25:117-126.

Copper Beard Orchid, *Calochilus cupreus*
Critically Endangered

IPBES Global Assessment

(Intergovernmental platform for biodiversity and ecosystem services)



Nature underpins all aspects of our lives and prosperity

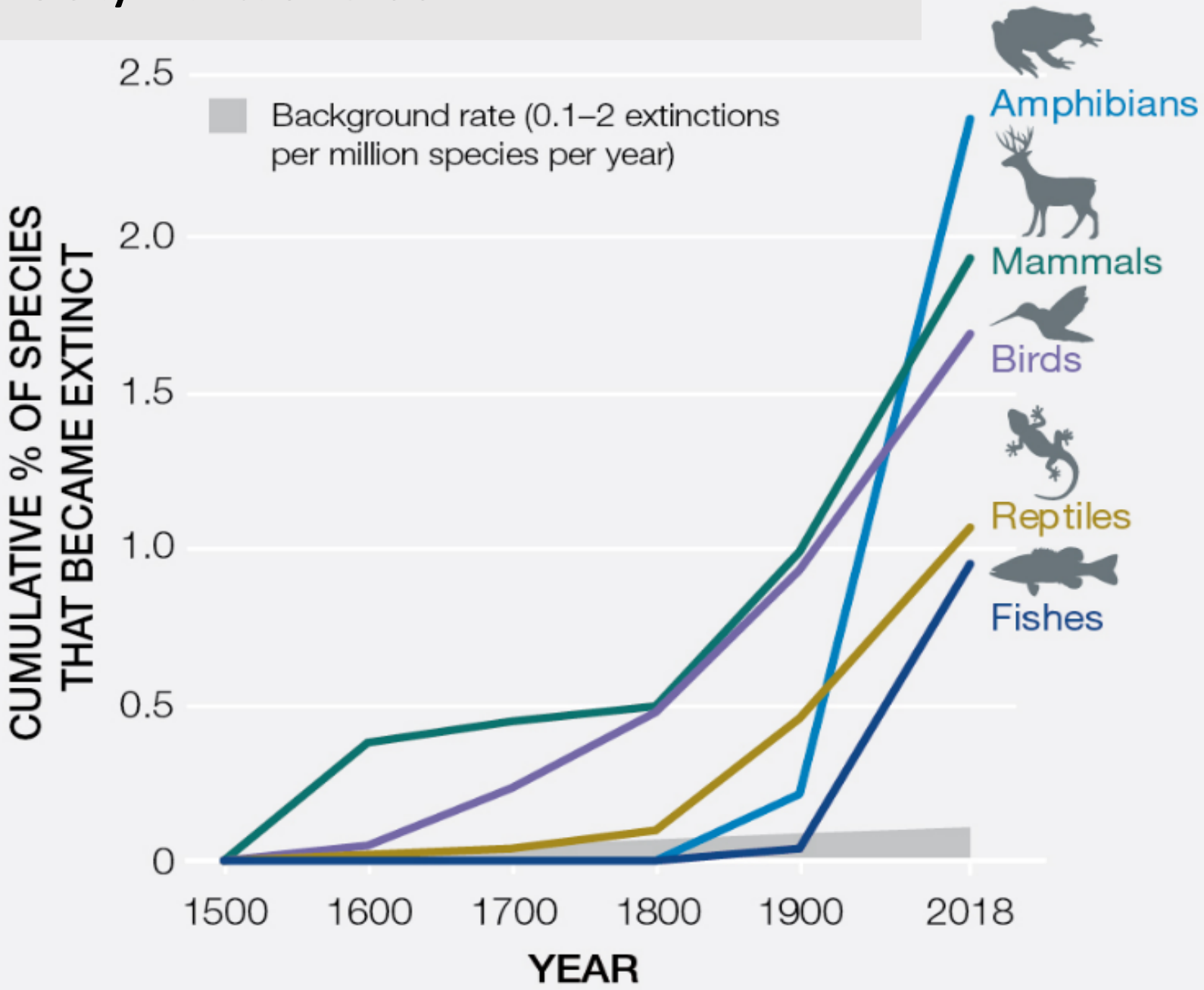
- WEF $US44T/yr dependent on nature (~50% GDP)
- 4 billion people rely primarily on natural medicines
- 75% of all crops are animal pollinated
- Natural systems the only viable carbon sink (5.6 Gt/yr)

… but its capacity to do so is declining everywhere

Adapted from Bain and
WWF (Denmark)

Current State of Nature: IPBES Global Assessment

Biodiversity Extinction Crisis



- >2000 species threatened with extinction
- 19 ecosystems showing clear sign of collapse
- Once common species now listed as threated by extinction
- 17million hectares of threatened species habitat cleared
- More weeds than native plant species


"Big house, big car,
big success... that's me baby."
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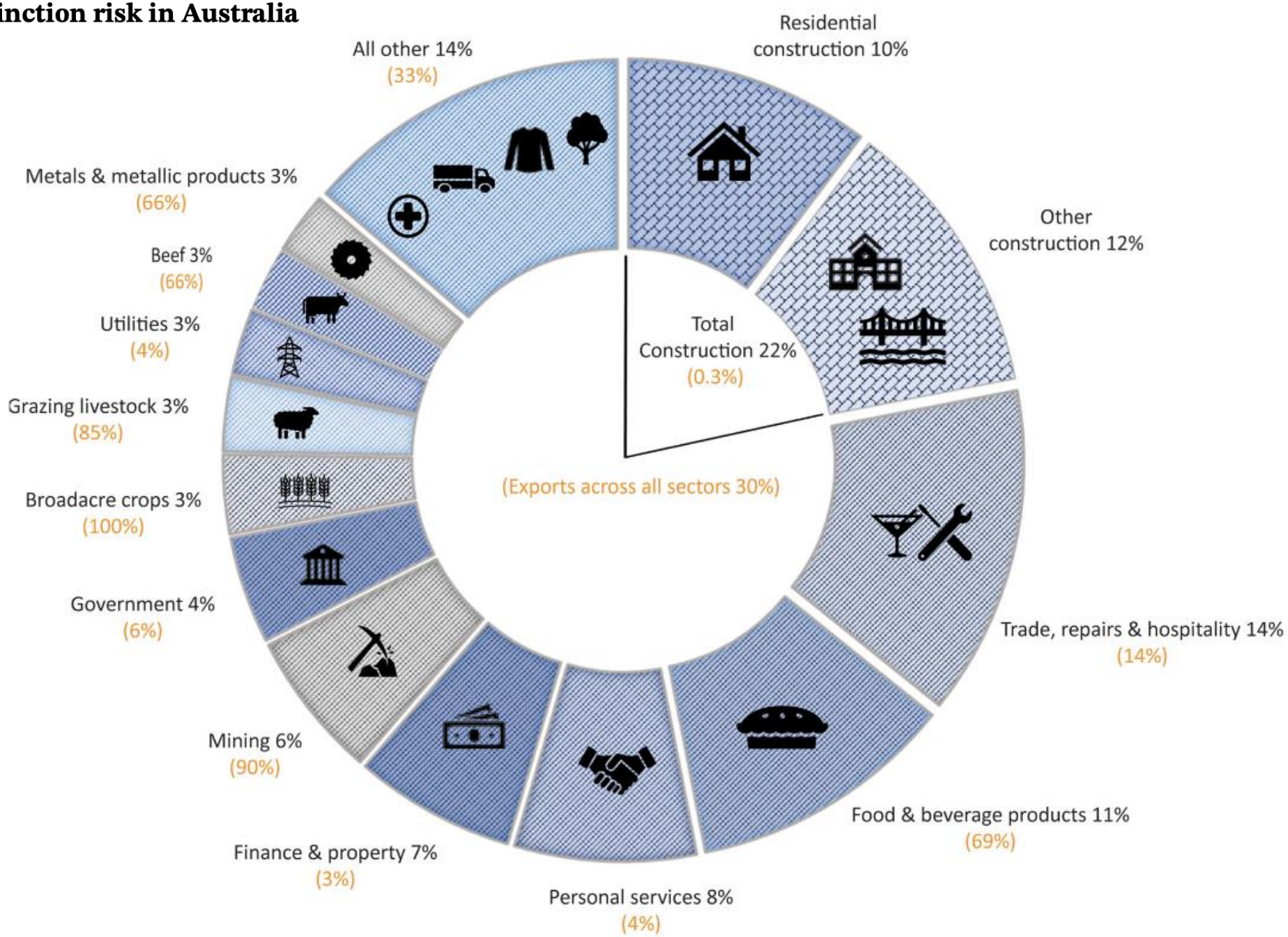
CAIRNLEA

A consumption-based analysis of extinction risk in Australia

Amanda Irwin | Arne Geschke



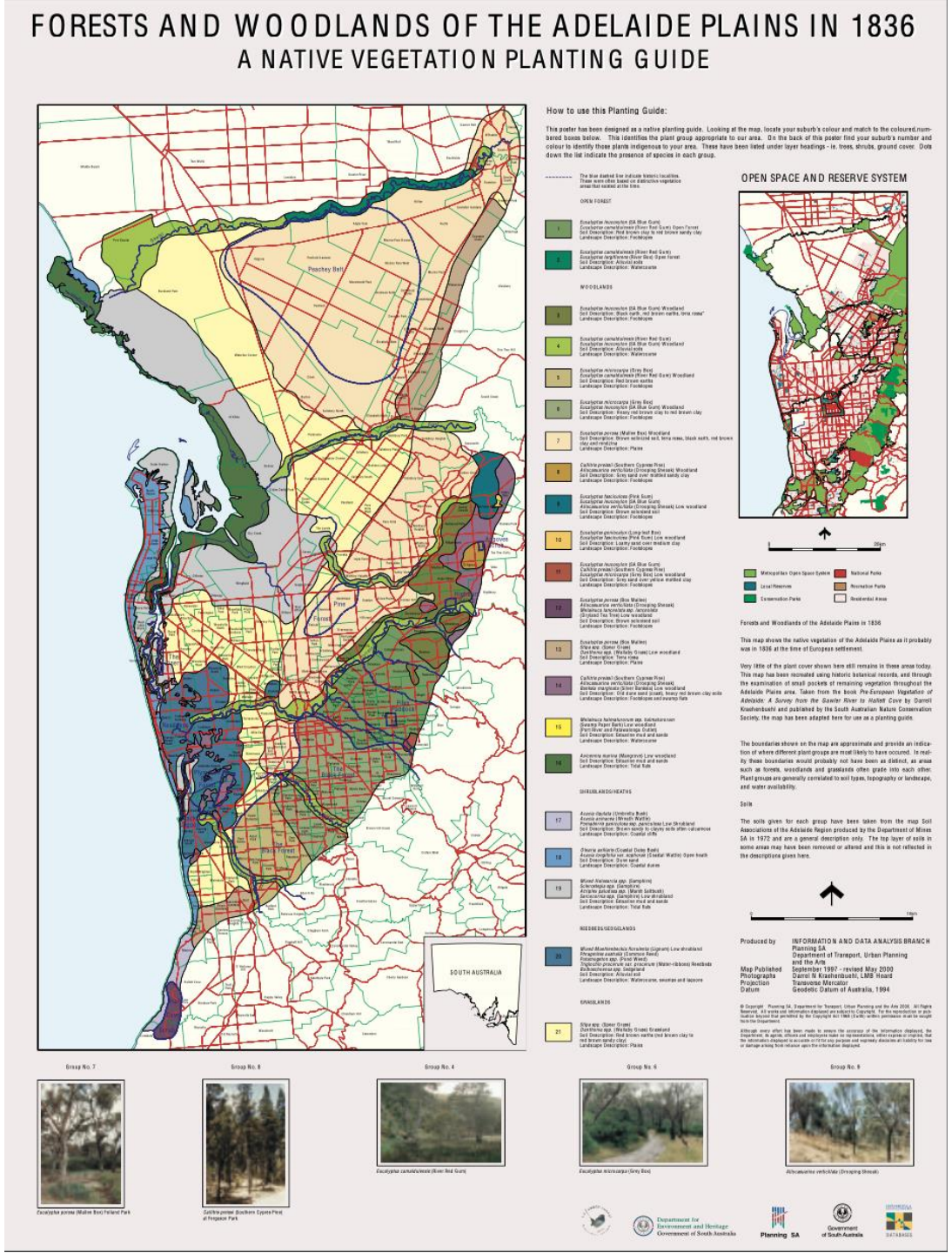
Biodiversity sensitive urban design (BSUD): A process for building nature-positive cities

Garrard GE, Williams NSG, Mata L, Thomas J, Bekessy SA. (2018) Biodiversity sensitive urban design. Conservation Letters. 11: 1-10.

Document Biodiversity Values

Case study: Nature-Positive Adelaide

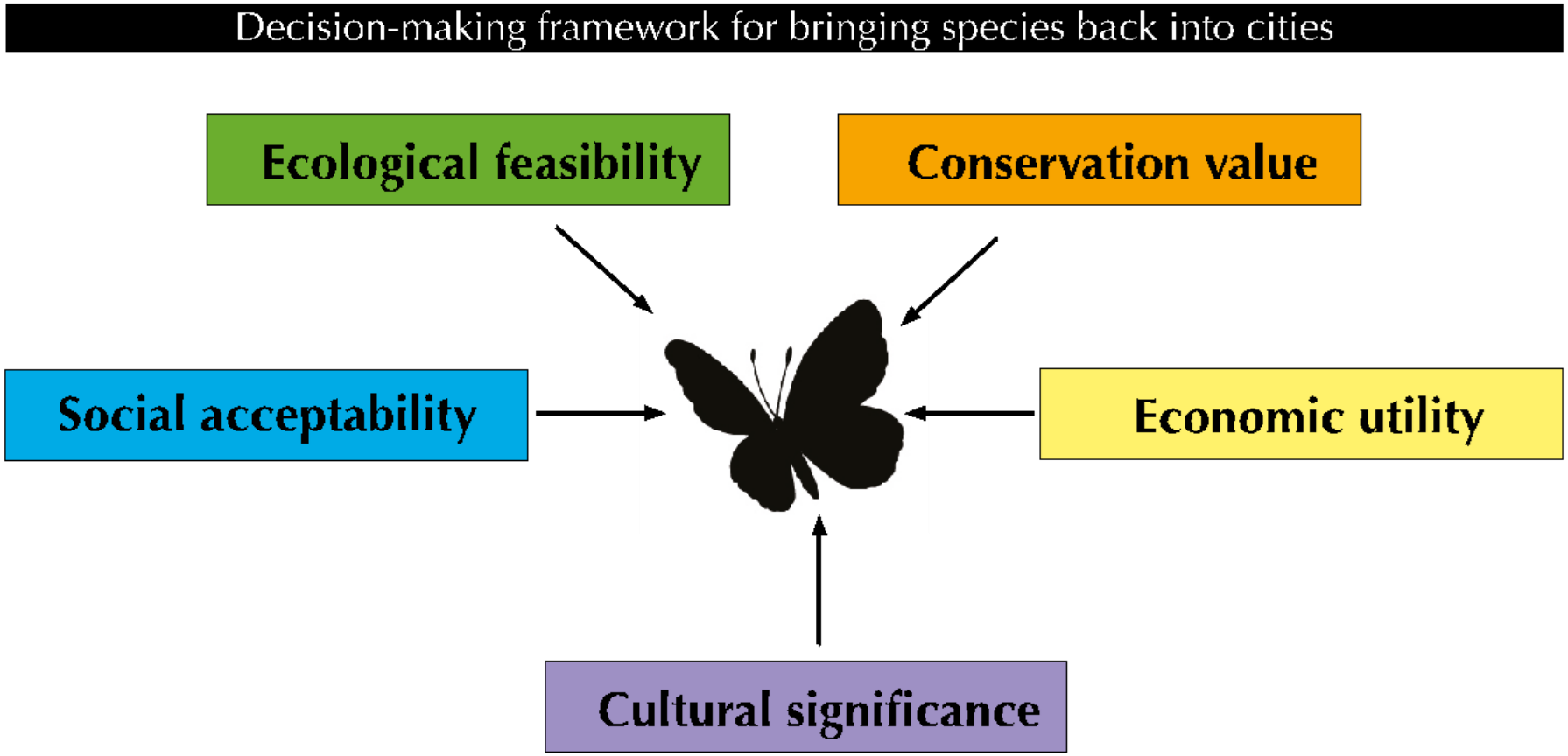
Berthon K, Bekessy SA, Garrard GG, Croeser T, Keogh C, Kirk H, Visintin C (2023) Blueprint for a Nature-Positive Adelaide. Report for Green Adelaide.



The start of the ‘swim through Adelaide’ from the Torrens weir in Adelaide in 1949.

Photo from State Library of South Australia

Identify Biodiversity Objectives

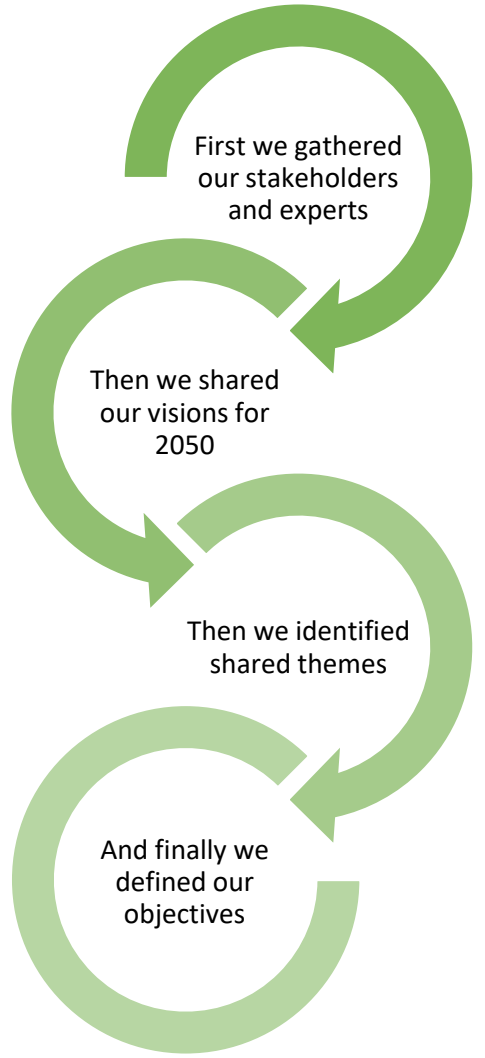


Mata L, Ramalho CE, Kennedy J, Parris KM, Valentine L, Miller M, Bekessy S, Hurley S, Cumpston Z (2020) Bringing nature back into cities. People and Nature. 1: 1-19.

Case study: Fishermans Bend, Melbourne

Kirk H, Garrard GE, Croeser T, Backstrom A, Berthon K, Furlong CM, Hurley J, Thomas F, Webb A, Bekessy SA (2021) Building biodiversity into the urban fabric: A case study in applying Biodiversity Sensitive Urban Design (BSUD). Urban Forestry & Urban Greening, 62: 127176

Case study: Fishermans Bend, Melbourne



A place that **honours Indigenous culture**

The habitats of this area reflect Indigenous knowledge and stories, in their design, naming and function. This objective guides the rest.

A place with **seven seasons**

Constant seasonal change is reflected in our flora and fauna, how we use places, and how water appears in the landscape.

A place **known by its diverse ecosystems**

Local ecosystems and species are a core part of each precinct's identity and function. Local habitat helps you know where you are and where you're going.

A place for the **senses**

Habitat areas offer scents, colours and sensations, which bring daily delight but also opportunities to feel relief and escape from the 'concrete jungle'.

A place of **shifting waters**

Water is part of the landscape – both freshwater and brackish, ephemeral and permanent.

A place that's **comfortable and beautiful in any weather**

Habitat offers a range of microclimates – from shaded to open, from wet to dry and from breezy to sheltered. Species and landscape designs are selected to correspond to microclimates, so every area teems with life.

Superb fairywren (*Malarus cyaneus*)

Habitat requirements

Dense vegetation cover incl. 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

Brolga (*Grus rubicunda*)

Habitat requirements

Large open wetland (saline or freshwater) Mudflats, grassy areas, low vegetation or herbaceous veg

Some distance (approx. 200m buffer) from human disturbance

Clear airspace (without powerlines)

Design implications

Large ephemeral wetland area on edge of development

Native grasses/rushes and ground cover (<100cm high)

Fungi

Habitat requirements

Damp soil

Eucalyptus trees, fallen logs, dead plant matter/mulch

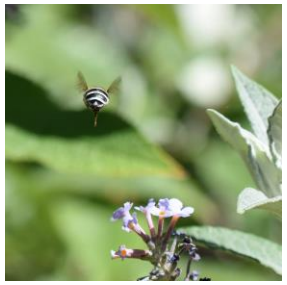
Shade

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-banded bee (*Amegilla* sp.)

Habitat requirements

Diverse mid-storey flowering vegetation (with some blue flowers ideally, incl. native *Dianella* sp.)

Vegetation placed in sheltered, sunny areas

Long-stemmed plants Nesting areas of soft sandstone, mud-brick or mortar

Design implications

Open garden beds planted with flowering plants (50-100cm height)

Sandstone blocks or patches of masonry

Blue-tongue lizard (*Tiliqua scinoides*)

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

Growling grass frog *(Litoria raniformis)*

Habitat requirements

Ponds or creeks with slow-flowing fresh water

Grassy/weedy/reedy edges

Weedy/reedy patches within the water

Safe connection to Westgate Park

Sunny areas within the waterbody

Design implications

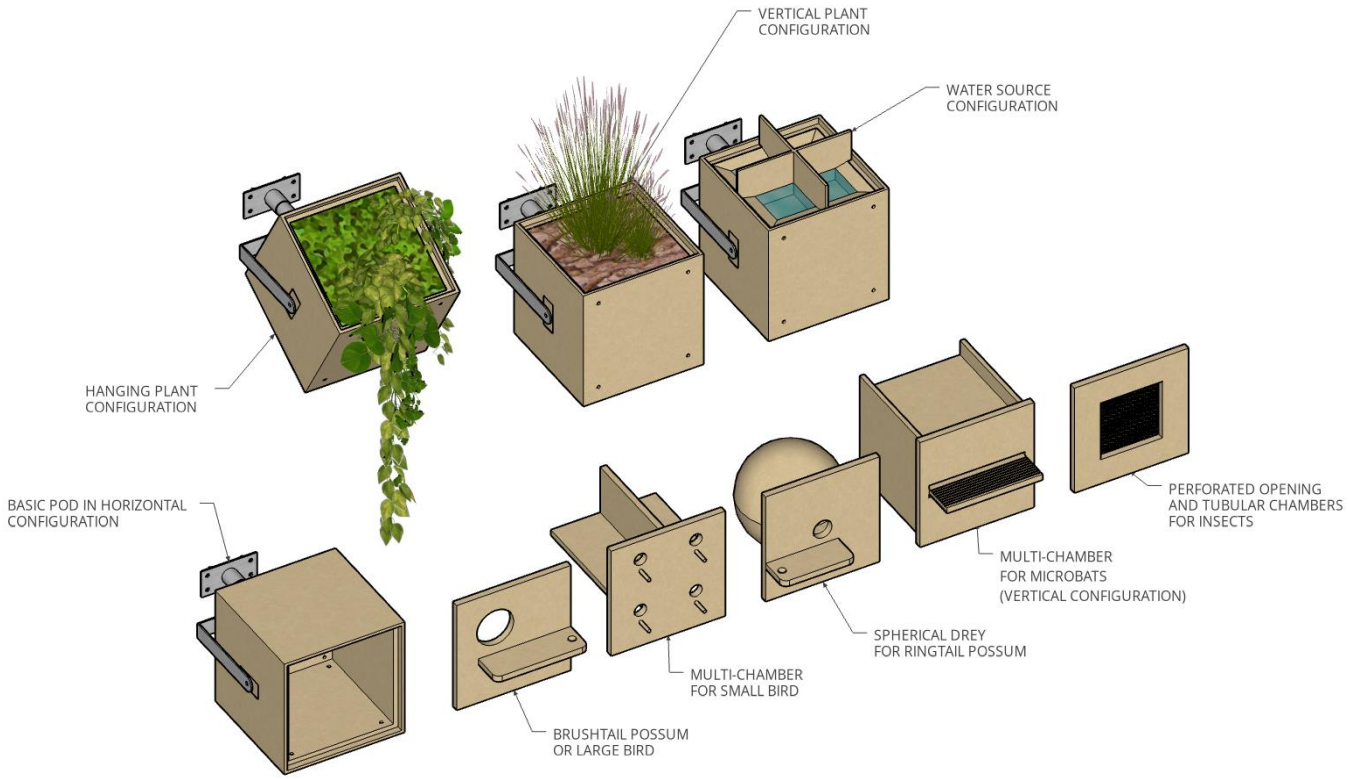
Some permanent & ephemeral freshwater

Aquatic vegetation: Low (<50cm high) vegetation around water

Sunny road underpasses

Identify BSUD Actions

Resources

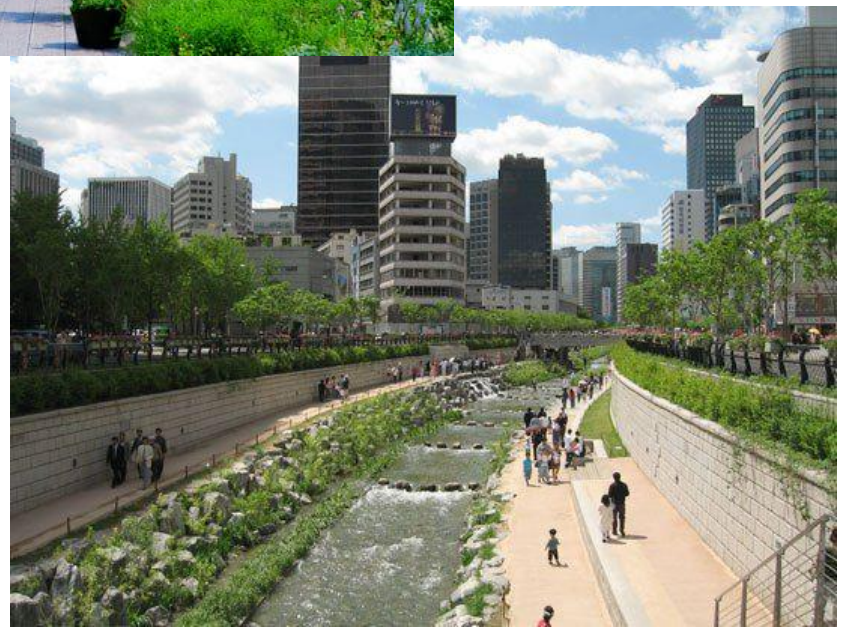


Images: Mark Jacques (RMIT/Openwork)

Threats


Lawson is a cat containment area.
ACT Government
Access Canberra
13 22 81

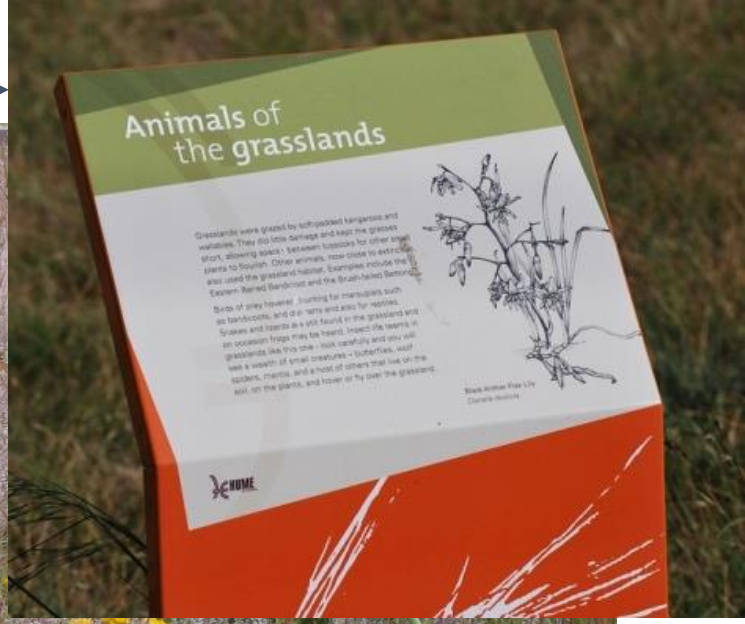
Connectivity



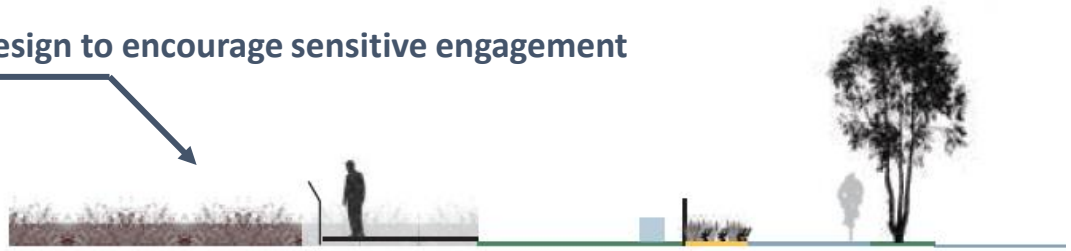
Engage the local community

Provide cues to care

Positive human-nature interactions



Design to encourage sensitive engagement



Adrian Marshall: *Start with the Grasslands.* VNPA

Species	% change in habitat area	% change in effective mesh size
Insect pollinator	31.0	103.9
Aquatic insect	25.9	54.6
Reptile	3.1	52.4
Woodland bird	32.4	66.2
Tree-hollow using bird	24.5	88.3
Tree-hollow using bat	48.8	241.2

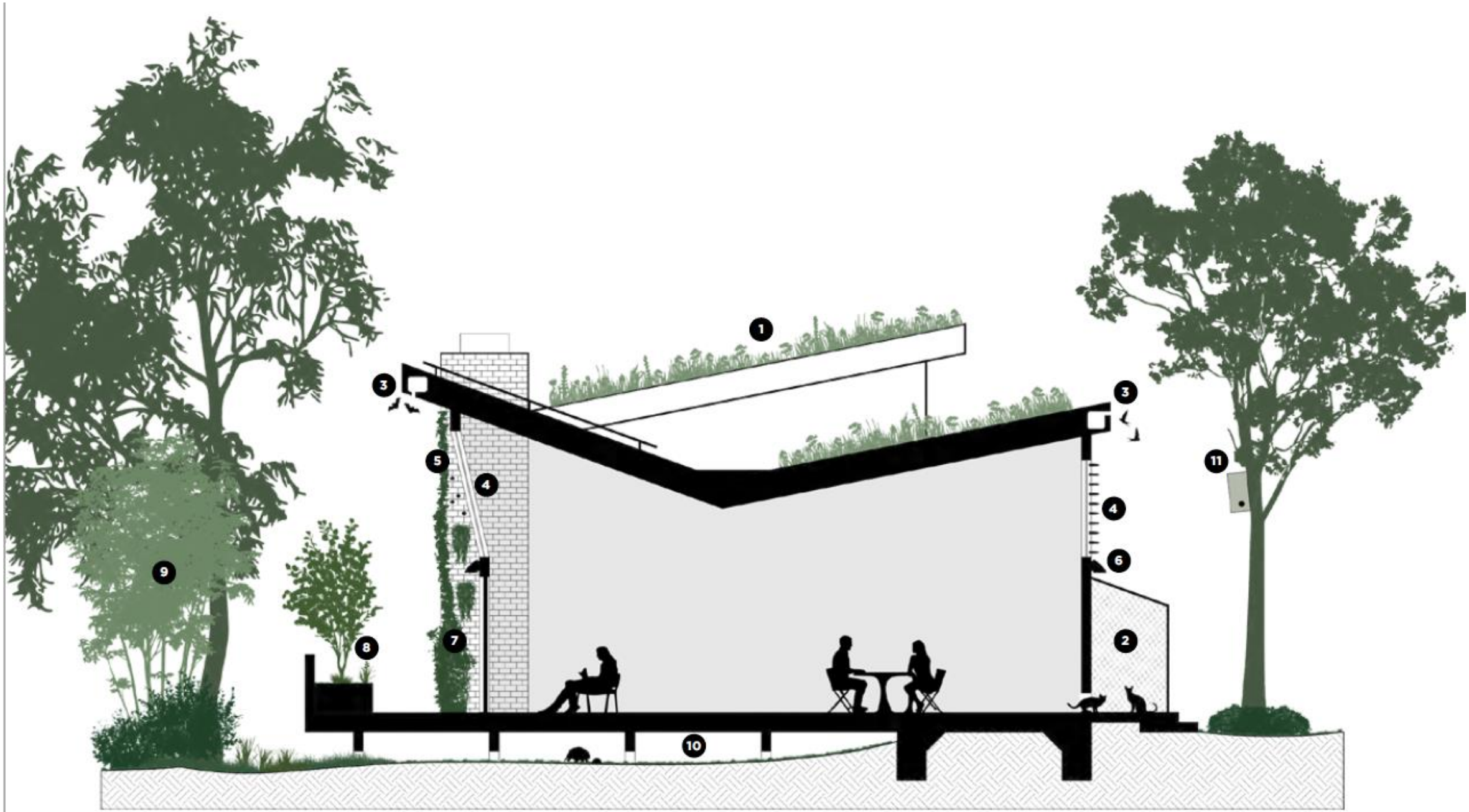
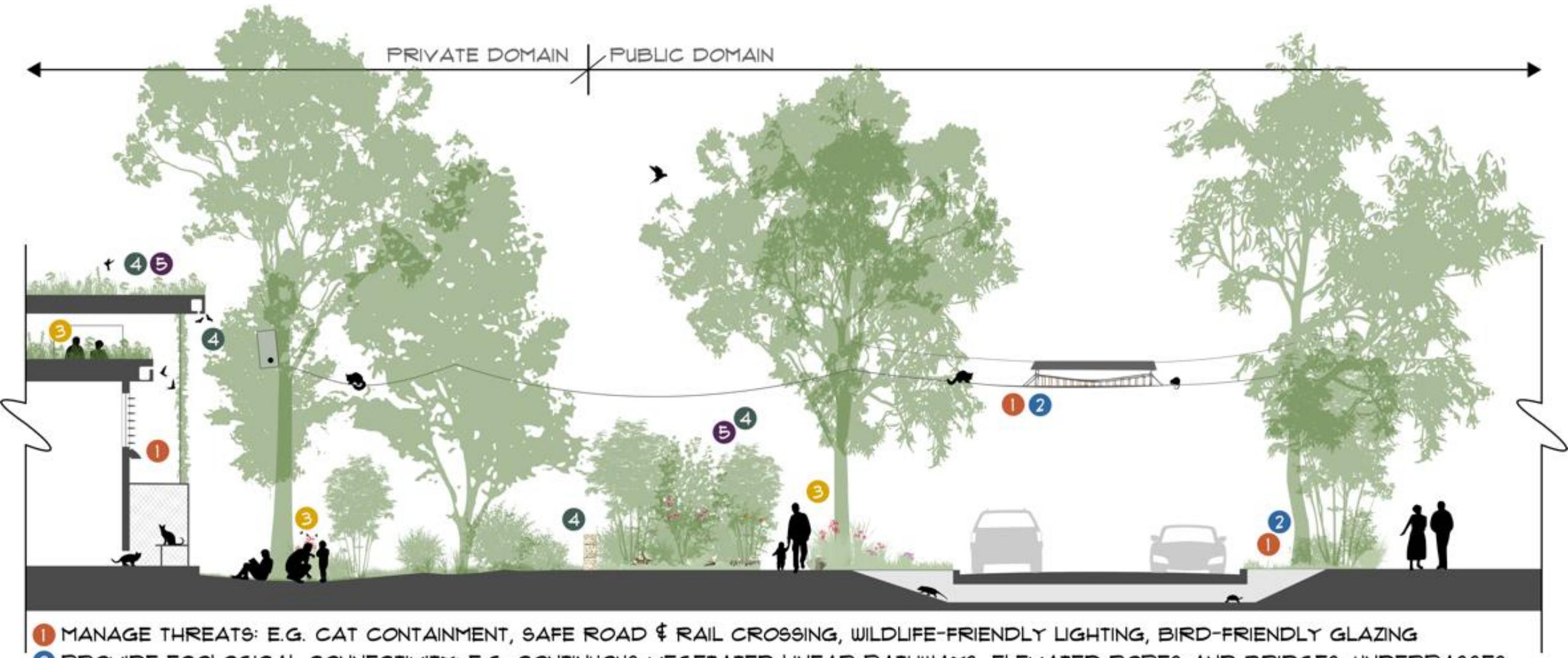


Image by Casey Visintin



1. MANAGE THREATS: E.G. CAT CONTAINMENT, SAFE ROAD & RAIL CROSSING, WILDLIFE-FRIENDLY LIGHTING, BIRD-FRIENDLY GLAZING
2. PROVIDE ECOLOGICAL CONNECTIVITY: E.G. CONTINUOUS VEGETATED LINEAR PATHWAYS, ELEVATED ROPES AND BRIDGES, UNDERPASSES
3. PROMOTE HUMAN-NATURE INTERACTIONS: E.G. EDUCATION SIGNAGE, CITIZEN SCIENCE PROGRAMS, ACTIVE TRANSPORT, NATURE PLAY
4. PROVIDE RESOURCES: E.G. ROOFTOP GARDENS, LIVING WALLS, NESTING CAVITIES, HABITAT WALLS, FLOWERING PLANTS, DIVERSE PLANTINGS
5. FACILITATE ECOLOGICAL PROCESSES: E.G. POLLINATION, SEED DISPERSAL, RESILIENT POPULATIONS

Image by Casey Visintin

EVERYDAY NATURE. BIODIVERSITY SENSITIVE URBAN DESIGN. AN ACHIEVABLE REALITY

1 PRESERVE REMNANT VEGETATION
2 GREEN WALLS & ROOFS
3 ENGAGING WITH NATURE WHERE PEOPLE LIVE, WORK, PLAY & TRAVEL
4 WALKABILITY
5 CITIZEN SCIENCE
6 POP-UP PARKS
7 HABITAT ANALOGUES
8 MID-RISE ARCHITECTURE MAINTAINS CONNECTION WITH STREET LEVEL
9 RE-WILDING WITH TARGETED NATIVE SPECIES
10 LANDSCAPE DESIGN THAT HIGHLIGHTS THE INDIGENOUS SEASONS
11 SEMI-PRIVATE GREEN SPACE PROMOTES STEWARDSHIP OF BIODIVERSITY

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BSUD
BIODIVERSITY SENSITIVE URBAN DESIGN

Holly Kirk

Casey Visintin

Georgia Garrard

ICON SCIENCE
INTERDISCIPLINARY CONSERVATION

Australian Government
Australian Research Council

RECETAS

URBAN GREEN UP

The Ian Potter Foundation

Biodiversity Council

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