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Aurecon

Presentation

More than Trees: Improving the design and function of Urban Forests

Biography

Cormac is an environmental scientist within the Canberra office of Aurecon, specializing in both the vegetation management and building protection aspects of bushfire management. This includes the detailed ecological assessment and design of Asset Protection Zones and Shelters in Place. He led a major program of fire infrastructure upgrade following the Canberra fires, as well as the first comprehensive audit of Defence bushfire planning. He was also a technical lead for the Victorian Schools Bushfire Protection Project, which remains one of the single largest bushfire safety projects ever undertaken in Australia.

He is a Certified Environmental Practitioner through the Environment Institute of Australia and New Zealand, and is also certified in Bushfire Planning and Design through the Fire Protection Association of Australia.

Abstract

Urban Forests are a major asset for many cities, providing a beautiful backdrop to suburban areas that is highly prized by residents. The recent State of the World's Plants report identified urbanisation as one of the key factors driving loss of habitat for plants, and by extension the animals that rely on them. Urban forests have an important part to play in softening the impact the urbanisation has on surrounding areas. While the impacts of urban development are undeniable, diverse and well planned urban forests provide opportunities for conservation, food production and improved living space.

Species within these urban forests have traditionally been selected for aesthetics and ease of maintenance, with the function of the forest in the landscape a lower order issue. Increasing digital data on urban forests has opened up new ways to analyze functional aspects of urban trees. This paper presents the results of an analysis of this maintenance data to provide a functional analysis of urban trees in Canberra, ACT.

The database for Canberra's urban forest contains over 200 000 entries covering both the species and the suburb in which they are planted. This database was cross referenced against the flowering period for plant species to obtain a picture of nectar and pollen resources potentially available throughout the year.

Precincts within Canberra were then assessed for both their total nectar and pollen resource, as well as the seasonal availability. The study identified a large variance

between precincts in terms of total nectar production, as well as some significant seasonal gaps in availability.

The analysis also covered the additional features that could potentially be incorporated into the planning of urban forests including:

- Bushfire Protection
- Food production for residents
- Seasonal color to create landscape level artworks

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to life*



More Than Trees

Improving the design and
function of urban forests

4 November 2016

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Multiple functions of urban forests:

- Beauty
- Shade
- Food for wildlife
- Cleaner air, water
- Urban food (for us!)
- Disaster mitigation/resilience

*“A taste for the beautiful is
most cultivated out of doors”*
Henry David Thoreau

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Urban Forests

- Canberra's urban forest is a major asset, and is intensively managed for safety and aesthetics
- Urban trees are highly protected, highly managed
- Intensively maintained to create beautiful streetscapes
- Planning challenges include replacement, shading of PV



Trees in urban forests have a 'working life' that is less than their natural lifespan

Significant trees are intensively managed for safety, aesthetics

Significant expenditure on maintenance, over \$96M spent on land management

Removal of trees for Canberra's Light Rail a major political issue



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Urban Nectar and Pollen Resources

- Volume of potential production is large and variable
- Tree species selection is based on numerous factors, to date nectar/pollen production not a major focus
- Analysis based on the urban trees database provided by TAMS
- Database covers 260 000+ trees
- Suburbs grouped into broad areas of Canberra for analysis
- Not the governments job to feed wildlife, but a functional urban forest helps improve sustainability



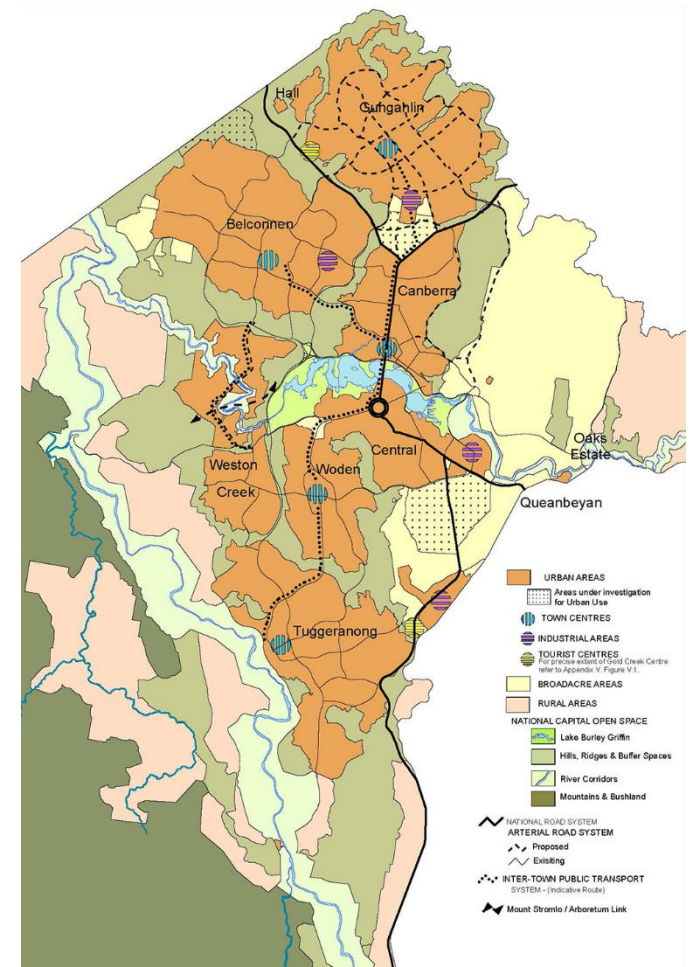
Limitations of our knowledge

- Analysis of the flowering period of trees within the actively managed urban forest
- Difficult to predict relative abundance of nectar between species
- Typically large seasonal variations in flowering
- Nectar sources are also important for birds, insects, which at certain times will significantly change availability (i.e. Bogong season)
- Brittle Gum (*Eucalyptus mannifera*) biggest unknown – low nectar but medium pollen production

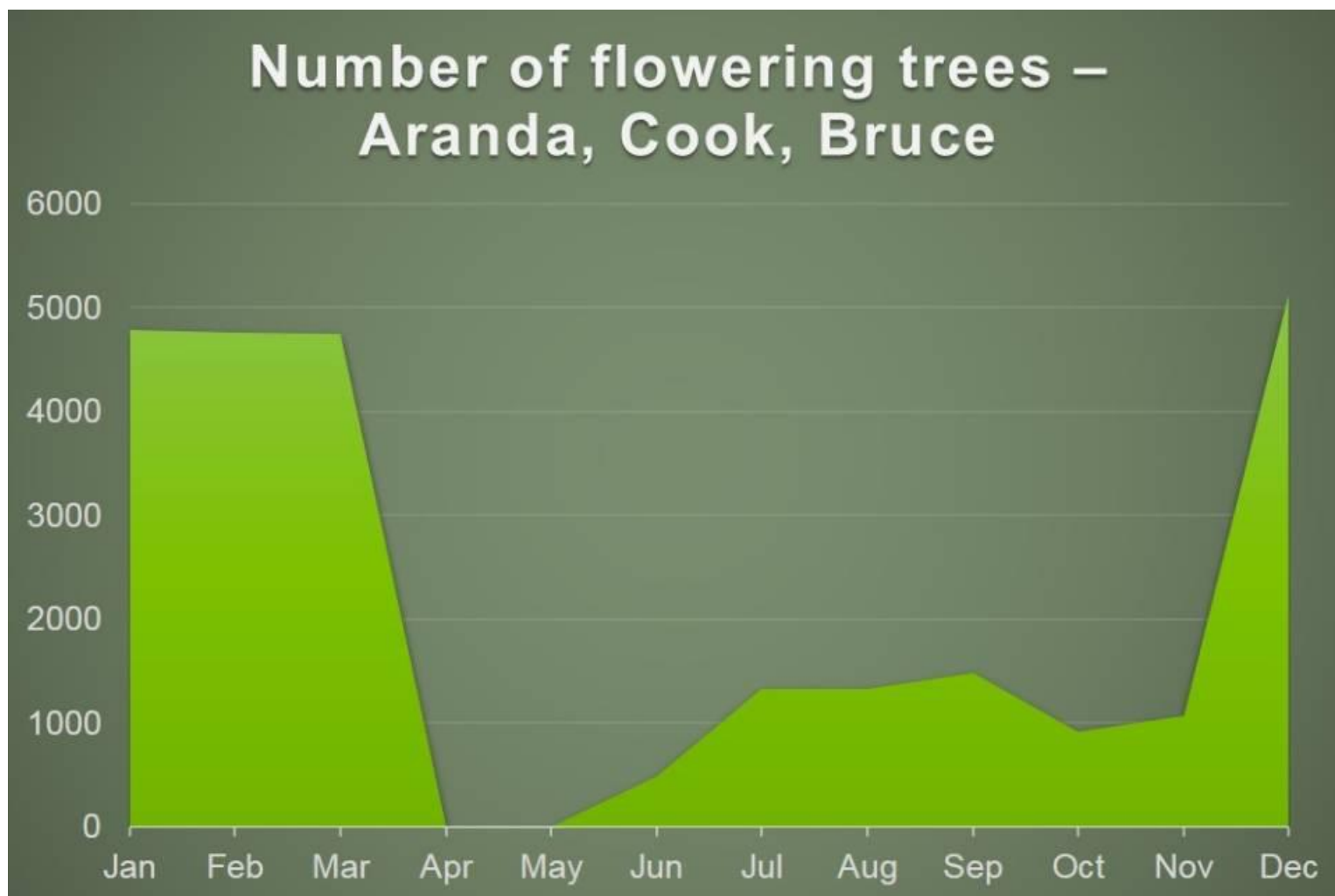


Significant variation in nectar resources

District	Peak # Flowering Trees	Total months flowering / annum
North Canberra	3954	24956
South Canberra	3218	22340
Tuggeranong	14536	75289
Woden Valley	3882	17785
Weston Creek	2251	10822
Gungahlin	4758	25390
Belconnen	15553	106502



Pollination resources in the inner north



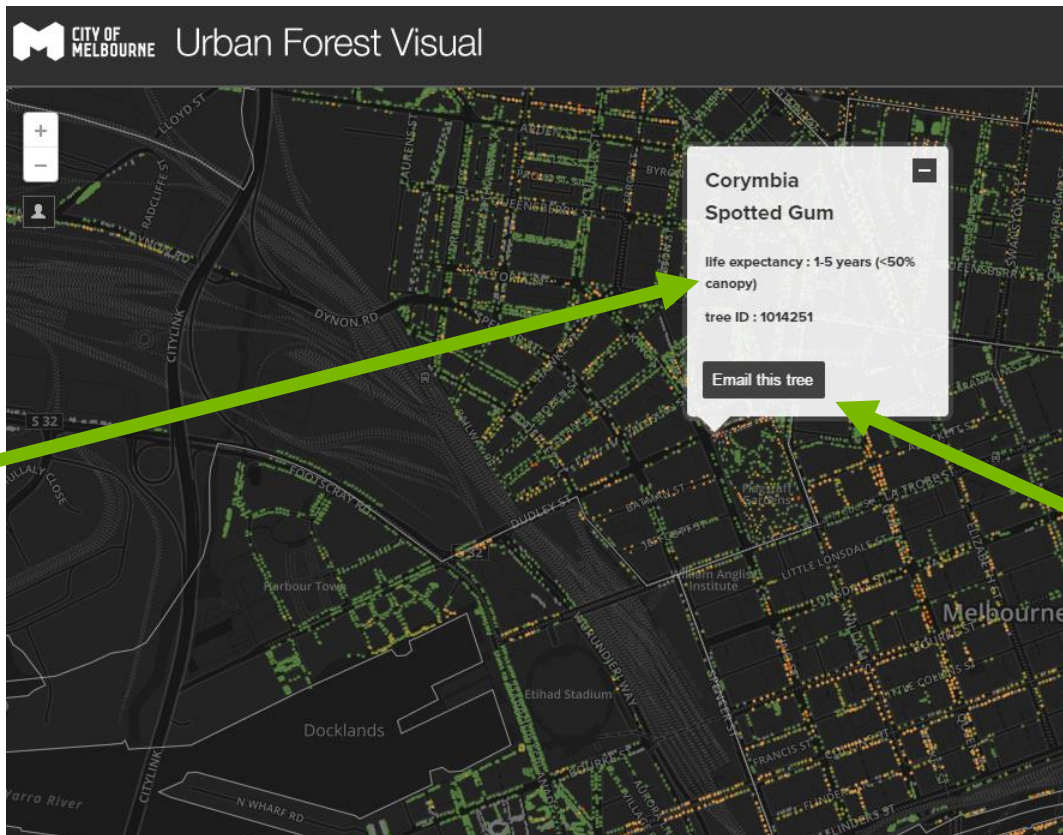
Pollination resources around Parliament



Melbourne's urban forest is online

Spatial data systems allow you to add almost anything to the Internet of Things

Each tree has a unique identifier, and a condition index



You can even email the trees (with some fun results)

Urban agriculture

- Canberra hosts the most successful urban ag business, Canberra Urban Honey
- Winner of the gold award at the 2016 Royal Easter Show

- Lyneham Commons is paving the way for urban food forests, integrating food and ecology

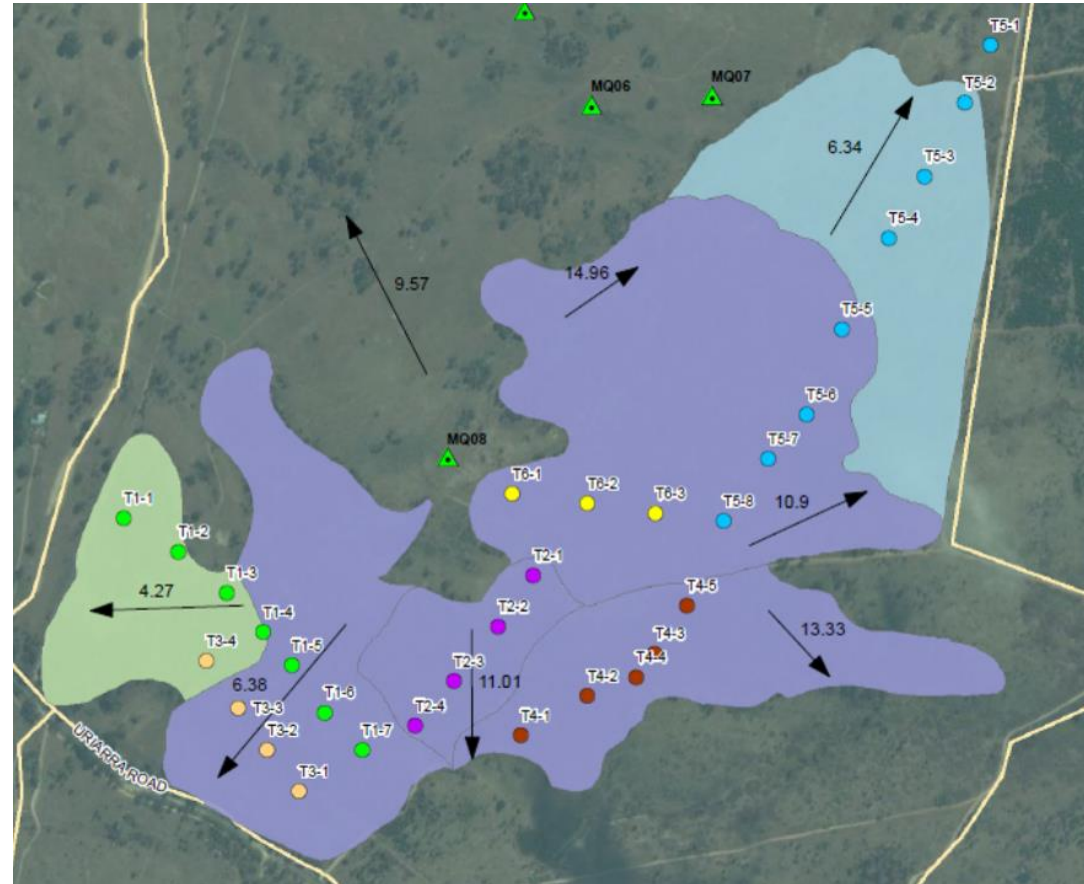


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Bushfire Protection

Assessing bushfire risk factors

- Not all trees burn equally, factors that increase risk are known and measurable
- Modern bushfire protection planning uses GIS analysis
- Detailed modelling of fire behaviour now a reality



Designing precinct and landscape level solutions



Legend

Transect Locations

- T1
- T2
- T3
- T4
- T5
- T6
- Previously surveyed grasslands

Average Slopes

Vegetation Community

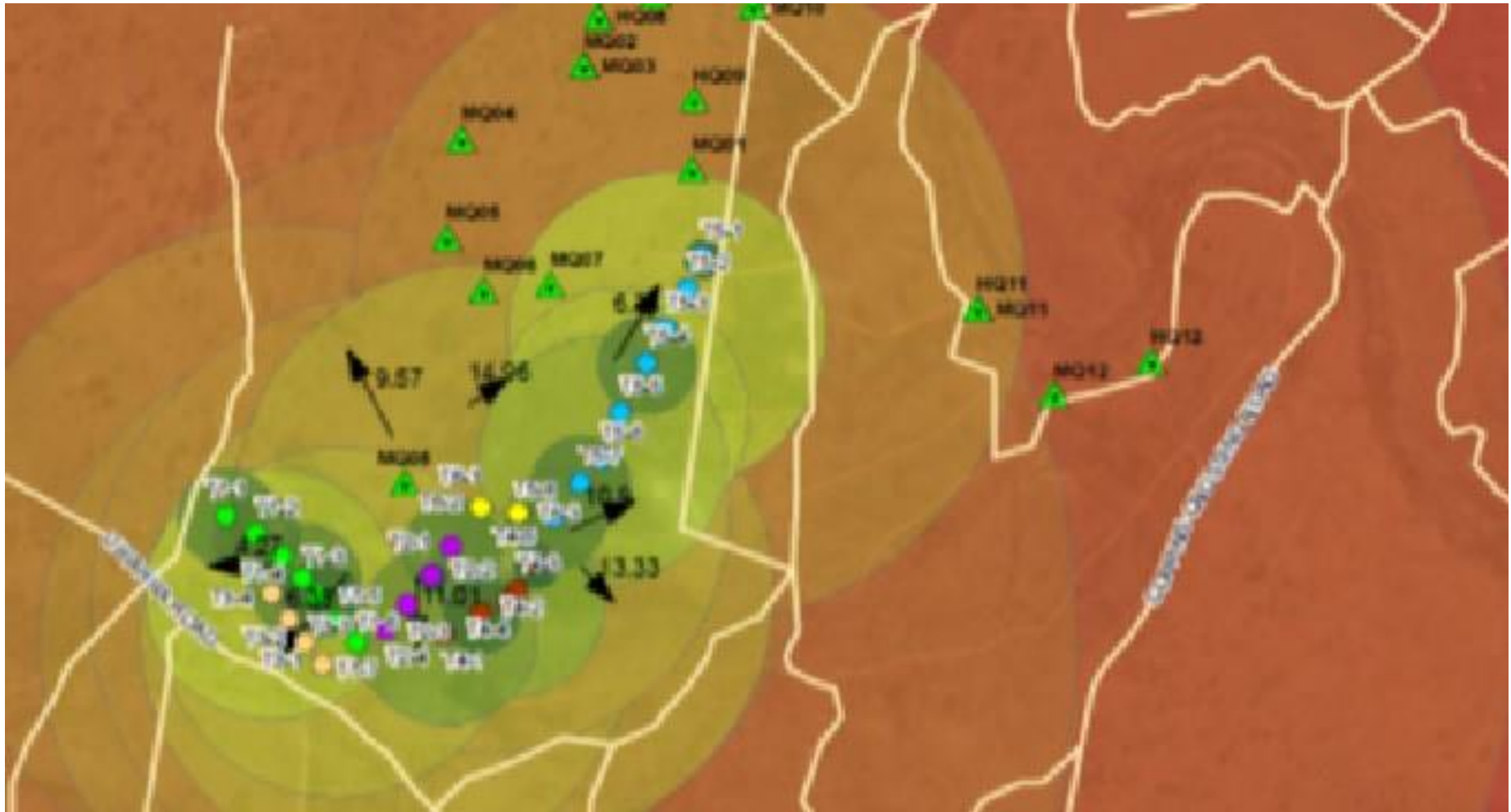
- Black Cypress Pine Tableland Open Forest
- Red Stringybark - Scribbly Gum Tableland Forest
- Yellow Box - Bleakly's Red Gum Tableland Grassy

FR

- BAL 12.5
- BAL 29
- Ember Zone

Source: Aurecon, Bing

Advanced prediction of ember hazard

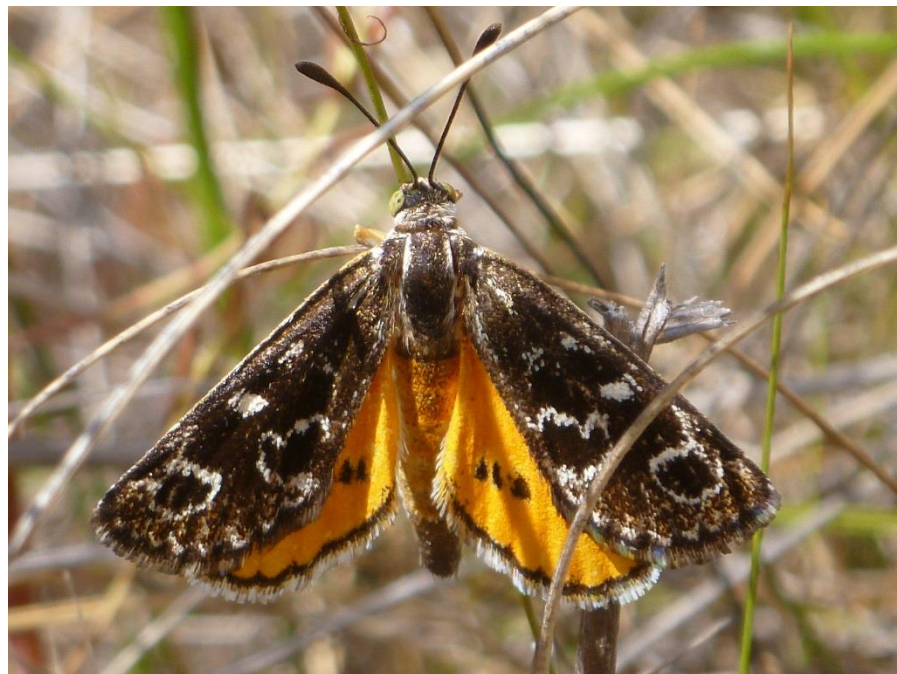


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Conservation outcomes

Urban forests as a refuge for wildlife

- Food density is higher in urban areas
- Suburban gardens can provide an important refuge
- Numerous species visit
 - Swift Parrot
 - Superb Parrot
 - Turquoise Parrot
 - Rosenberg's Goanna



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Multiple-use planning

Key enabling steps for a modern urban forest

- Inventory is digital, spatial and online
- Planned on a precinct & landscape scale
- Multiple attributes (forage, fire, aesthetics, life cycle cost)
- Opportunities for citizen science engagement



Remember – even a single flower brings beauty to you and food for wildlife.



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