

Biodiversity in Glebe's Hill –benchmarks and possibilities

Professor Dieter Hochuli

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School of Life and Environmental
Sciences



   @dieterhochuli



Biodiversity in Glebe's Hill –benchmarks and possibilities

What does a weed infested and degraded space contribute to ecology in cities?

Sydney's natural legacy

Common needs among residents, visitors, and biodiversity



Biodiversity in Glebe's Hill –benchmarks and possibilities

What **can** a weed infested and degraded space contribute to ecology in cities?

Sydney's natural legacy

Common needs among residents, visitors, and biodiversity

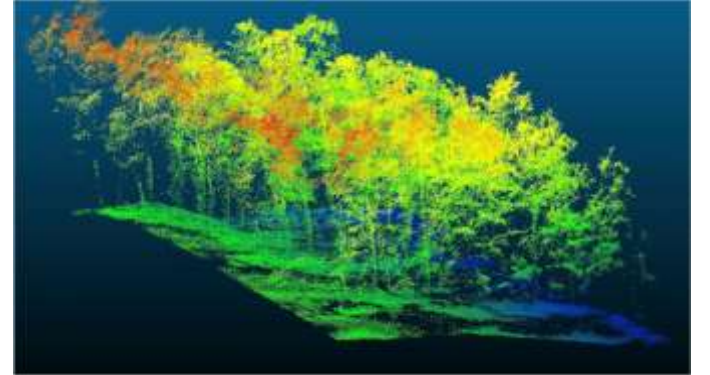
Things in and around the site





An overview of the project

- What it is, what's there, and what could be there
- Environmental history and restoration
- Why high quality small, isolated greenspaces matter
 - Pollinators
 - Invertebrates
 - Powerful Owls
 - Brush turkeys
- Surveys of the Hill and reference sites
 - Multiple animal groups
 - Vegetation
 - Habitat traits
- Extended projects
 - Microbats (Luke Amjah Hons 2023)
 - Superb Fairy Wrens (Genevieve Heggarty Hons 2023)
- Citizen Science and community engagement



My background - ecology of cities

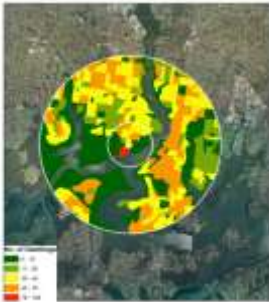


My background - ecology of cities





My background - ecology of cities



Urbanisation at Multiple Scales Is Associated with Larger Size and Higher Fecundity of an Orb-Weaving Spider

Elizabeth C. Lowe*, Sheam M. Wilder, Dieter F. Hochuli
School of Biological Sciences, The University of Sydney, Sydney, New South Wales, Australia

Landscape and Urban Planning 161 (2015) 232–239

Contents lists available at ScienceDirect
Landscape and Urban Planning
journal homepage: www.elsevier.com/locate/landurbplan

Pollination and plant reproductive success in restored urban landscapes dominated by a pervasive exotic pollinator

Boris Lomov*, David A. Keith*, Dieter F. Hochuli*

Urban Ecosystems 18 (2015) 409–415

Urbanization affects the trophic structure of arboreal arthropod communities

Fiona J. Christie · Gerasimos Cassis · Dieter F. Hochuli

Ecology of Sydney's urban fragments: has fragmentation taken the sting out of insect herbivory?

Dieter F. Hochuli, Heloise Gibb, Susan E. Burrows and Fiona J. Christie
Institute of Wildlife Research, School of Biological Sciences
Haydon-Laurence Building (A08), The University of Sydney, N.S.W. 2006, Australia

Linking ecological function to species composition in ecological restoration: Seed removal by ants in recreated woodland

BORIS LOMOV*, DAVID A. KEITH* AND DIETER F. HOCHULI*
*School of Biological Sciences, The University of Sydney, Sydney, *Biodiversity Conservation Science Section, Department of Environment and Climate Change, Harefield, New South Wales, Australia

Journal of Applied Ecology 51 (2014) 100–108

Responses of wasp communities to urbanization: effects on community resilience and species diversity

Fiona J. Christie · Dieter F. Hochuli

Are butterflies and moths useful indicators for restoration monitoring? A pilot study in Sydney's Cumberland Plain Woodland

By Boris Lomov, David A. Keith, David R. Britton and Dieter F. Hochuli

Are urban bandicoots solely to blame for tick concerns?

Lydecker, HW, Stanfield, E, Lo, N, Hochuli, DF, and Banks PB
School of Biological Sciences, A08 Haydon-Laurence Building, The University of Sydney, NSW, 2006, Australia
Email: henry.lydecker@sydney.edu.au

Creating better cities: how biodiversity and ecosystem functioning enhance urban residents' wellbeing

Lacy Taylor · Dieter F. Hochuli

Urban Ecosystems 18 (2015) 18–34
DOI 10.1007/s11252-014-0427-3

Published online: 9 November 2014
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Habitat fragmentation in an urban environment: large and small fragments support different arthropod assemblages

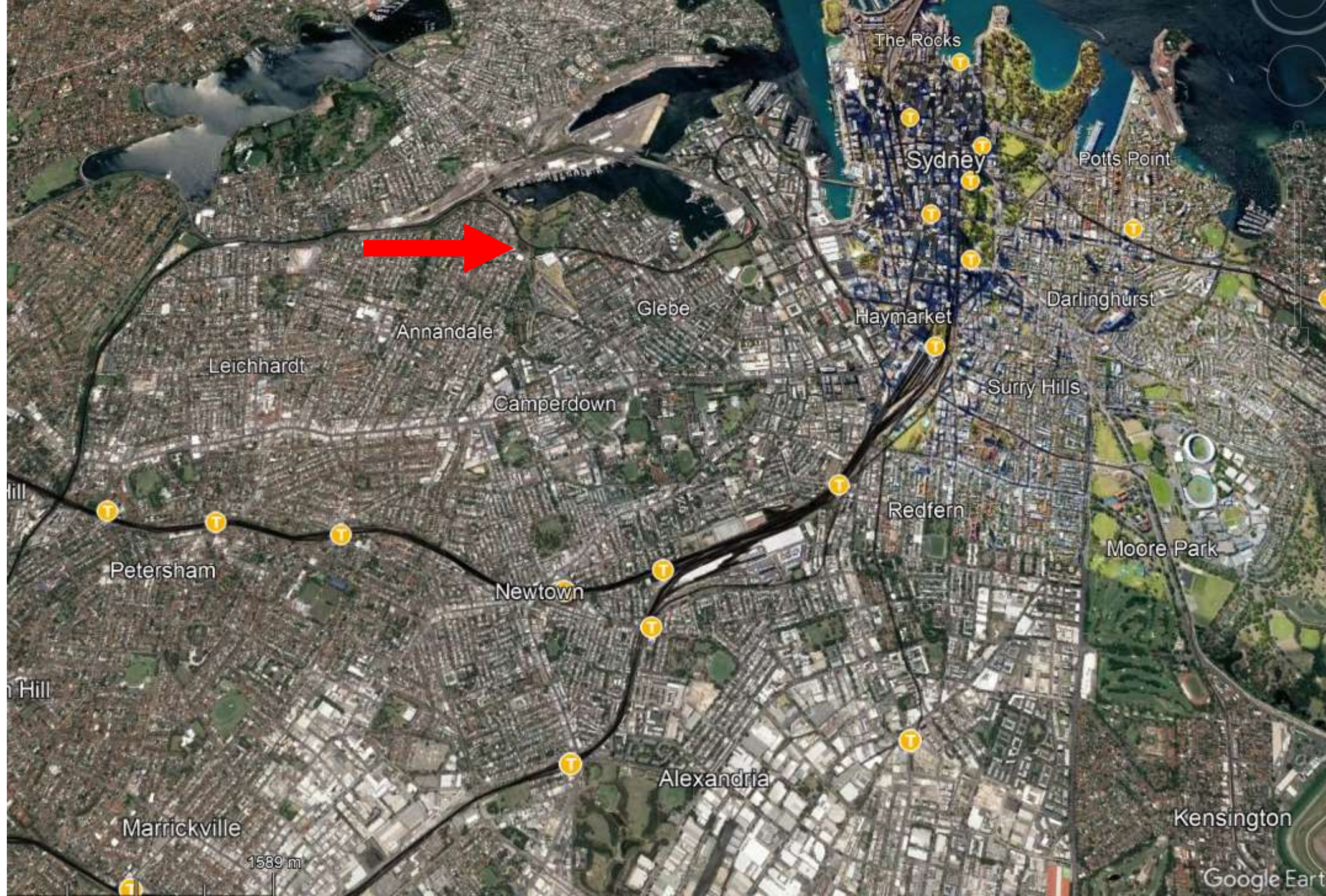
Heloise Gibb*, Dieter F. Hochuli
School of Biological Sciences, The University of Sydney, Sydney, New South Wales, Australia

Biological Conservation 180 (2014) 10–18

Elevated Levels of Herbivory in Urban Landscapes: Are Declines in Tree Health More Than an Edge Effect?

Fiona J. Christie* and Dieter F. Hochuli*





The Rocks

Sydney

Potts Point

Annandale

Glebe

Haymarket

Darlinghurst

Leichhardt

Camperdown

Surry Hills

Petersham

Newtown

Redfern

Moore Park

Alexandria

Marrickville

Kensington

1539 m

Google Earth



Jubilee Park

40

42

44

36

34

30

26

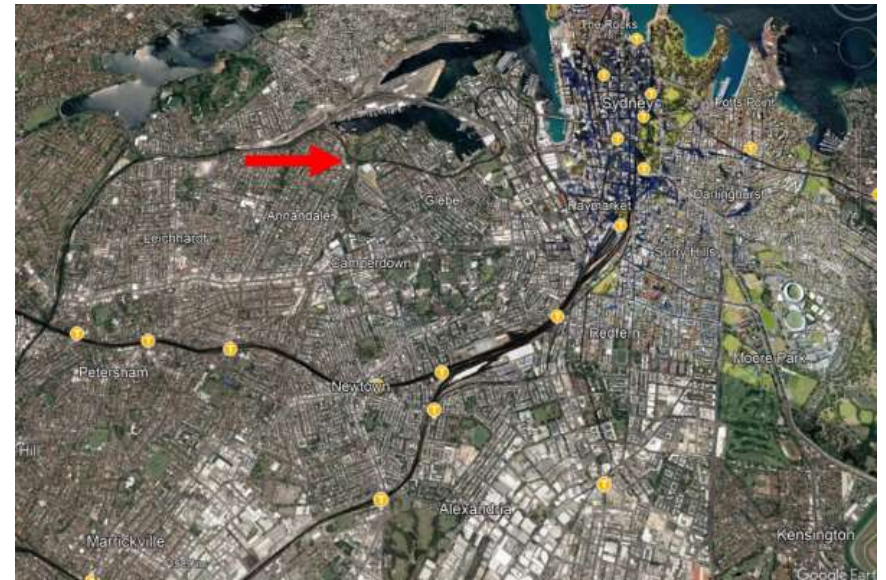
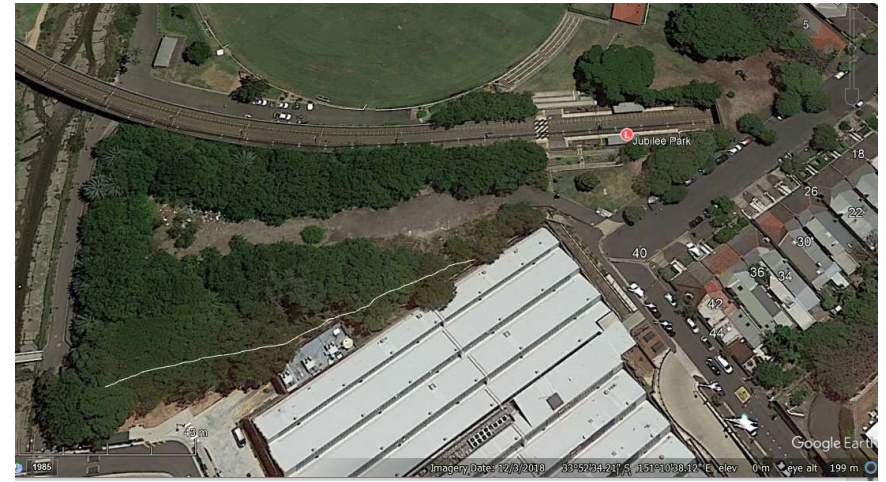
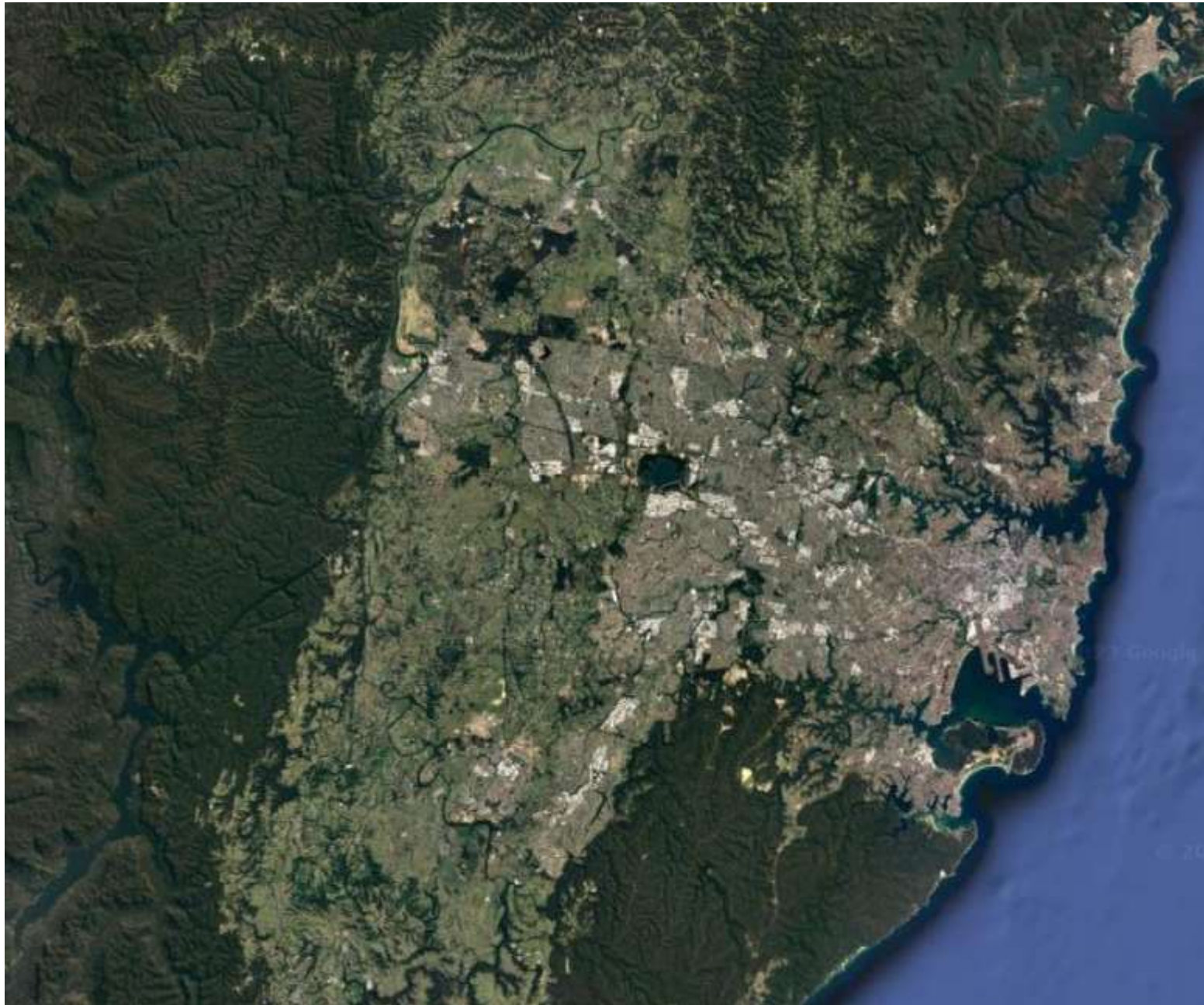
22

18

Google Earth

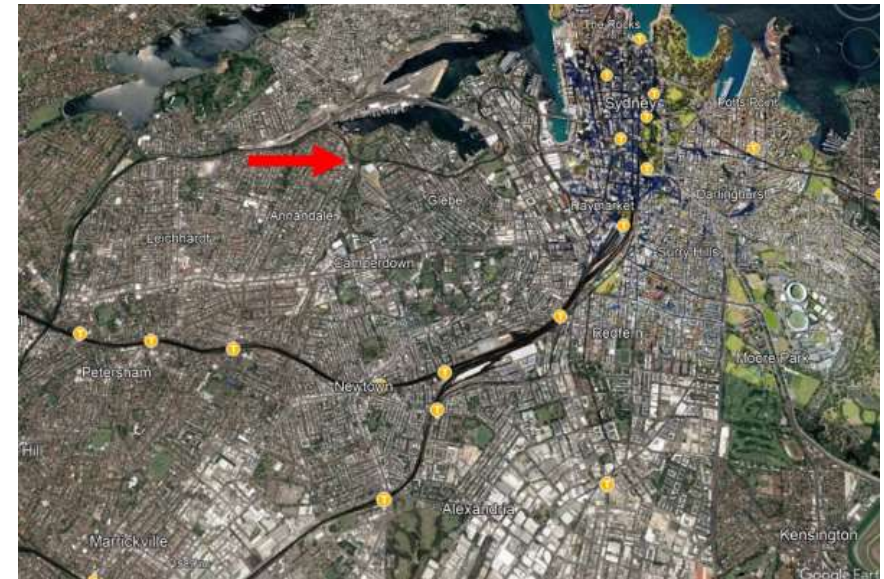
1985

Imagery Date: 12/3/2018 33°52'34.21" S 151°10'38.12" E elev 0 m eye alt 199 m



Objectives

- Identify biodiversity values (current and future possibilities)
- Survey biodiversity and habitat traits in and around The Hill
- Put these in the context of reference sites
- Identify opportunities for restoration
- Identify ecological goals for restoration
- An urgent need to enhance urban greenspace and biodiversity connections in cities





1943

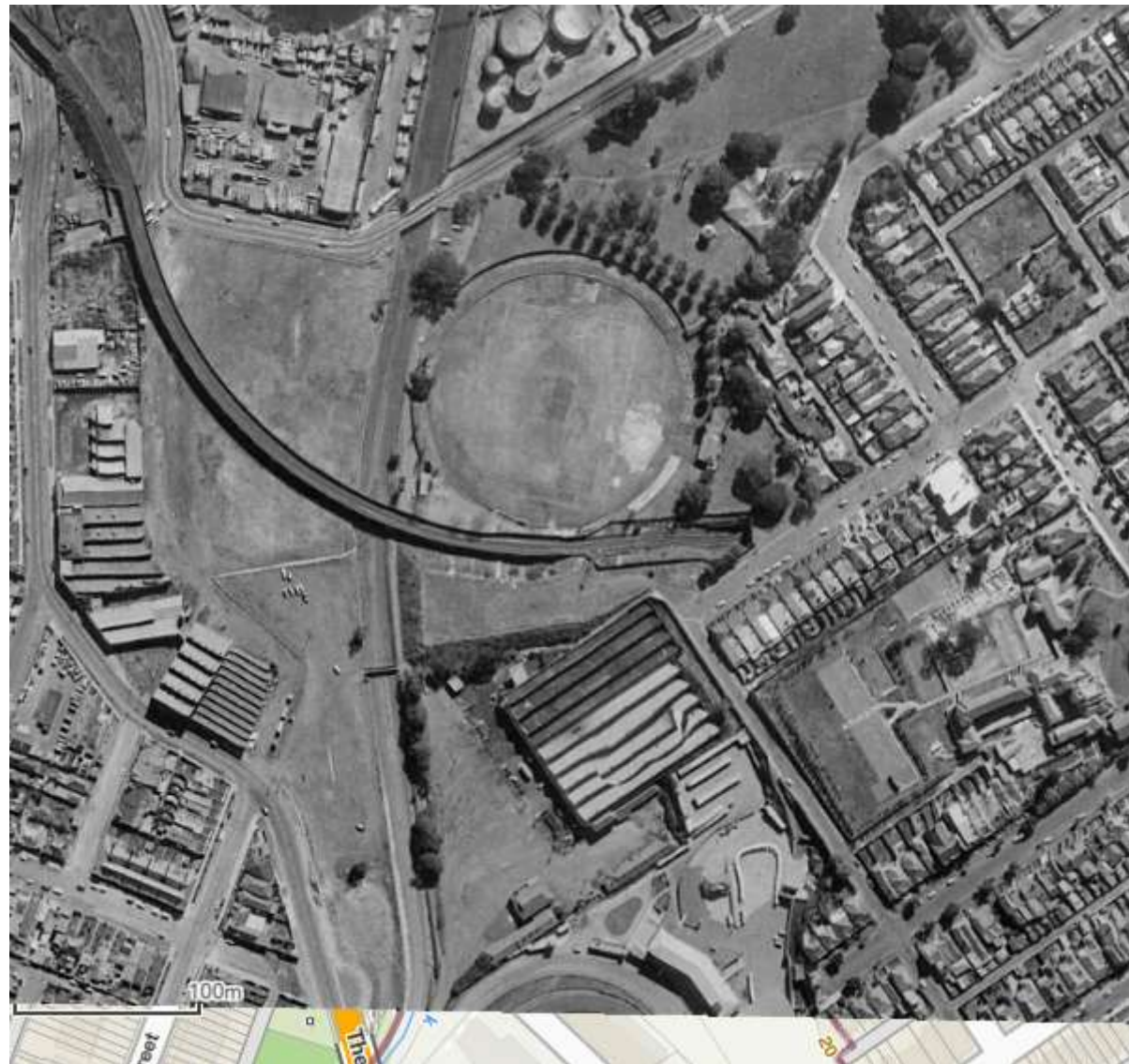




Historical Imagery

Search and Discovery

1965





Historical Imagery

Search and Discovery

1982





Historical Imagery

Search and Discovery

1994





Historical Imagery

Search and Discovery

2005

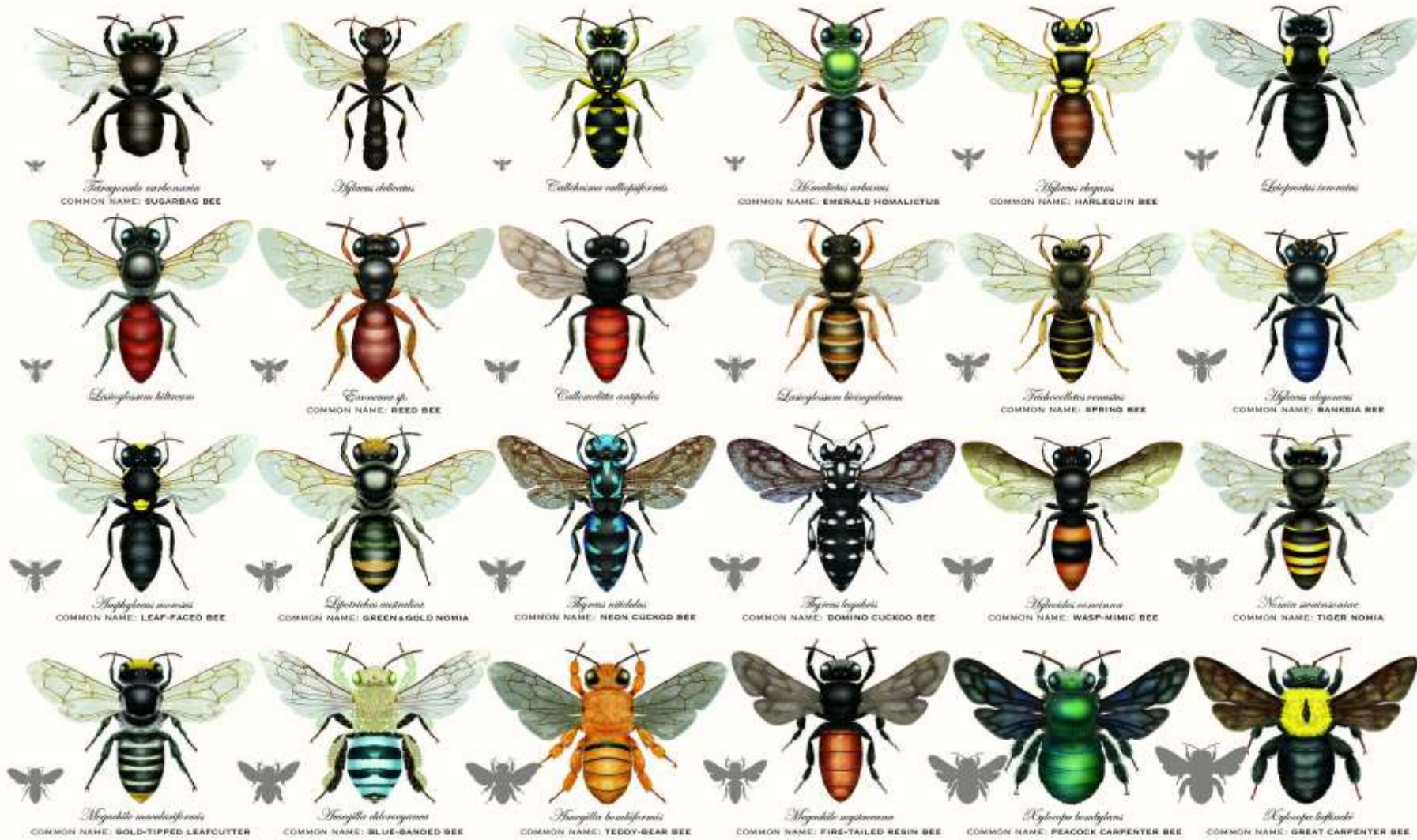




2023







NATIVE BEES OF NEW SOUTH WALES

By Gina Cranson WITH THE GUIDANCE OF DR MICHAEL BATLEY FROM THE AUSTRALIAN MUSEUM, SYDNEY

THIS 2018 POSTER SHOWCASES A SMALL SELECTION OF THE MANY AND VARIED NATIVE BEE SPECIES THAT OCCUR IN THIS STATE. THE ARTIST HAS CHOSEN TO DEPICT FEMALES AS THEY ARE MORE LIKELY TO BE SEEN. MALES MAY DIFFER IN APPEARANCE. BEES THAT DO NOT HAVE COMMON NAMES ARE REFERRED TO HERE BY THEIR SCIENTIFIC NAMES ONLY. * SILHOUETTES INDICATE ACTUAL SIZE.

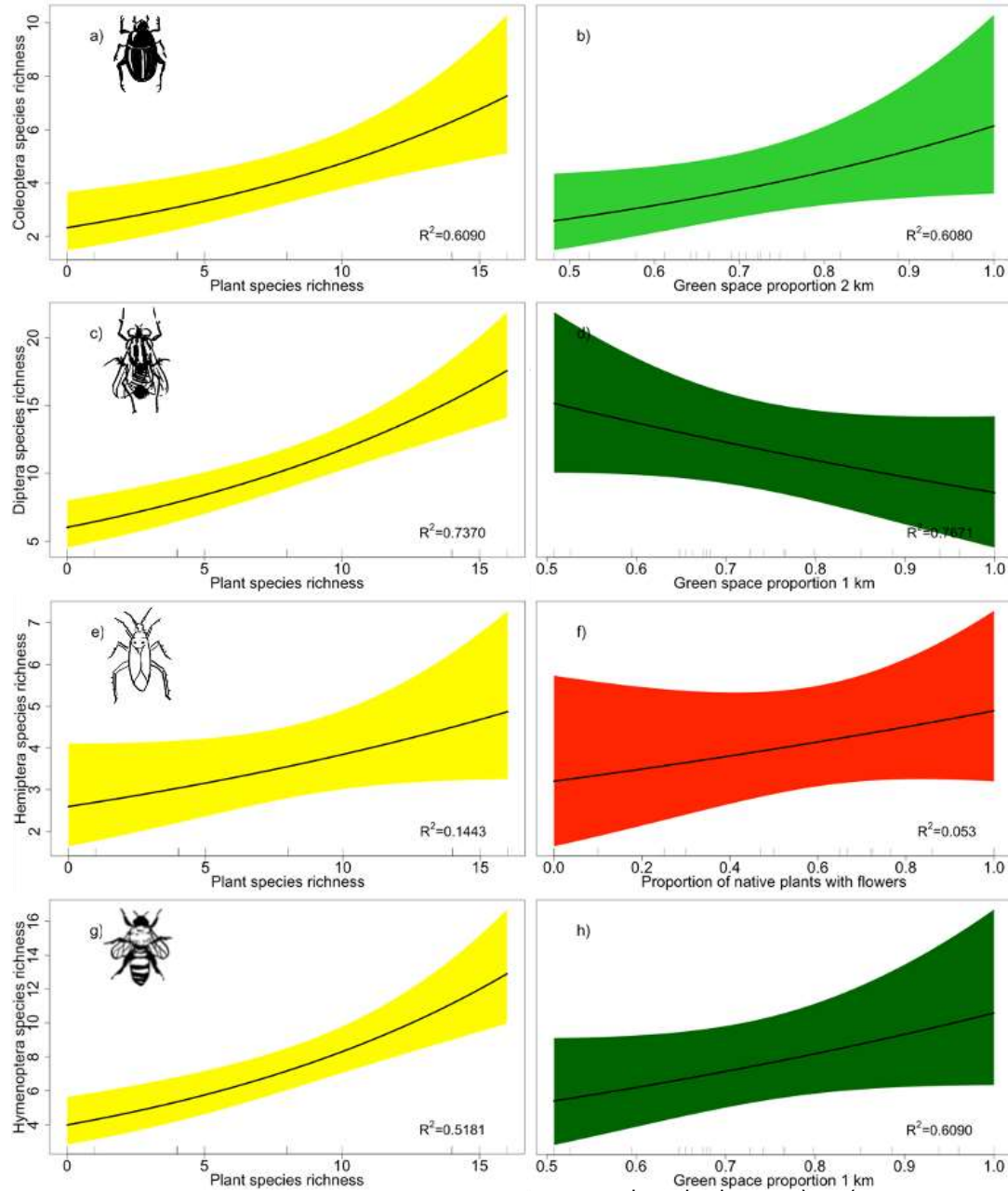


What can you do to encourage native pollinators to return?



Manuel Lequerica Tamara, PhD 2022





Major insect groups show distinct responses to local and regional attributes of urban green spaces

Manuel E. Lequerica Tamara^{a,*}, Tanya Latty^a, Caragh G. Threlfall^{a,b}, Dieter F. Hochuli^a



Green space proportion
=
landscape attribute



Flower species richness
=
local attribute

Hoverflies



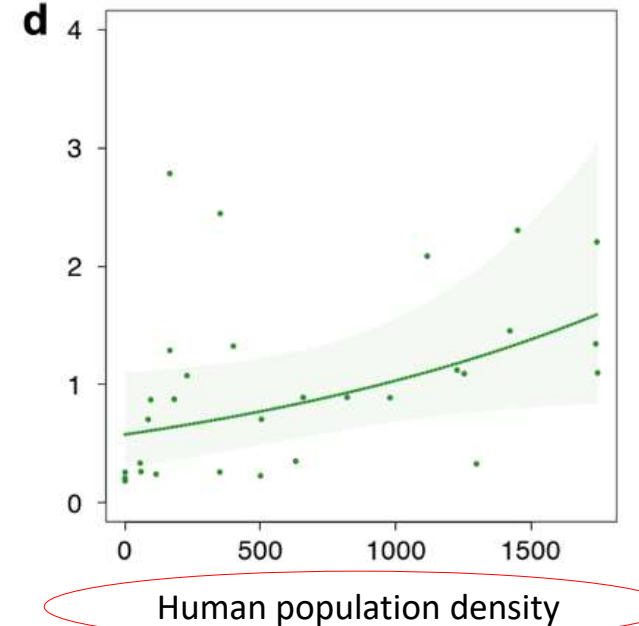
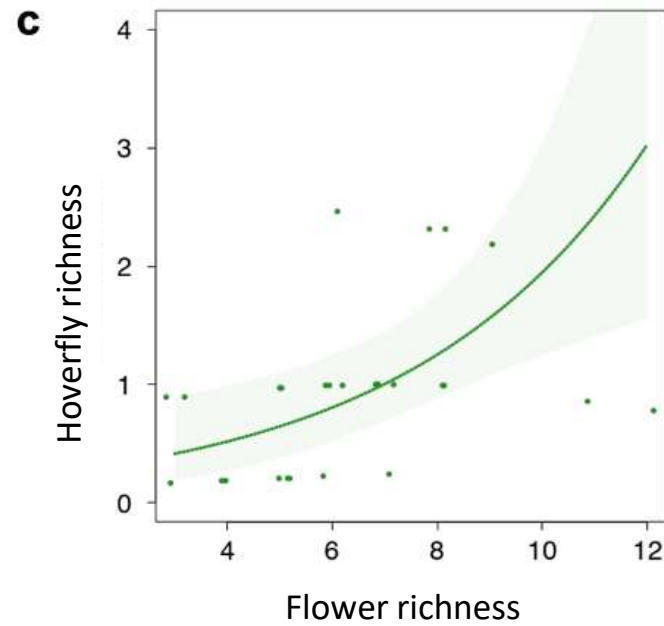
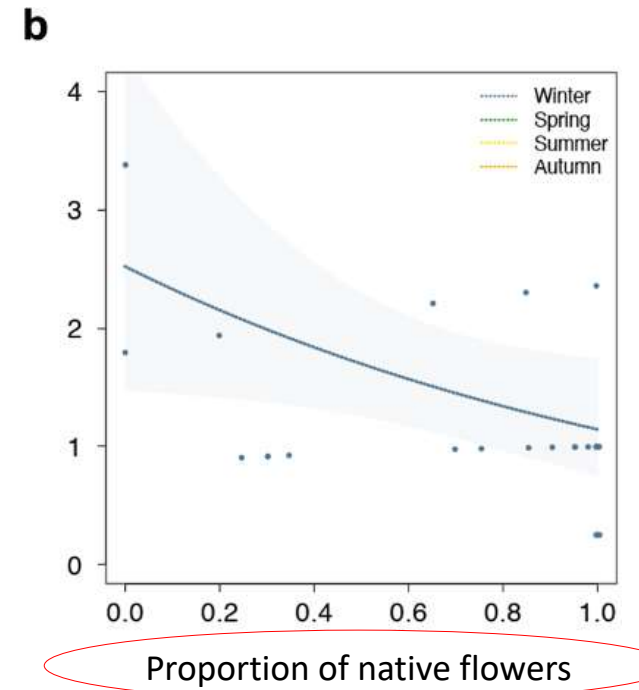
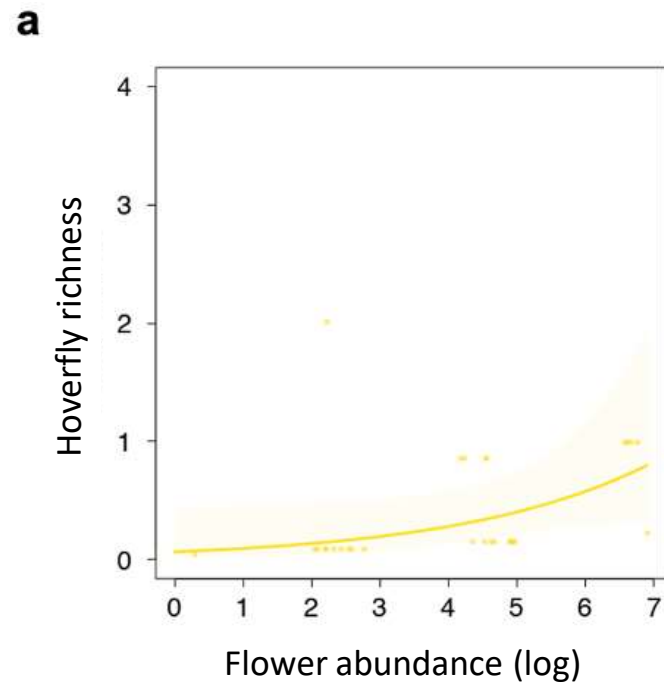
Exotic species are vital floral resources for urban pollinators

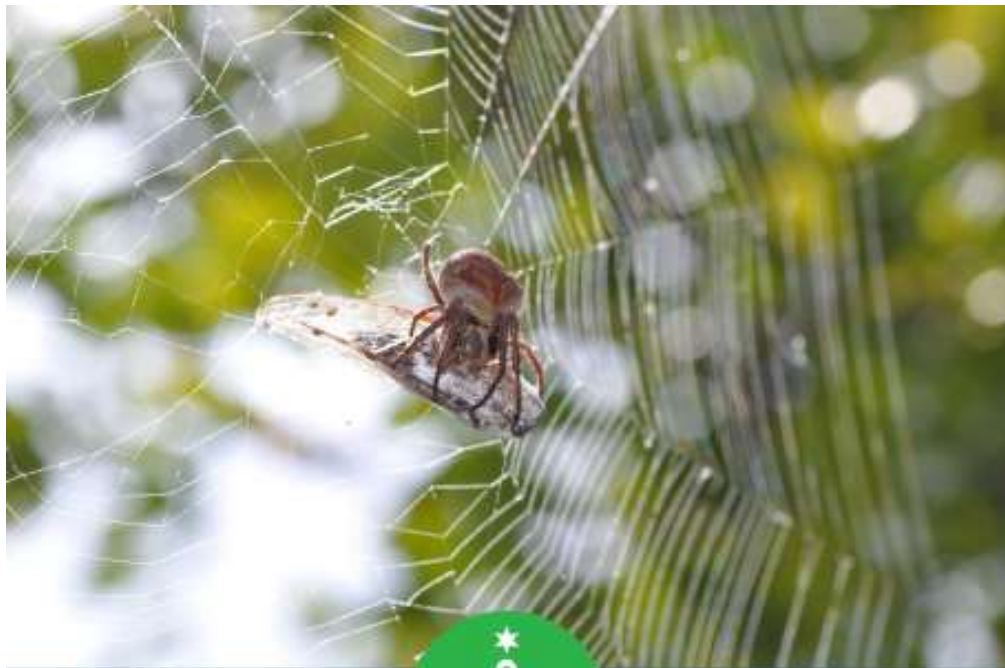


Melangyna sp



Symosyrphus grandicornis





Baseline Invertebrate Survey

Report
June 2020

CITY OF SYDNEY 

<https://www.thomasjackson.com.au/>





Lloyd Hedges



Dieter Hochuli

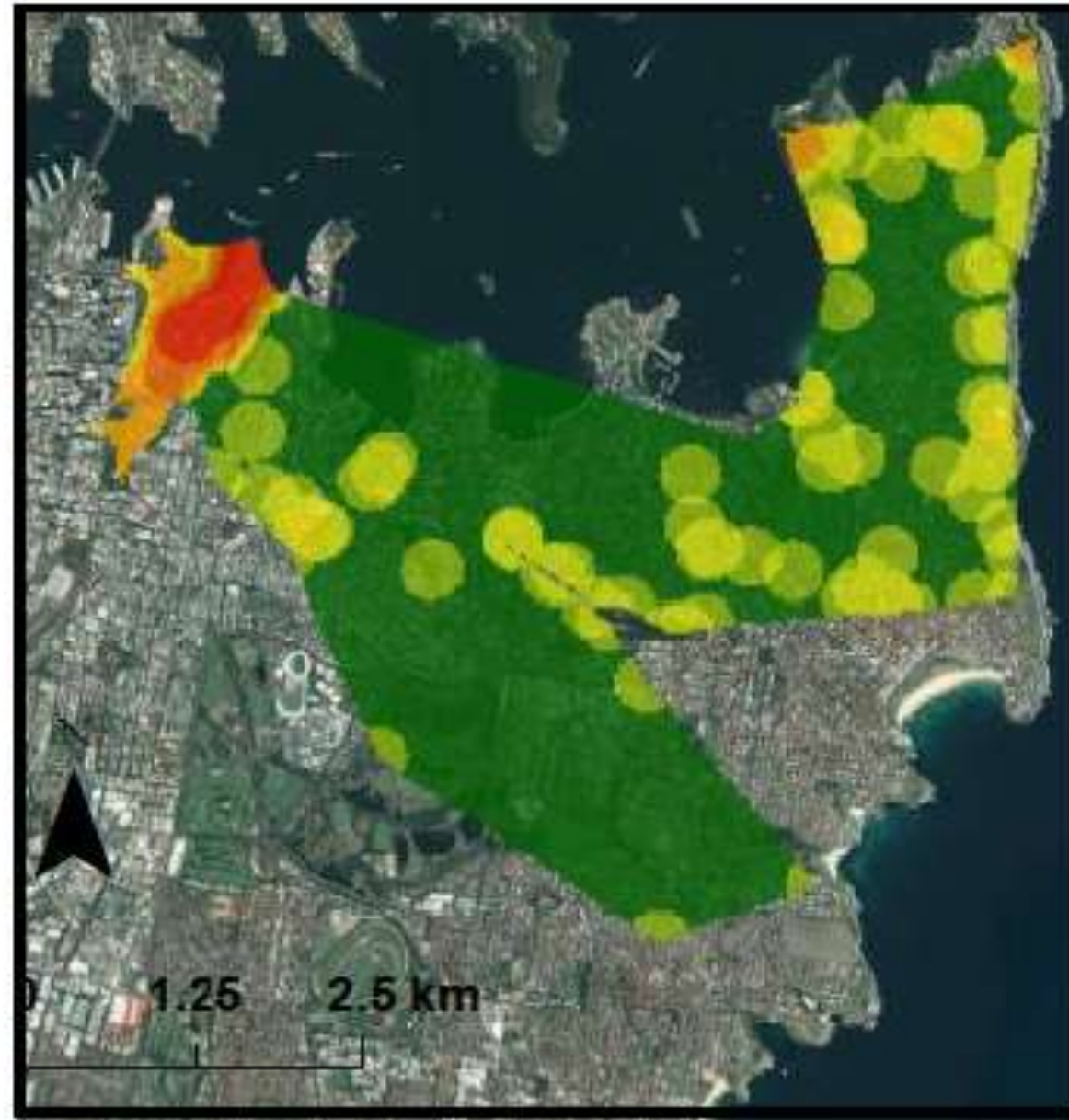
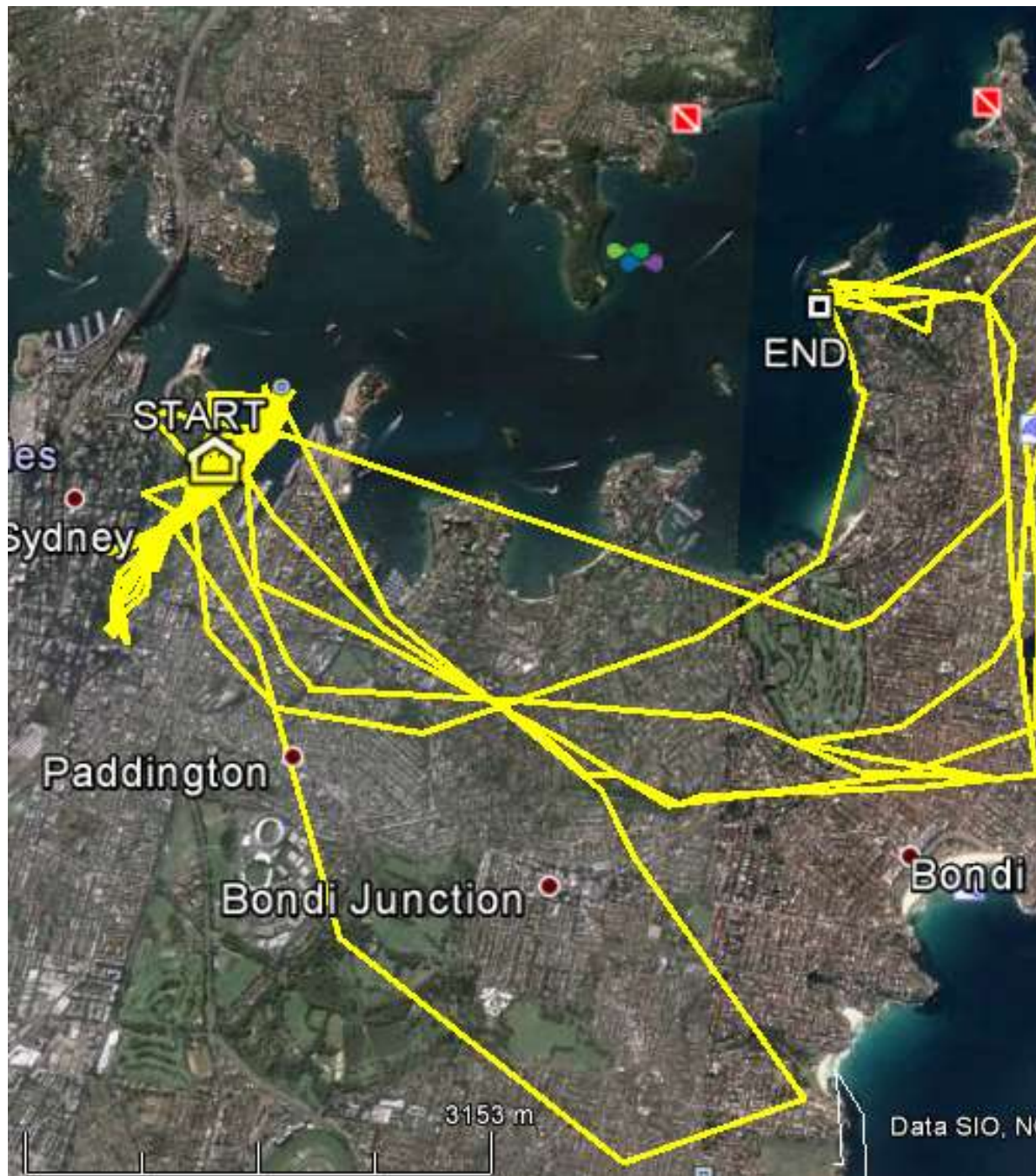


John Martin

Ecology of Powerful Owls in the city (Lisa Harvey, Hons 2016)



THE UNIVERSITY OF
SYDNEY





BIG CITY BIRDS ADAPTING TO CHANGE

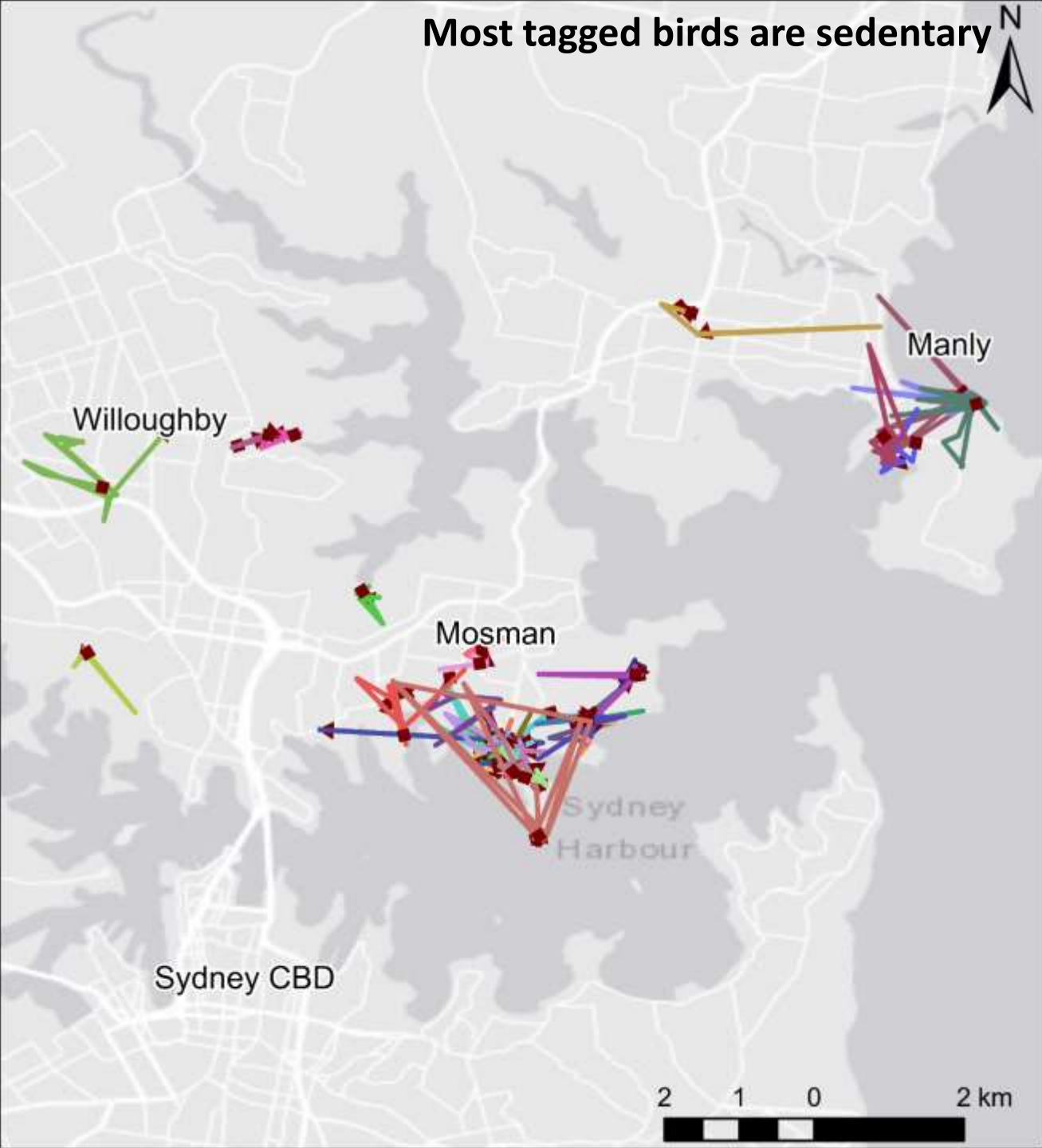


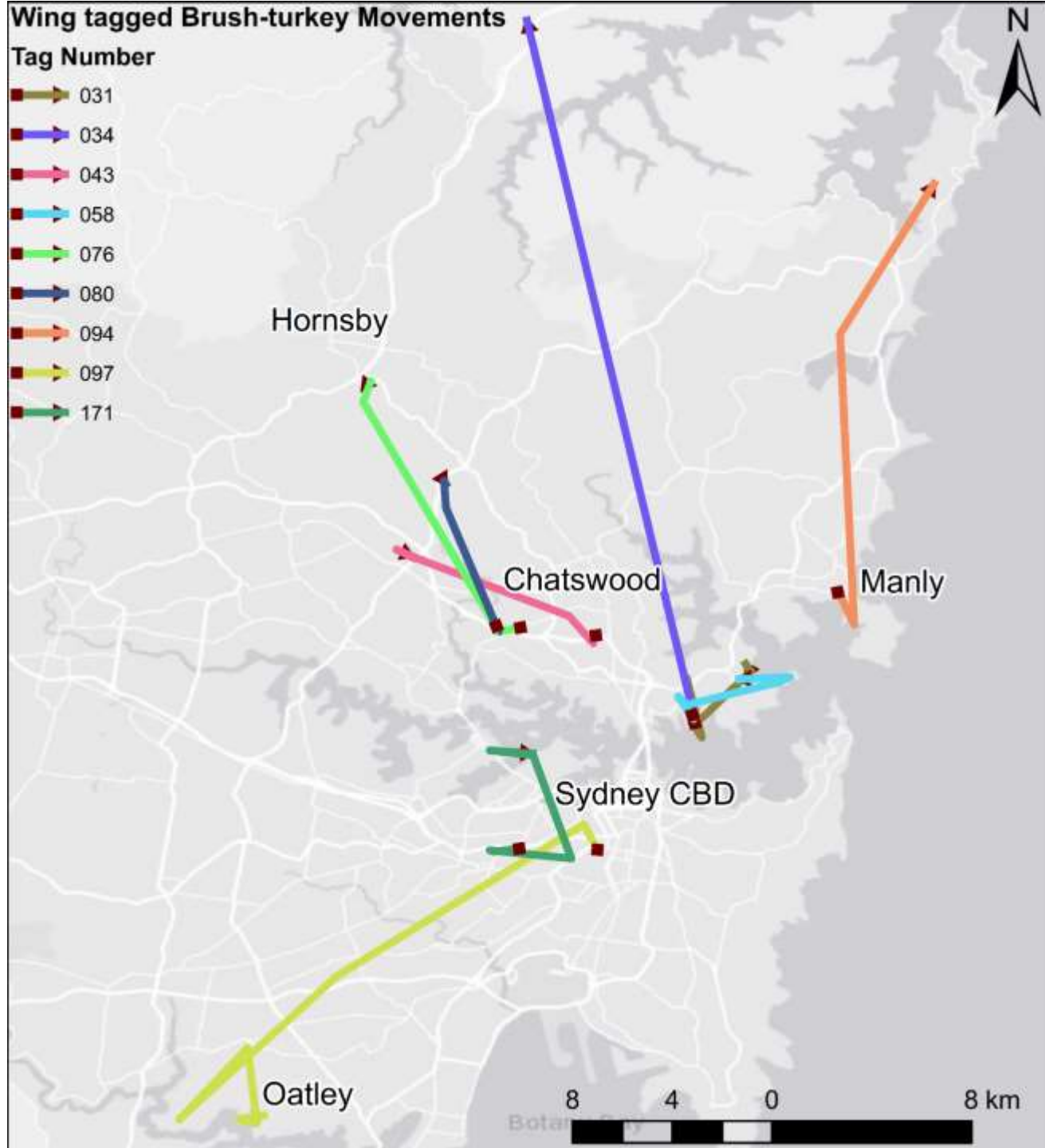
Tracking turkeys with citizen science



Photo: Chris M

Most tagged birds are sedentary





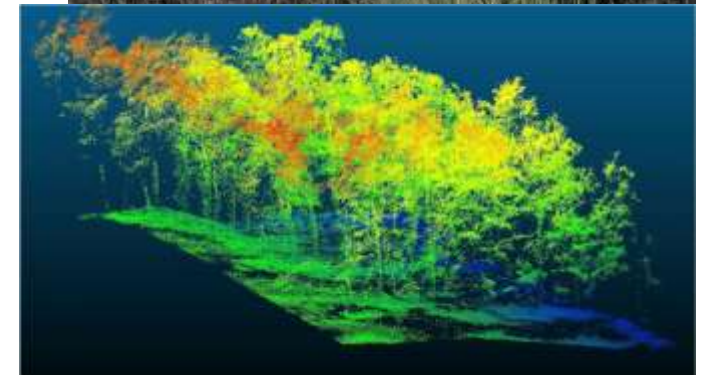


12/03/2020 05:38:35 10 Sec

Survey methods and target groups



- Camera traps
 - Mammals, larger birds
- Acoustic surveys
 - Microbats
- Direct surveys
 - Birds
 - Pollinators
 - Target invertebrates from the baseline groups
 - Reptiles
- Vegetation surveys
- Habitat assessments
 - Physical
 - remote sensing (LIDAR/ALS)







How insectivorous bats use habitat in the city





How insectivorous bats use habitat in the city

Luke Amjah (Hons 2023)

Dr Caragh Threlfall
Dr Leroy Gonsalves
Prof Dieter Hochuli



Department of
Primary Industries





**Insectivorous Bat Survey for
City of Sydney Local
Government Area (2016-17)**

City of Sydney
Town Hall House
468 Kent Street
Sydney NSW 2000



Sydney2030 Green Global Connected
city of villages



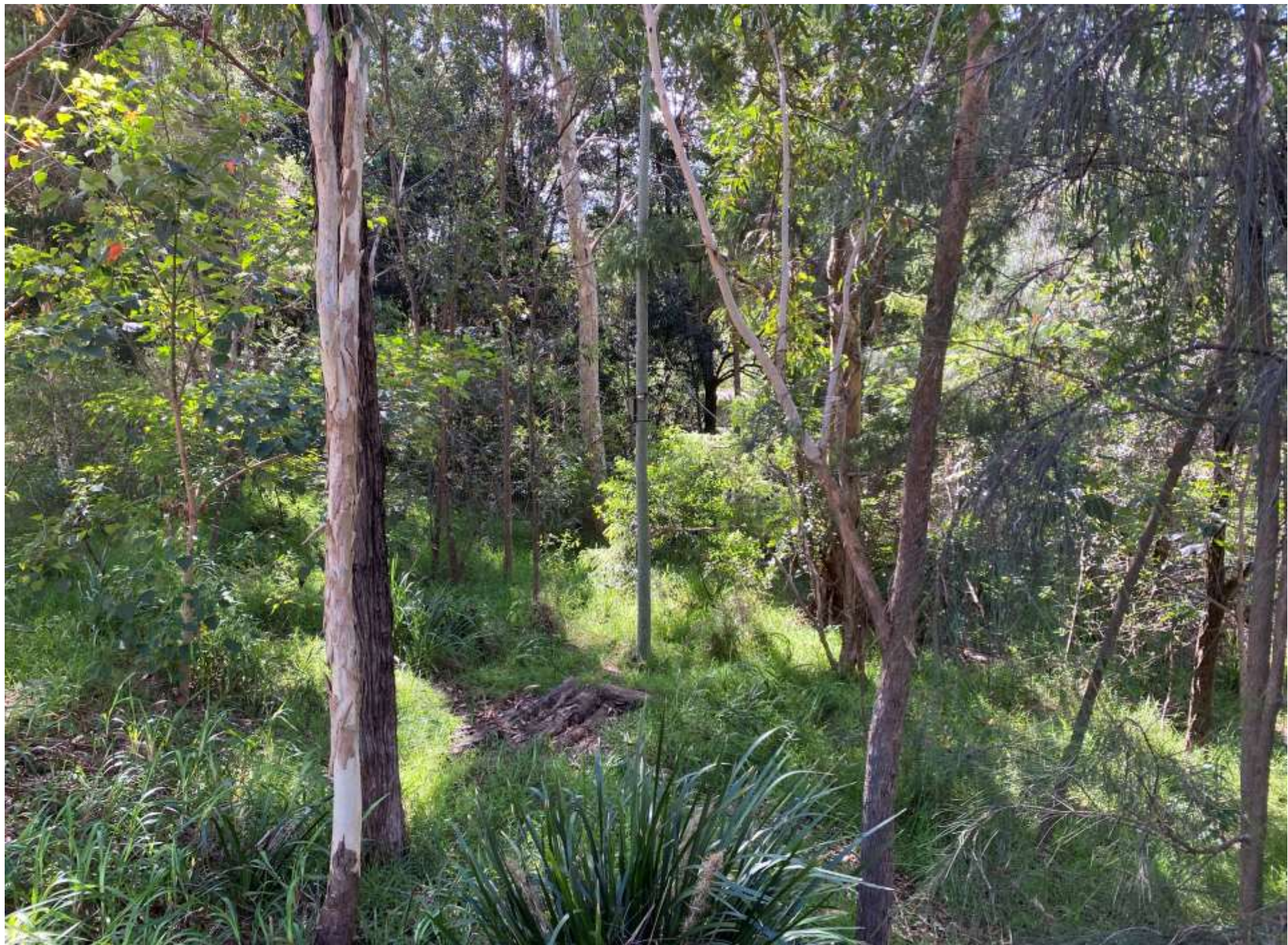
Eastern or Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
Listed as vulnerable in NSW

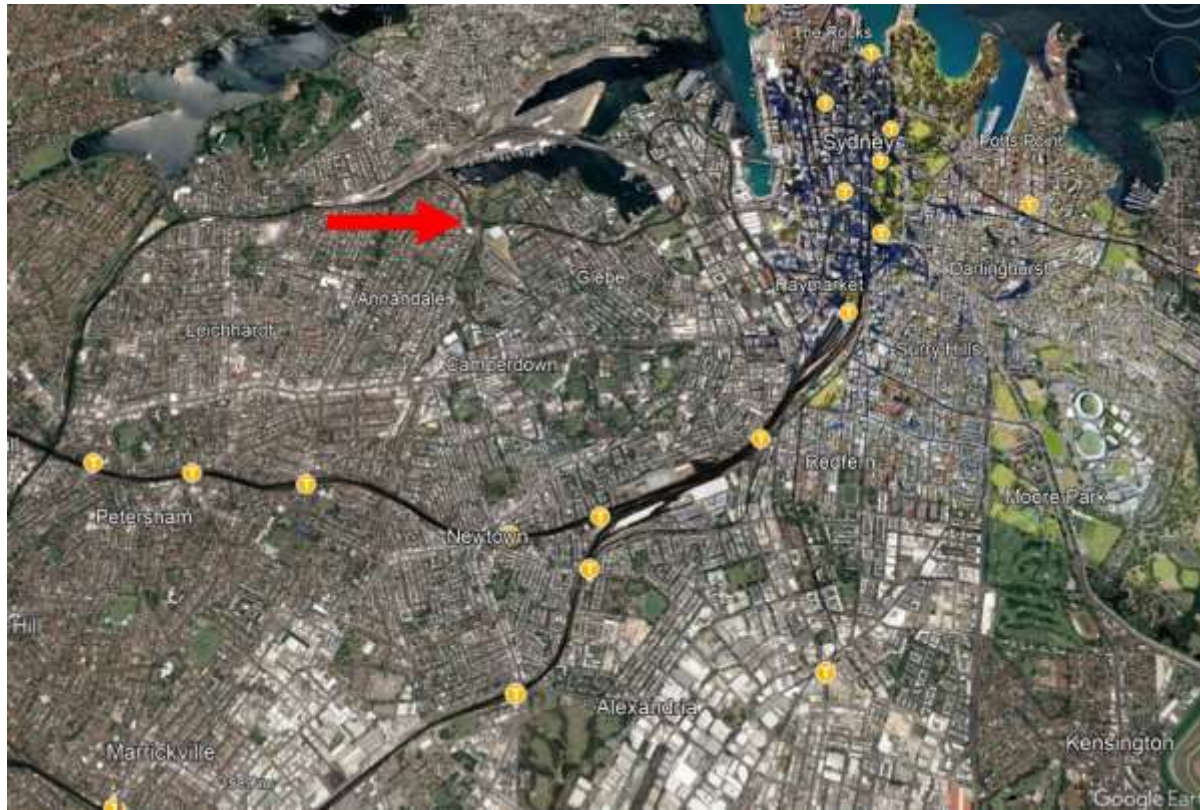


Eastern or Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
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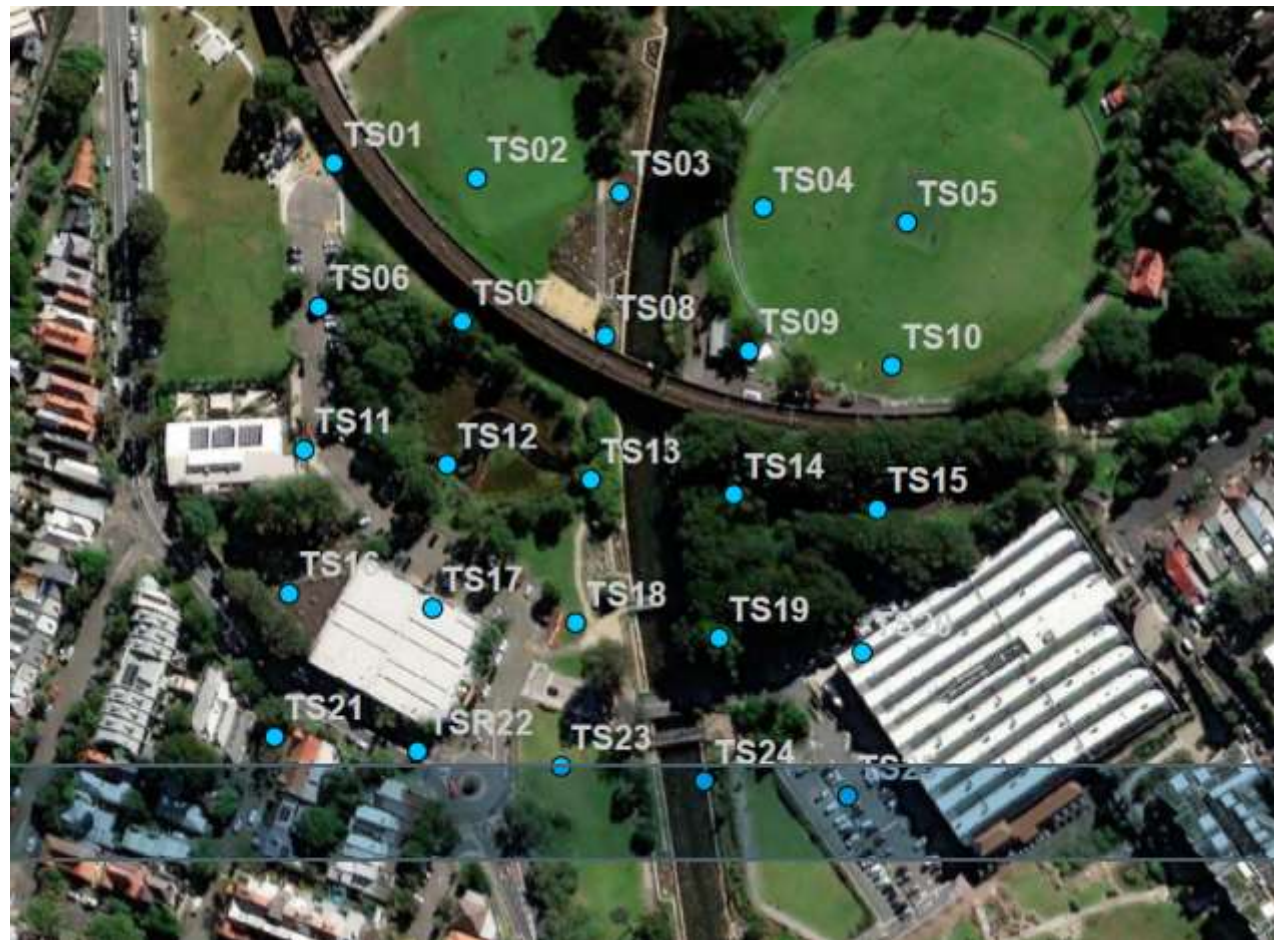
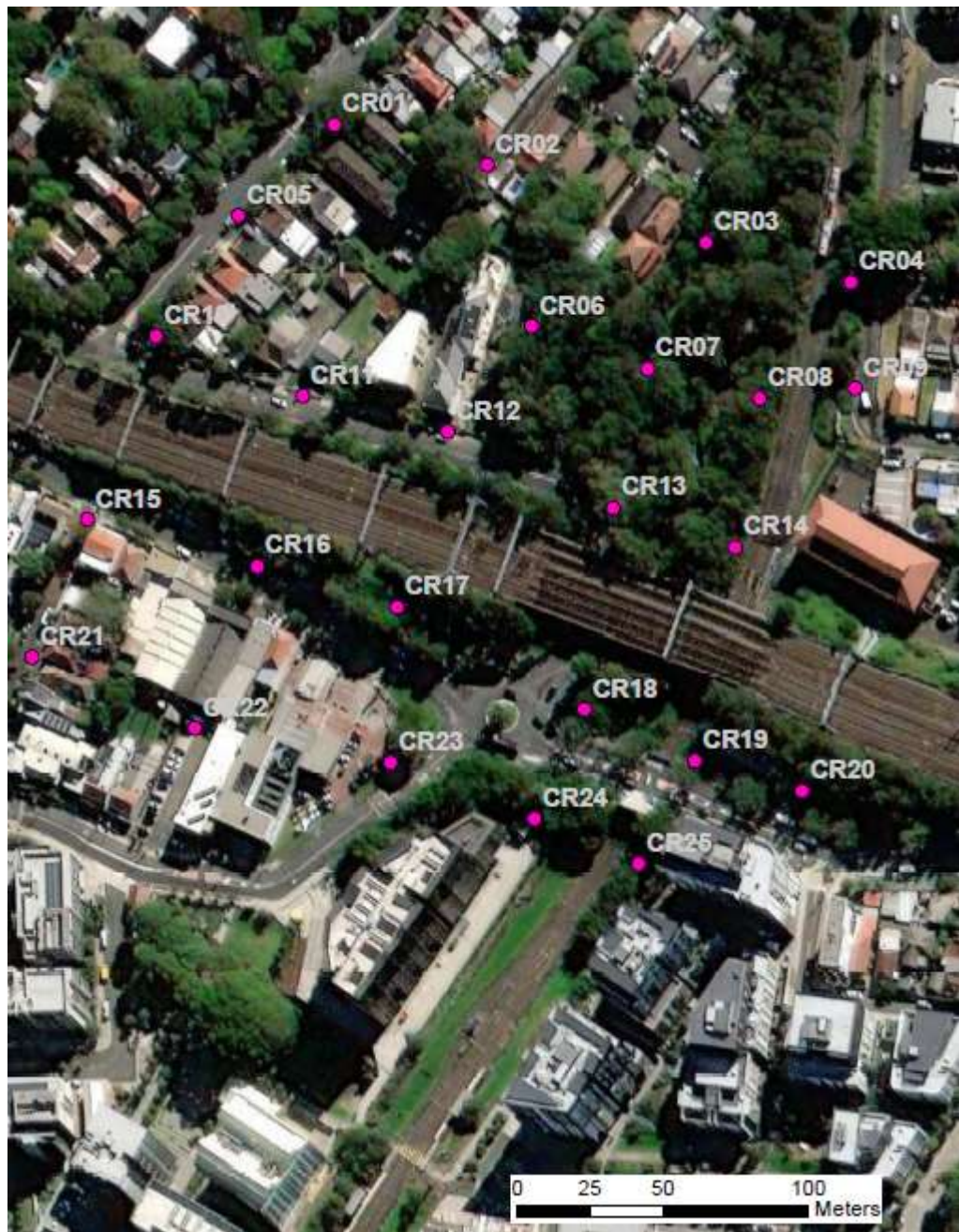




Insectivorous Bat Survey for City of Sydney Local Government Area (2016-17)

City of Sydney
Town Hall House
468 Kent Street
Sydney NSW 2000







CITY OF SYDNEY

Orphan School Creek

This area was once an ugly, weed-infested site with polluted soils. How did it become the attractive bushland area you see today?

The male Superb Fairy Wren, *Malurus cyaneus*, has a distinctive blue-and-black waistcoat.

Fairy-wrens of Australia



How to attract small birds to your garden

Why plant native plants for small bird habitat?

Food

Shelter and protection

Nesting material and nest sites

For more information contact Wildlife Council on 021 738 or visit www.wildlife.org.au

New Habitat Site

This is one of many corridors sites started by community volunteers and residents, local schools and council, across Valleys areas of metropolitan and private land.

A RIVER Environmental Trust grant funded project.



The persistence of the superb fairy-wren in urban greenspaces

Genevieve Heggarty (Hons 2023)

Dr Holly Parsons

Prof Dieter Hochuli



What are the local and landscape scale traits required to sustain a viable superb fairy-wren population across urban greenspaces?

- 1. Local biotic traits** that promote superb fairy-wren presence and abundance within and among greenspaces by examining the interactions between vegetation structure, free-roaming cat density, and bird community composition
- 2. Landscape traits** (size, amount, and configuration of suitable vegetation) that affect superb fairy-wren populations





Jubilee Park

40

30

36

34

42

44

43 m

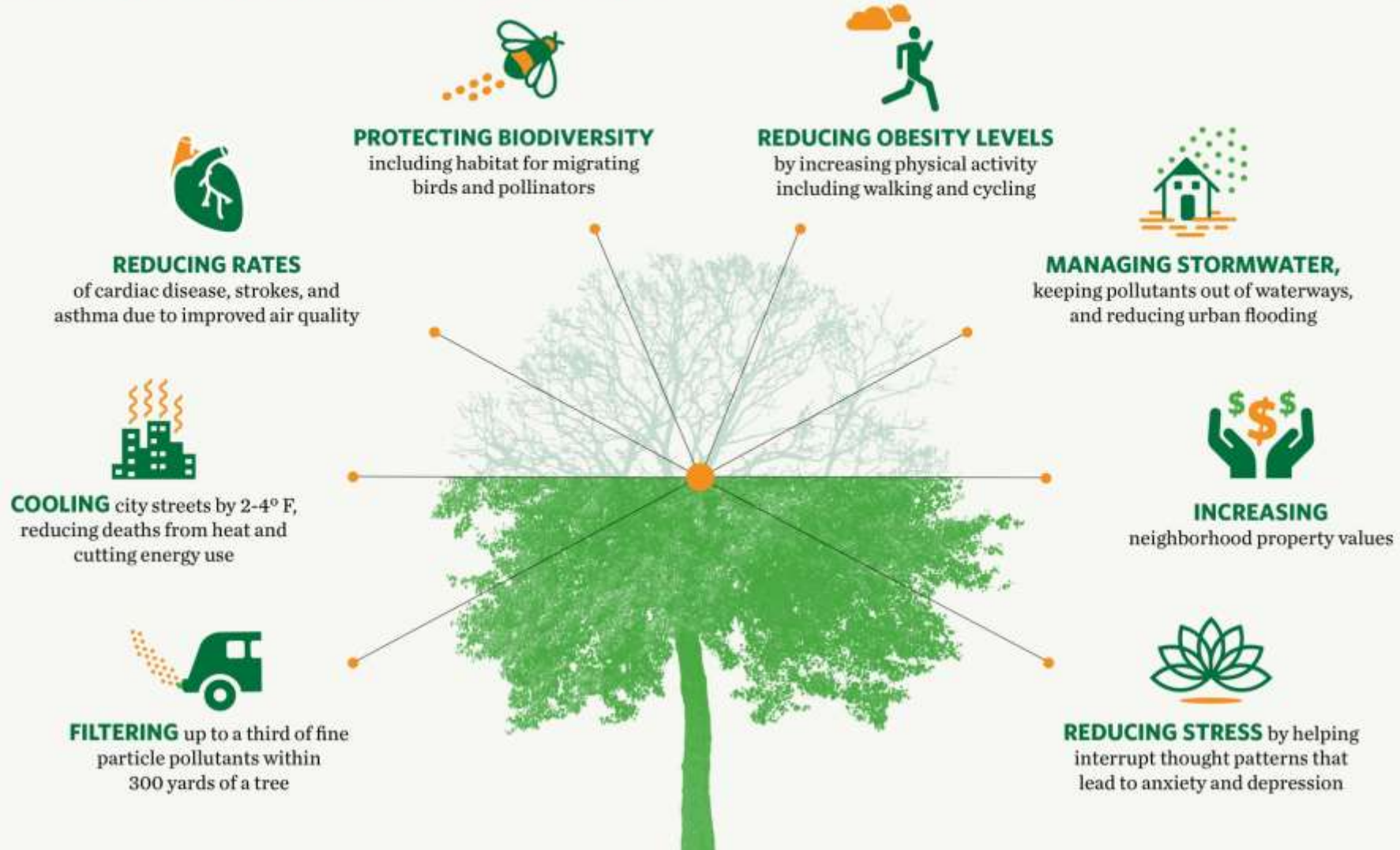
1985

Imagery Date: 12/3/2018 33°52'34.21" S 151°10'38.12" E elev 0 m eye alt 199 m

Google Earth

Benefits of Urban Trees

Research has linked the presence of urban trees to...



<https://global.nature.org/content/funding-trees-for-health?>

Lucy Taylor (2018, PhD)
The impact of nature on urban residents' wellbeing



- Surveys, focus groups, and field interviews of residents in Sydney, Melbourne, Wellington and Auckland
- **Wellbeing tied not necessarily to what is there, but we *think* is there**
- **Sometimes “any green will do”**
- **The importance of “nature near you”**
- The case for accessible and inclusive nature, nature connectedness, and links to human health

Urban Ecosyst
DOI 10.1007/s11252-014-0427-3

Creating better cities: how biodiversity and ecosystem functioning enhance urban residents' wellbeing

Lucy Taylor · Dieter F. Hochuli



Defining greenspace: Multiple uses across multiple disciplines

Lucy Taylor^{1,*}, Dieter F. Hochuli²

¹ School of Life and Environmental Sciences, University of Sydney, Room 410 Rhodes-Lessore Building (408) The University of Sydney, NSW 2008, Australia
² School of Life and Environmental Sciences, University of Sydney, Australia

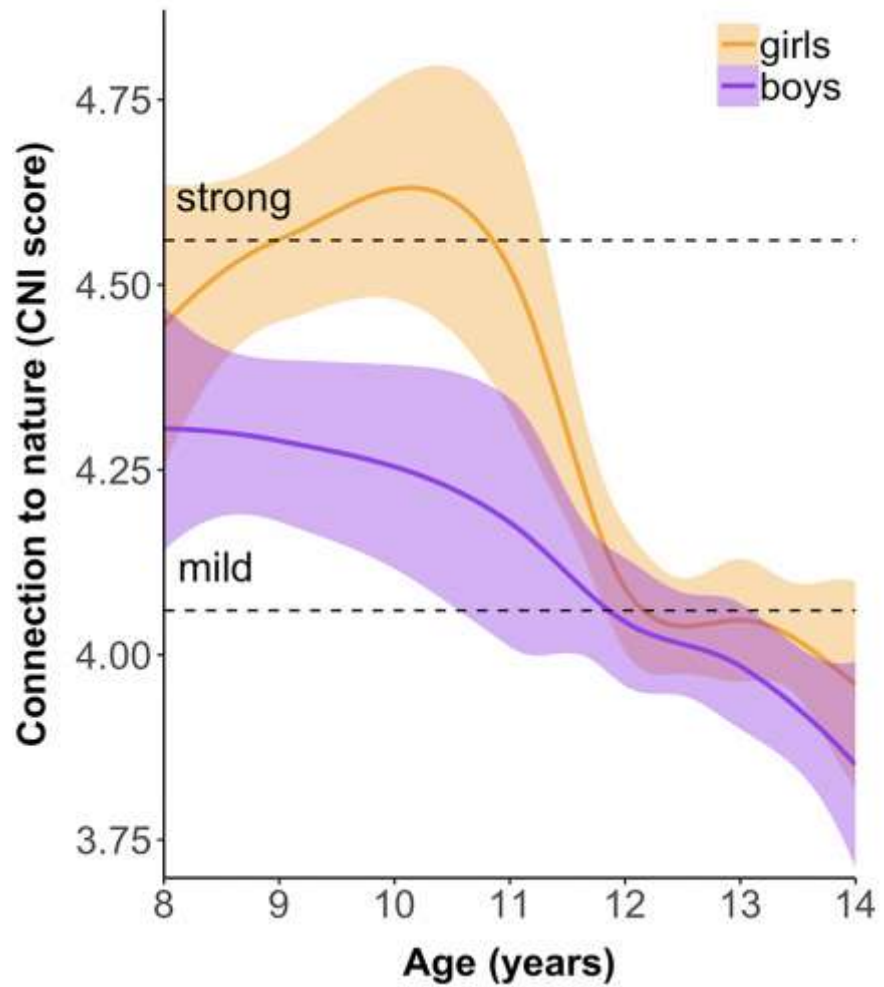
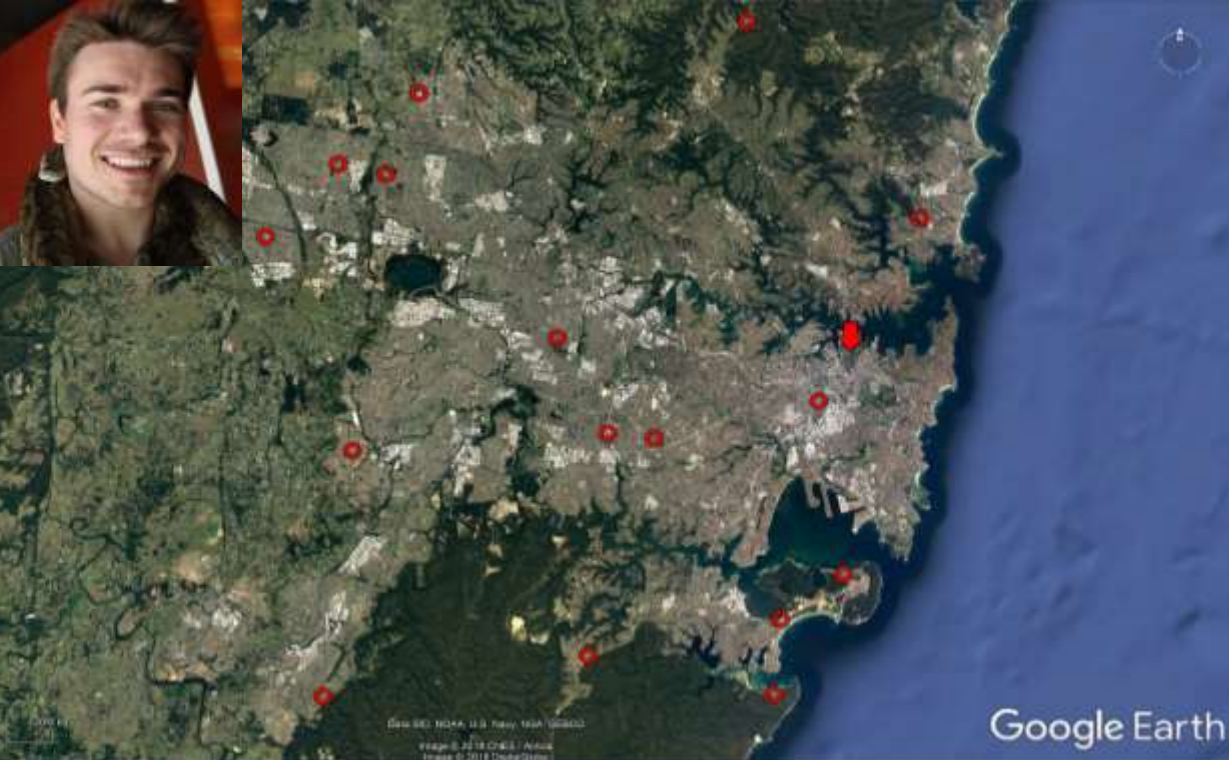


Urban Ecosyst
DOI 10.1007/s11252-017-0702-1

Wellbeing and urban living: nurtured by nature

Lucy Taylor¹  · Amy K. Hahs² · Dieter F. Hochuli¹





16 schools
(8 primary, 8 secondary)

1165 students
Years 3-8 (ages 8-15)

Ryan Keith (PhD 2022)

PLOS ONE

OPEN ACCESS PEER-REVIEWED
RESEARCH ARTICLE

Urban children's connections to nature and environmental behaviors differ with age and gender

Ryan J. Keith, Lisa M. Given, John M. Martin, Dieter F. Hochuli





Published: July 29, 2021 • <https://doi.org/10.1371/journal.pone.0255421>















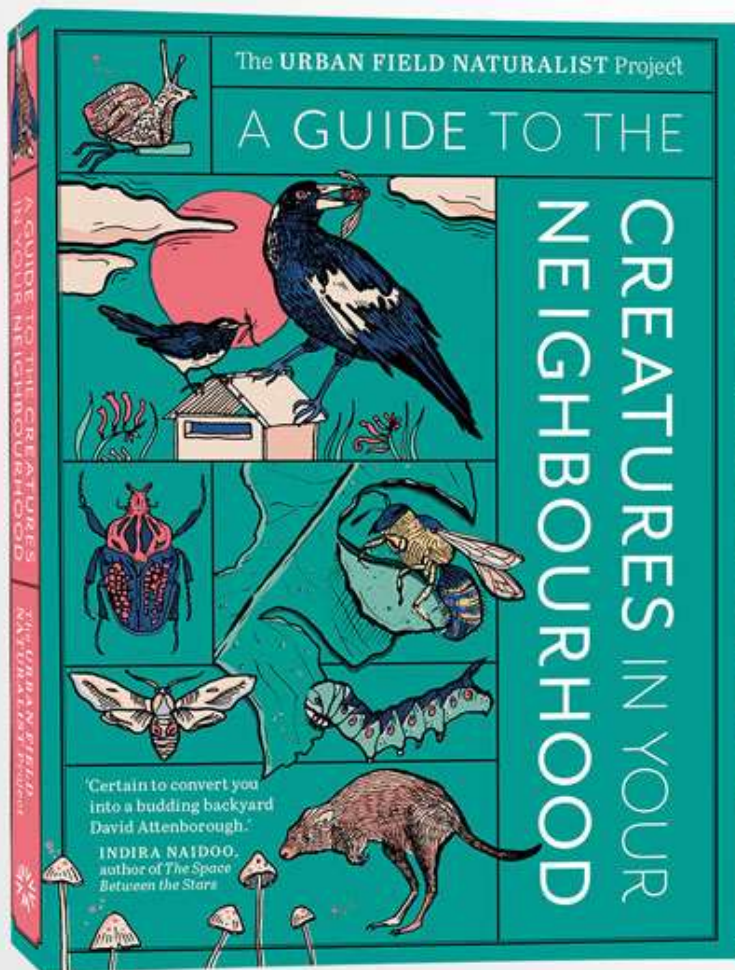
- Download the app
- Join the project
- Project name: “The Glebe Hill”
- Take a picture to record what you see
- Identification – as little or as much as you want
- Any picture located in either City of Sydney or Inner West will be added

Overview **23** OBSERVATIONS **22** SPECIES **35** IDENTIFIERS **3** OBSERVERS [Stats](#)

Recent Observations [View All](#)

 Genus <i>Asianopis</i> Asian Ogre-faced Spiders 1 1d	 Genus <i>Heteroclados</i> ... 1 23d	 <i>Cracticus torquatus</i> Grey Butcherbird 1 23d	 <i>Butorides striata</i> Striated Heron 1 7mo
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 Most Observations dieterhochuli 12	 Most Species dieterhochuli 9	 Most Observed Species <i>Gallinula tenebrosa</i> 1
 ilovetapirs 10	 ilovetapirs 7	 <i>Threskiornis molucca</i> 1
 manuellequerica 1	 manuellequerica 0	 <i>Anas superciliosa</i> 1
View All View Yours	View All View Yours	 <i>Aythya australis</i> 1
		 Kingdom <i>Fungi</i> 1
		 Genus <i>Oxalis</i> 1



“Certain to convert you into a budding backyard David Attenborough.”

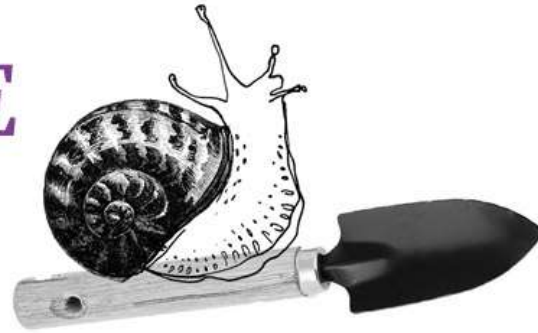
INDIRA NAIDOO



Becoming an URBAN FIELD NATURALIST in



A FEW SIMPLE STEPS



Slow Down
Observe
Record and collect
Ask questions
Share

Becoming an URBAN FIELD NATURALIST in

A FEW SIMPLE STEPS

1. SLOW DOWN



There is a world of activity going on all around us; take the time to pause and really pay attention. Even the soil beneath our feet is home to a startling variety of diverse creatures. When we SLOW DOWN, we move beyond the immediately obvious and visible, small things become noticeable and we can appreciate everything in a finer and more nuanced grain. This kind of attention requires us to spend the time necessary to see slow-motion processes unfold, but it also allows us to tune into things that are happening so rapidly that if you blink you might miss them. When we SLOW DOWN it is easier to appreciate the living world in all its diverse scales and paces.

2. OBSERVE



We can hone our skills at really paying attention to what is happening in front of us and around us. Use all your senses to OBSERVE CLOSELY. Watch for those small movements, those tiny differences— which insects are visiting this particular flower, what are they up to? Listen carefully to how a bird's call changes in different circumstances. Smell the different scents on the wind at a given time of day or season. We might even touch and taste the world around us, too (albeit only when we know it is safe to do so—don't go tasting mysterious plants or mushrooms!). To observe in this way is to go well beyond creating an inventory of the particular species we've spotted; it is to take the first step towards crafting new understandings.

3. RECORD AND COLLECT



Keep close records of observations. We can do this in a variety of ways, from writing or drawing in a field journal to a photograph, a video, or an audio recording. Whatever way we RECORD AND COLLECT, it's a good idea to keep track of when and where things occurred, perhaps also the weather and environmental conditions. In general, the more detail we're able to capture, the better—we often don't know what is most interesting or important about an observation until much later. Videos, in particular, can allow us to revisit a particular interaction or behaviour, to slow it down and pause, to listen and glean things that we might otherwise have missed. In some circumstances it may be appropriate to collect specimens that can be shared and studied further. There are also now a variety of online biodiversity databases—like iNaturalist and eBird—that allow us to both record and share observations.

4. ASK QUESTIONS



Cultivate our curiosity about why the things we're observing are as they are. This requires us to move beyond absorbing facts and experiences and into a genuine inquisitiveness about what they mean: ASK QUESTIONS. Why are some animals more abundant on some days? Why do some plants thrive in cities and others disappear? The more we observe and learn, the more we realise we don't know, and the better our questions become. Becoming curious about the 'why' behind what animals and plants do makes everything that much more interesting. All sorts of resources exist for learning more about animals and plants, including their behaviours, in ways that can inform our questions. The guides and stories on this site are intended as information and inspiration in this endeavour, but you might also consult materials specific to your particular place and the species that interest you.

5. SHARE



We can pass our observations, our insights, and our questions on to others. There is a whole world of interested people out there who we might learn from—or even have something to teach. Our observations might be invaluable to others; they might feed into a broader web of information that helps us all, as a community, to see and understand the world a little differently. Some of the online biodiversity databases mentioned above provide a platform not just for recording but to SHARE and discuss observations. Of course, you can also send The Urban Field Naturalist Project a short story.

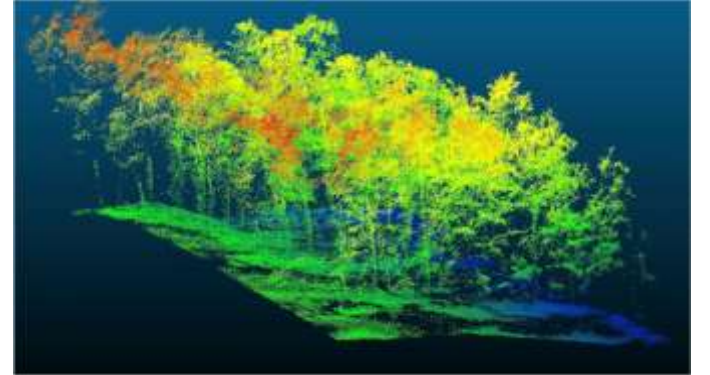
Finally, we begin the process again, with all that we have learnt informing our efforts to appreciate and understand our living world in all its complexity, beauty and rawness.





An overview of the project

- What it is, what's there, and what could be there
- Environmental history and restoration
- Why high quality small, isolated greenspaces matter
 - Pollinators
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