# URBAN ECOLOGY RENEWAL INVESTIGATION PROJECT

## SUMMARY REPORT PREPARED FOR THE NSW ENVIRONMENTAL TRUST

THE NATIONAL
**GREEN INFRASTRUCTURE**
**NETWORK**

# Background

More people are living in cities than ever before and at the same time biodiversity in cities is being lost at ever increasing rates. For terrestrial plants and animals this is primarily due to habitat loss from land clearing. For aquatic plants and animals this is linked to changes in stream hydrology associated with a rise in impervious surfaces and a loss of aquatic habitats. Some species, the urban adapters, are thriving in cities and play an important role in connecting people to nature. To arrest the ongoing loss of biodiversity in cites there is a need for transformational change in the way cities and urban regions are planned, built and managed. There is also a need to value the benefits of biodiversity to cities and the people living therein.

# Scope

The NSW Environmental Trust (the Trust) provides funding for a broad range of projects that enhance the environment of NSW. The Trust commissioned the National Green Infrastructure Network (NGIN) to undertake the Urban Ecology Renewal Investigation Project. The objective was to provide an evidence-based set of practical recommendations to improve biodiversity outcomes for major cities in NSW including Sydney, Wollongong and Newcastle.

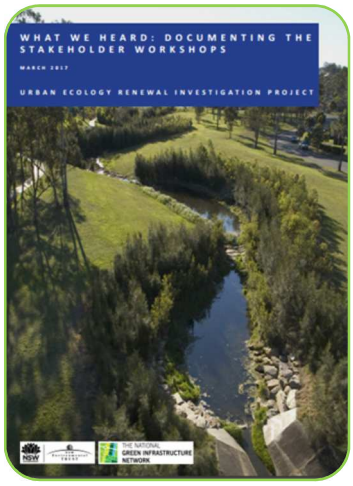
# Methods

The project triangulated the literature and the practice of government and industry to form recommendations to enhance the ecology in cities. Over 1,250 pieces of primary, secondary and grey literature, including guidelines, reports, peer-reviewed journals articles as well as government policies and publications were reviewed. Stakeholder engagement was conducted and consisted of:

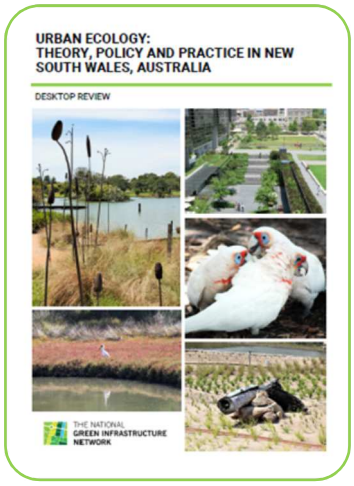
- 5 stakeholder workshops
- 4 in-depth key stakeholder interviews
- Government and industry leader's workshop
- Think-tank workshop


# Deliverables

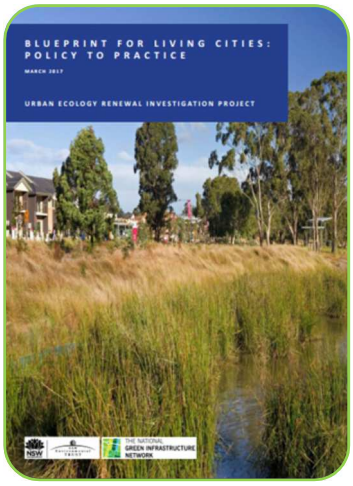
The project produced three reports.




The stakeholder study identified the issues faced by and priorities for change as identified by industry, government and practitioners.




The desktop study established the evidence base with a specific reference focus on ecology, planning and the built environment.




The Blueprint triangulated the evidence base and practice perspectives and established a list of strategies, actions, and potential projects through which to advance urban ecology outcomes in urban renewal.

# 9 Key findings

**1 Urban biodiversity and ecosystems are being lost in our cities**

Past and current pressures such as land clearing, habitat fragmentation and invasive species are contributing to this loss. To reverse this trend, cities need to protect and conserve what exists (which does not include trading the protection of one habitat for another) and reduce the individual and collective ecological pressures through adequate and enforced standards.

**2 Strategic planning reform is required** to protect existing habitats and create or re-establish habitats and corridors

Strategic reform should be vertically integrated, and state and local governments and the community – not the development sector – should set priorities built on an agreed urban 'vision'.

**3 Cities are heterogeneous** in land use, density, form and function, and there is **high variability in institutional and community values and practices**

Actions to improve urban ecology in cities must consider spatial and temporal scales, reflect political, business and community drivers and priorities, and be driven by values derived from both top-down, politically relevant and scientifically informed (governance), and bottom-up (community) processes.

**4** The **natural environment is not considered** to contribute to a city's **wellbeing or economic outcomes**

Addressing this lack of understanding requires incorporating the co-benefits of urban ecology into decision-making processes.

**5 Performance-based development application and assessment tools** are required to support urban ecological outcomes at the **lot-to-precinct scale**

Environmental planning instruments can be developed and applied to advance the sustainability of cities, including urban ecology. Such tools should be spatially specific (e.g. connecting green grids and linking to regional parks), offer flexibility (e.g. in the choice of plantings and setting limits on house-to-land development ratios), and support diverse and appropriate habitat form and function that is relevant to species and community.

**6** The **enforcement of laws and policies** needs to be prioritised and **embedded within institutional processes and community-change education and awareness programs**

The land use planning and development control systems that operate in NSW are tied to a regulatory framework, however the consistency in the decision-making process and enforcement at the development stage is lacking. There is a disconnection between local plans, policies, best-practice guidelines and development conditions and their enforcement which is exacerbated by changes in the planning and approval system towards more code-based development and exempt forms of development, in which environmental and landscaping controls are given little or no attention.

**7** The **perception that "our cities are green enough"**

Typically, NSW cities have been perceived as already 'green', and this contributes to a values-based conflict, in which urban ecology is afforded insufficient importance to warrant changes to policy and practice. Resolving this value conflict is complex: efforts must go far beyond the conventional (business-as-usual) approach of providing more or new education and awareness programs. There is a need for a whole-of-government review of policy and practice to identify and resolve contradictions in laws, policies and practices that have detrimental effects on urban ecology in our cities.

**8 Public open space is an underused opportunity** for enhancing urban ecology in cities

There is a need to develop locally based open-space standards that relate to current and forecast urban population size and density and which also consider and provide for improved urban ecological outcomes.

**9** Need for **full evaluation of environmental services and disservices**

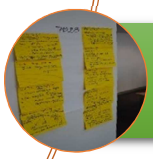
Environmental services can provide a range of valuable economic, health and social services as well as increase resilience to extreme weather events and climate change**.** They can also provide disservices which can create policy tension, for example, in landscape management for bushfire protection at the urban interface, where tree removal and understorey clearing can be at odds with the provision of habitat.

## What the stakeholders reported

**Lack of cross-sector definition of urban ecology**

**Need inter- and intra-institutional collaborations**

**Need stronger policy and planning interventions**



**Shift perceptions of urban ecology through education, training and awareness**

**Need local, publicly-available evidence base to demonstrate the benefits of urban ecology**

## Co-benefits of urban ecology

Ecology in cities provides many benefits that are not captured in current decision making processes. These include:

ECONOMIC

- Mitigating impact of UHI and extreme weather events on infrastructure
- Savings through passive cooling and heating
- Savings incurred by effects on health and mental well-being
- Desirability premium from lot to catchment level

SOCIAL & HEALTH

- Significant social and health benefits (passive and active) in areas of enhanced urban ecology, such as:
- Increased outdoor activity
- Lowered health risks during heatwaves and improved recovery rates in hospitals and clinics
- Improved mental well-being and productivity

ENVIRONMENTAL

- Resilience to weather extremes and climate change
- Mitigate climate change
- Biodiversity is an important resource for innovation and research (e.g. pharmaceuticals, bio-technologies)

# 7 Blueprint strategies & priority actions

*Blueprint for Living Cities* establishes seven interconnected strategies that recognise the importance of scale and address the roles of stakeholders involved in and influencing urban ecological outcomes.

**STRATEGY ONE**

Retain and enhance habitats to support biodiversity in cities

**Evidence**

Biodiversity is declining in Sydney, Newcastle and Wollongong, due in part to the loss of green spaces. A healthy urban environment supports the wellbeing of city dwellers. In general, the area of green space decreases as urban density increases, with cumulative and detrimental ecological impacts. Planning and design strategies, therefore, must strive to maintain and strategically increase green spaces and habitat.

**In Practice**

State planning and policy legislation does not go far enough in supporting habitat retention, stymying the intentions of practitioners, such as local planning authorities, to support urban ecological outcomes. Moreover, there is little or no enforcement of existing plans. Policies and legislation are required that include enforceable compliance requirements for the protection and enhancement of urban ecosystems.

**Priority Action**

Explicitly assess the impacts on biodiversity of proposed changes to land-use zoning and the use of public land (e.g. community to operational).

**STRATEGY TWO**

Reform city planning to embed urban ecology into decision making

**Evidence**

There is no apex policy in NSW identifying urban ecology as a priority. Such an overarching government policy priority would help reverse the inconsistent and ineffective coordination of conservation policies and practices across and between levels of government, which, in the past, has been a significant cause of negative urban ecological outcomes.

**In Practice**

Better coordination is needed of policies and decision-making processes. The policy, compliance and enforcement components of land-use decision-making are inherently flawed because they lack attention to urban ecology. Combining top-down and bottom-up approaches is required to achieve the greatest gains for urban ecosystems in Sydney, Newcastle and Wollongong.

**Priority Action**

Develop technical guidelines and specifications to support the integration of urban ecology principles in buildings, streets, parks and public spaces. Develop and implement incentive mechanisms to prioritise urban ecological outcomes to support a transition to value urban ecology in cities.

**STRATEGY THREE**

Connect biodiversity across cities through green and blue networks

**Evidence**

Core habitats connected by corridors are vitally important for enhancing biodiversity in cities. Networks of green and blue corridors, rather than 'stepping stone' habitats, are crucial, and they need to cross both public and private land. Multiple strategies are required, including changes to land-use planning policies and regulations to protect and extend existing, and establish new, corridors, supported by education, incentives and public policy.

**In Practice**

There is a need for a holistic, coordinated approach to the creation of green and blue networks across urban areas. The Sydney Green Grid represents an opportunity of how this could be implemented, although the grid itself would need to incorporate an ecological layer.

**Priority Action**

Ensure that city planning integrates green and blue grids to improve terrestrial and aquatic biodiversity outcomes.

**STRATEGY FOUR**

Design and deliver green and blue cities

**Evidence**

The planning and development of cities to achieve urban ecological outcomes should be based on maximising the retention and size of green spaces and remnant vegetation. The protection and conservation of green spaces and remnant vegetation requires that development outcomes consider cumulative and spatial impacts, from the lot to metropolitan scales.

**In Practice**

Existing policies such as Biobanking are perceived as having a negative or inadequate impact on overall urban biodiversity. Actions at the community level to drive change generally improved a community's understanding of the benefits of the local environment and its ecosystems. Increasing or streamlining the uptake of green infrastructure and retrofitting it into mainstream applications is essential in delivering compact, resilient and sustainable cities.

**Priority Action**

Protect, restore, enhance and create habitat when planning, designing and managing precinct-level redevelopments.

**STRATEGY FIVE**

Create new habitats to support biodiversity and human well-being

**Evidence**

Urbanisation can reduce the availability of specific habitats in urban areas, for example in the form of rock pools, tree hollows, fallen logs and dense shrubby vegetation, leading to a decline in the suitability of the urban matrix for certain species. The identification of key habitats and structures that are limited or absent in urban areas can enable the development and implementation of strategies to address this.

**In Practice**

The building and maintenance of new habitats and structures, including WSUD treatments, are two very different propositions. Trials and best-practice examples to demonstrate how urban ecology can best be integrated into cities, but there is concern over how such projects would be maintained over the long term.

**Priority Action**

Coordinate and implement an urban forest strategy that benefits biodiversity and ameliorates the urban heat island effect and associated heat stress. In doing so, best practices should be trialed and monitored to integrate urban forests into city planning and maintenance.

**STRATEGY SIX**

Develop and implement ongoing engagement programs to increase education and involvement across all sectors

**Evidence**

Urbanisation can reduce the availability of specific habitats in urban areas, for example in the form of rock pools, tree hollows, fallen logs and dense shrubby vegetation, leading to a decline in the suitability of the urban matrix for certain species. The identification of key habitats and structures that are limited or absent in urban areas can enable the development and implementation of strategies to address this.

**In Practice**

Multiple opportunities and entry points were identified for engaging with sectors to increase understanding of urban ecology. The need to engage with 'time poor' community members using technologies such as mobile phone apps and through activities such as 'bioblitzs' (intense surveys involving local communities with the goal of recording all species in an area).

**Priority Action**

Develop education programs (such as citizen science) that integrate and demonstrate co-benefits of urban ecology across multiple scales, including health and wellbeing and resilience.

**STRATEGY SEVEN**

Align urban ecology policies and practices between levels of government

**Evidence**

The ways in which biodiversity is governed across scales and by state agencies and local government are unclear. There is considerable evidence that protecting and managing urban ecosystems is essential, but, this is not matched by political legitimacy or the priority afforded urban ecology in city planning and development control decision-making processes.

**In Practice**

There is insufficient coordination among and within state agencies and local governments. This lack of coordination is compounded by a lack of awareness of who is doing what, which has led to duplications and gaps. A review of metrics should build on the Biodiversity Assessment Methodology being developed by the NSW government, as well as on local, state and national state-of-the-environment reporting.

**Priority Action**

Ensure that apex plans of the state (such as the State Plan and Premiers Priorities) feature biodiversity as a key priority and evaluation metrics, such as canopy cover, support political, policy and institutional change.


**Project team**

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**Image credits**

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