

## SWIFFT Video conference notes 31 October 2012

### Biodiversity conservation in urban and fringing landscapes

*SWIFFT meeting notes are a summary of the video conference and not intended to be a definitive record of presentations made and issues discussed.*

#### KEY POINTS SUMMARY

*Quick take home messages from this video conference or read through the speaker summaries.*

1. Conserving our cities birds – Bird habitat in the suburbs and the urban fringe pg. 2
2. Response of mammals to urbanisation pg. 8
3. Living on the edge – Threatened species in peri-urban landscapes pg. 13

**Many development in urban and fringing landscapes are carried out with reduced consideration for retaining greenspace.**

**Large old trees (>100 cm trunk diameter) tend to support more birds than parks with only smaller trees.**

**Suburbs with greater than 30 percent native (*Eucalyptus*) street trees and reserves adjacent to these suburbs were found to have about 11 percent bird more species than those with exotic street trees.**

**Protection of trees in Local Government planning schemes should not be based on tree size alone. Habitat values need to be considered as well.**

**Back yards with trees can provide important wildlife habitat especially when they are in proximity to reserves.**

**Municipalities need to consider wetland conservation in their planning to prevent adverse changes to hydrology and encroachment onto and wetlands.**

**Increasing pressure to burn more reserve areas in proximity to residential areas and increase the size of fuel breaks needs to be balanced with loss of biodiversity values.**

The fourth and final video conference for 2012 had a total of 64 participants were connected across 10 locations: Hamilton, Warrnambool, Heywood, Ballarat, Bendigo, Benalla, Wodonga, Geelong, Box Hill, and Nicholson Street Melbourne.

Those attending included participants from;

**Educational:** University of Ballarat, RMIT, National Education Centre (Wodonga), Australian Research Centre for Urban Ecology (University of Melbourne).

**Local Government:** City of Hume, Colac Otway Shire, City of Greater Geelong, Moorabool Shire, City of Boroondara.

**Field Naturalist Clubs:** Ballarat, Geelong, Hamilton, Portland.

**Community Conservation Groups:** Barwon Coast Committee, Brolga Recovery Group, Geelong Environment Council, Basalt to Bay Landcare.

**Conservation Organisations:** Barwon Coast Committee, Western Coastal Board, Victorian National Parks Association, Western Melbourne Catchment Network, Windamarra Aboriginal Corp., Parks Victoria, Dept. Primary Industries Victoria and Dept. of Sustainability and Environment biodiversity staff across 10 locations

**Industry related:** Ecology Australia, Department of Defence.

Connection to the Dept. Primary Industries South Australia and the Dept. of Environment, Water and Natural Resources South Australia at Mt Gambier have ceased due to administrative changes in South Australia.

## **SPEAKER SUMMARIES**

### **Conserving our cities birds – Bird habitat in the suburbs and the urban fringe - Dr Karen Ikin, Fenner School of Environment and Society, Australian National University, Canberra**

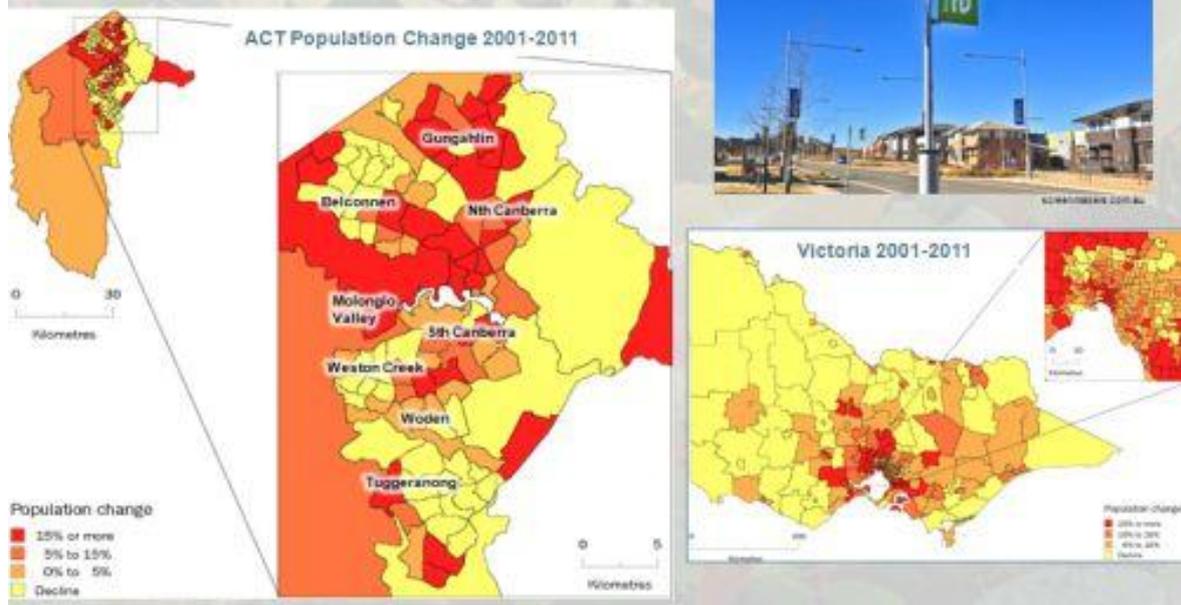
Karen spoke about a research which she has been undertaking in and around the suburbs of Canberra to determine relationships between birds and their habitat in urban and future urban landscapes and how this information can be used to guide urban planning and management.

#### **Urban growth**

Karen provided a brief overview of issues confronting bird diversity in Canberra which is Australia's eighth largest city with a population around 350 000 people (443.5 people per sq.km.). Karen spoke about the significant amount of urban sprawl and urban infill which has occurred over the past 10 years in Canberra. She noted there has been a similar trend in Victoria, particularly where many of the older suburbs have been subject to increased development infill.

...a city of:

- Urban sprawl and urban infill



Red areas indicate where 15% or more population change has occurred.

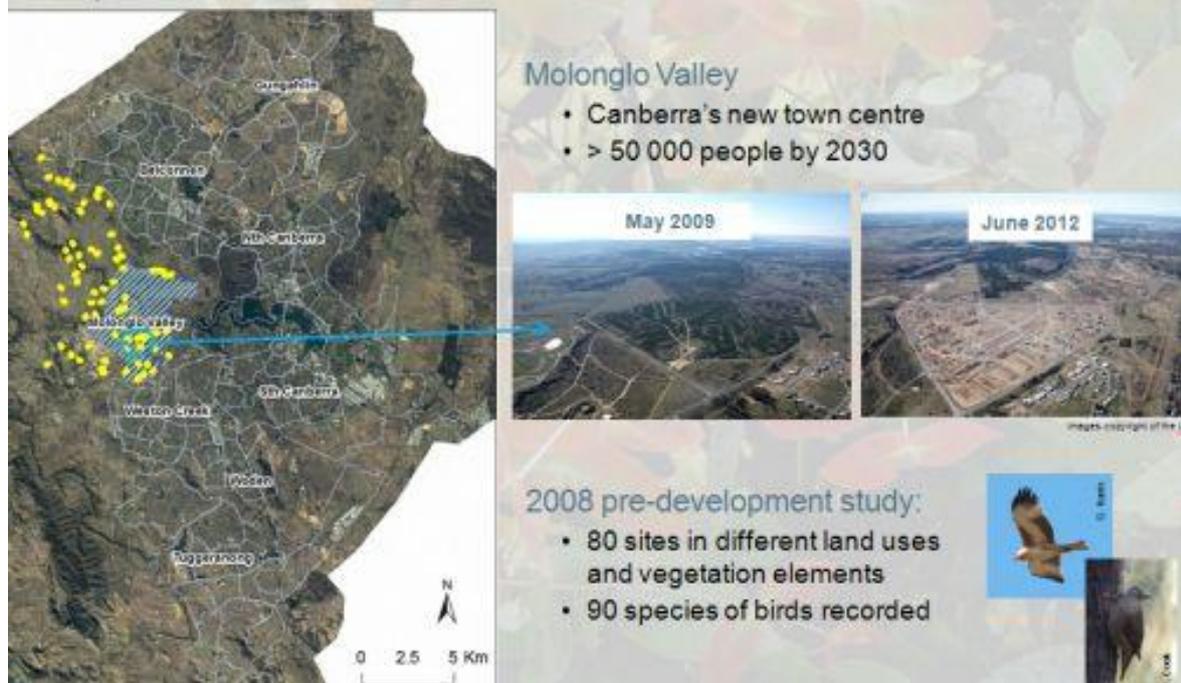
### Bird diversity and Canberra's future urban growth

Canberra has retained high bird diversity with 220 species of birds. Karen spoke about three main study perspectives which reflect how development can impact on bird diversity.

### New growth areas

Karen spoke about the Molonglo Valley which is Canberra's new town centre and expected to have 50,000 people by 2030. She said that in 2008 pre development studies at 80 different sites recorded 90 species of birds.

### Perspective #1: Future urban



## Urban Fringe issues

Karen described how the hills and ridges around Canberra are protected by planning policies and that there has been a lot of development in adjacent suburban areas.

In 2009 Karen monitored 160 sites spaced along the suburb-reserve edge and recorded 66 species of birds.

## Pocket Parks

Karen said these are small (<2 ha) residential parks within 400 m from every house which provide areas of important habitat. Increasing residential density has occurred in areas surrounding these parks. In 2010 Karen studied 109 pocket parks and recorded 44 species of birds.

## Important aspects of bird habitat in the urban fringe

Taking into account the results from her studies Karen felt that if we are to conserve our city's birds we must enhance, maintain and manage important habitat features in the city. She considers the following aspects to be the most important.

## Trees

Karen's research found that eucalypt woodlands had the highest number of bird species. She also found that areas with only scattered remnant trees had similar numbers of bird species to some woodland sites which highlights the importance of remnant trees in the landscape. Karen spoke about the value of trees in parks and found that the diameter of the tree had a major influence on bird numbers. Planting 5 trees in any size park made no difference to the abundance of birds, but when trees reached 70cm diameter there was a 60% increase in bird abundance. Parks with the largest old trees (>100 cm trunk diameter) had more birds than parks with only smaller trees.



## **Management recommendations for trees in urban and fringe areas**

### Retain eucalypt woodlands

- Leave large woodlands undeveloped when planning new suburbs
- Incorporate small woodlands into urban greenspace

### Preserve large remnant trees

- Plan urban greenspace around existing large trees
- Acknowledge biodiversity value of large trees in urban policies

### Plan for future trees

- Protect regenerating areas
- Plant endemic tree species
- Ensure there is a continuation of tree sizes and tree ages

## **Habitat complexity**

Karen spoke about the need to consider habitat aspects such as bark, hollows, tree cover, understory, flowering and leaf litter in the urban fringe. She studied 10 species of native urban-avoiding woodland birds (Brown Thornbill, Buff-rumped Thornbill, Grey Fantail, Superb Fairy-wren, Crimson Rosella, Eastern Rosella, Red-browed Finch, Mistletoebird, Silvereye, White-browed Scrubwren). She found that all ten species were influenced by local vegetation features, such as the presence of leaf litter, logs, eucalypt regeneration, tree hollows, and shrub and grass cover. By increasing habitat complexity there was an increase in the probability of sighting on the urban fringe right into the suburban core.

## **Management recommendations for habitat complexity**

### Keep a structurally complex habitat

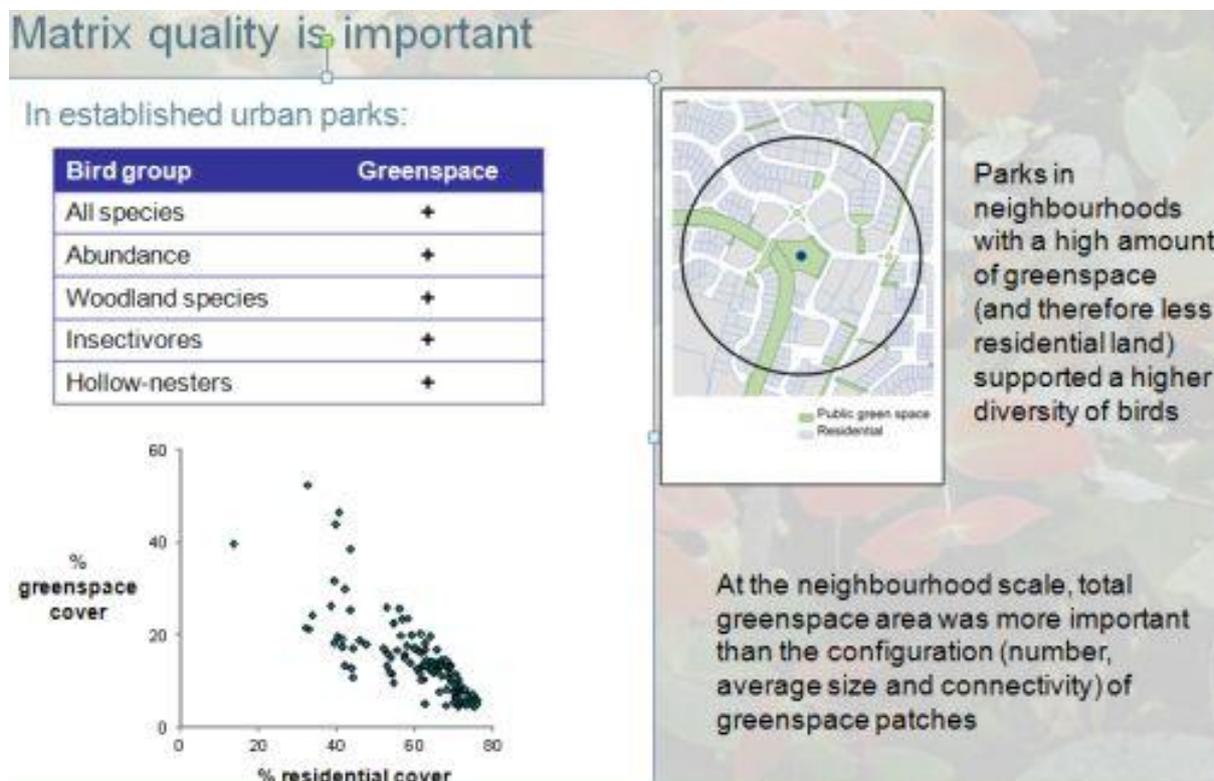
- Enhance litter, shrub, log and large tree cover in urban greenspace.
- Encourage home-owners to plant native trees and shrubs.

### Maximise available habitat resources

- Plant similar native species prior to removing weeds.

## High quality matrix

Karen spoke about the importance of native street trees and greenspaces in the urban landscape. Her studies found that suburbs with greater than 30 percent native (*Eucalyptus*) street trees and reserves adjacent to these suburbs had about 11 percent more bird species than those with exotic street trees. She also observed that increased native street trees had a positive influence on bird numbers up to 250 metres inside reserve areas.



Parks in neighbourhoods with a high amount of greenspace (and therefore less residential land) supported a higher diversity of birds. At the neighbourhood scale, total greenspace area was more important than the configuration (number, average size and connectivity) of greenspace patches. As residential density increases it is likely that bird species which were common will become uncommon.

## Management recommendations for matrix quality

### Improve and enhance matrix quality

- Plant native street trees
- Increase urban greenspace cover

Karen thanked her colleagues at the Fenner School, ANU and the ACT Government.

## Key points from questions and discussion session

- The protection of trees in Local Government planning schemes is often based on tree size diameter e.g. permit for removal required over 50cm dia. but this does not necessarily take account of biodiversity values. Some species of *Leptospermum* (Tea Tree) or *Melaleuca* (e.g. Moonah) would never meet minimum diameter requirements but may still have high biodiversity values and require protection.

- Karen suggested more research is required to determine the effectiveness of endemic native trees to other native trees in obtaining a 30% tree cover in urban environments. She said some species of eucalypts produce higher biodiversity values than others in terms of peeling bark, hollows, flowering etc.
- There is a conflict between attaining a 30% cover for street trees and fire control measures in urban fringe areas. Retention of large old trees is one positive step but there must be successional growth with protection of some small trees and/or new plantings as well.
- Landscape planning design to create numerous small unconnected patches in urban fringe areas may be a method of reducing fire management concerns.
- More education is required to promote the positives of living with biodiversity in urban and fringing areas.
- 'Candling' or burning of individual trees in proximity to housing could be a possible means of managing fuel loads in urban/fringing areas.
- As a community we need to be mindful that we are not becoming paranoid about fire and that there are situations where vegetation can be retained, planted or managed with minimal fire hazard in urban and fringing areas.

Contact: Karen Ikin, Fenner School, ANU, Canberra, 02 61251494

## Response of mammals to urbanisation - Rodney van der Ree, Deputy Director, Australian Research Centre for Urban Ecology (ARCUE)

Rodney's role in the ARCUE is involved with studying the response of mammals to urbanisation. Currently there are five project themes which he is involved with.

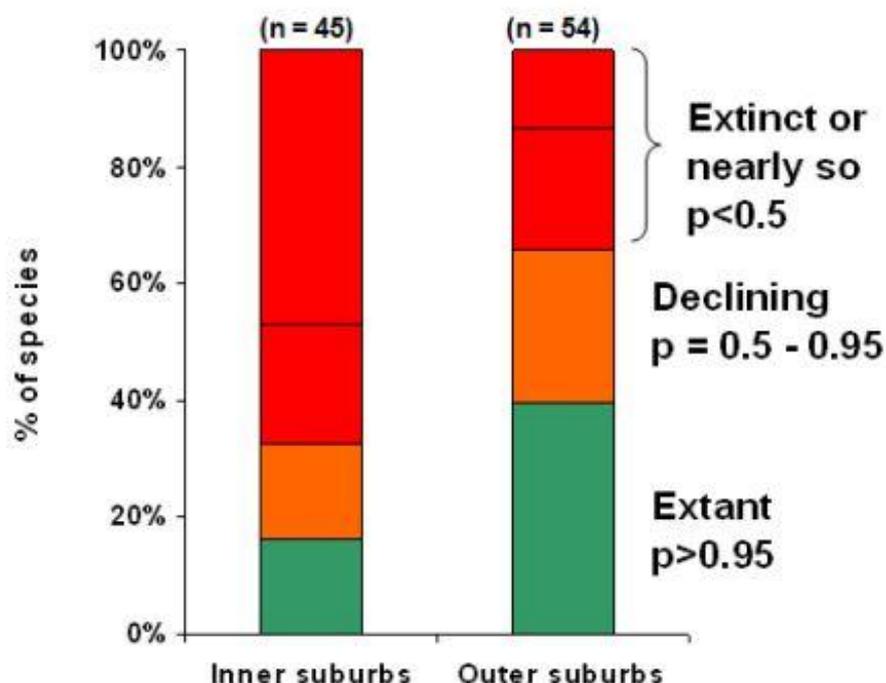
- Gaining a big picture understanding of changes to wildlife through analysis of the Atlas of Victorian Wildlife.
- Grey-headed Flying-fox – *all of city* effect
- Sugar Gliders – Matrix matters (looking at what wildlife in back yards)
- Roads and Wildlife – big effects but mitigation possible
- Insectivorous bats – an understudied group doing amazing things

### Changes to the mammal community since the 1980's

Rodney spoke about the massive changes to Melbourne's natural environment since European settlement. Rodney researched changes to mammal communities by looking at occurrence in Local Government Areas (LGA's) pre and post the 1980's. There has been a decline in the number of LGA's supporting arboreal mammals but for bats there has been an increase in LGA areas probably due to greater survey effort and improved survey techniques. Small terrestrial mammals less than 5kg in weight and the large bodied herbivores have also declined in their range across Melbourne's LGA's.

Rodney has been analysing data from the Victorian Wildlife Atlas records to determine if species are declining or becoming extinct in Melbourne. He separated Melbourne into inner and outer suburbs and found that only about 20% of the original species of mammals prior to European settlement are surviving in the inner suburbs compared with about 40% of the original mammal species in the outer suburbs. About 60% of the species no longer exist in the inner suburbs and about 30% of the mammals in the outer suburbs are extinct or nearly extinct.

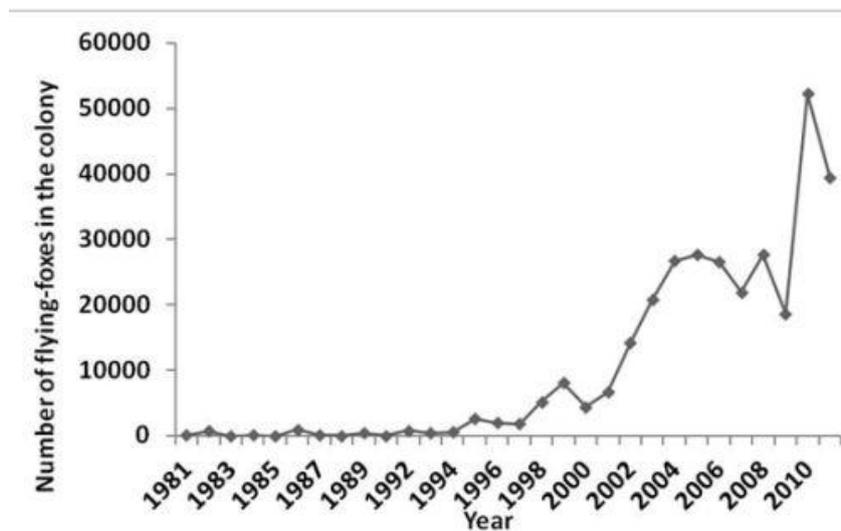
### Persistence in inner and outer suburbs



## Flying-foxes

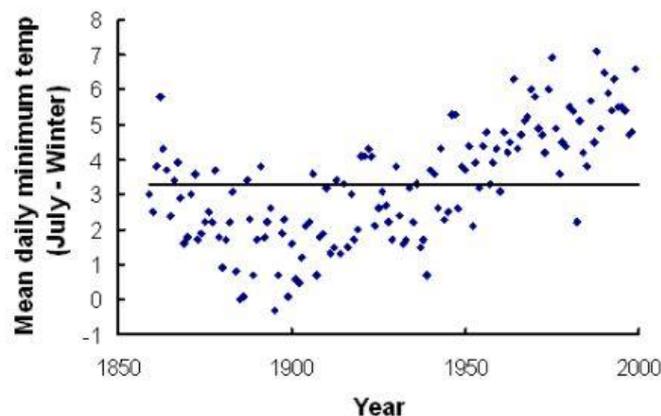
There are 4 species of flying foxes recorded in Melbourne. The most abundant species in Melbourne is the Grey-headed Flying-fox, but there are also a few records of the Red Flying-fox, Spectacled Flying-fox and the Black Flying-fox and it is possible these species could also become established in Melbourne in a few years time, much like the Grey-headed Flying-fox has done. Flying-foxes are highly mobile and can form large roosting camps in a very short period of time as they migrate around searching for food.

### Maximum population size in Melbourne



There were a few records of the Grey-headed Flying-fox between 1884 to 1986 but in 1986 there was a very significant increase in numbers with about 100 animals setting up camp in Melbourne which has now turned into an established year round population. Rodney felt the heating up of Melbourne's environment due to more concrete and bricks have created a heat island effect which has favoured the establishment of this sub-tropical species in Melbourne. There is also a constant and reliable source of food for flying-foxes with 13 species of trees known to be in the diet of flying-foxes indigenous to Melbourne, plus 87 species planted along streets and 45 species in backyards all adding to the diet availability. Flying-foxes feed on about 90% of the street tree species which are planted. There is also secure year round water from watering in parks and gardens.

### Urban heat island effect



Melbourne BoM data

## Sugar Gliders

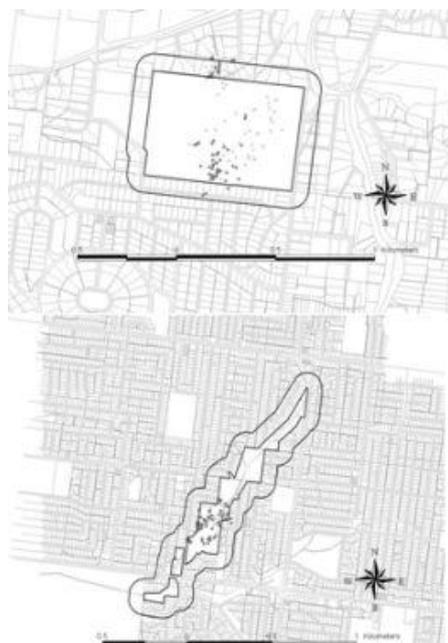
Rodney spoke about research on Sugar Gliders in bushland reserves in Melbourne. He referred to a typical example comprising a streamside reserve 50-100 metres wide and a few hundred metres long. The home ranges were very small (males 4 Ha, females 2.5 Ha) and incorporated the backyards of adjoining allotments. The males went 90 meters into back yards and the females about 20 meters. This highlights the need for park managers to communicate with adjoining landholders so people realise the habitat values and take measures to protect or enhance Sugar Glider habitat.



*Movement of male Sugar Glider (yellow dots & green line)*

## Planning to maximise reserve values

Rodney spoke about opportunities for park managers to work with local government to magnify the habitat values of bushland reserves, By incorporating buffer zones there can be a significant increase in habitat availability.

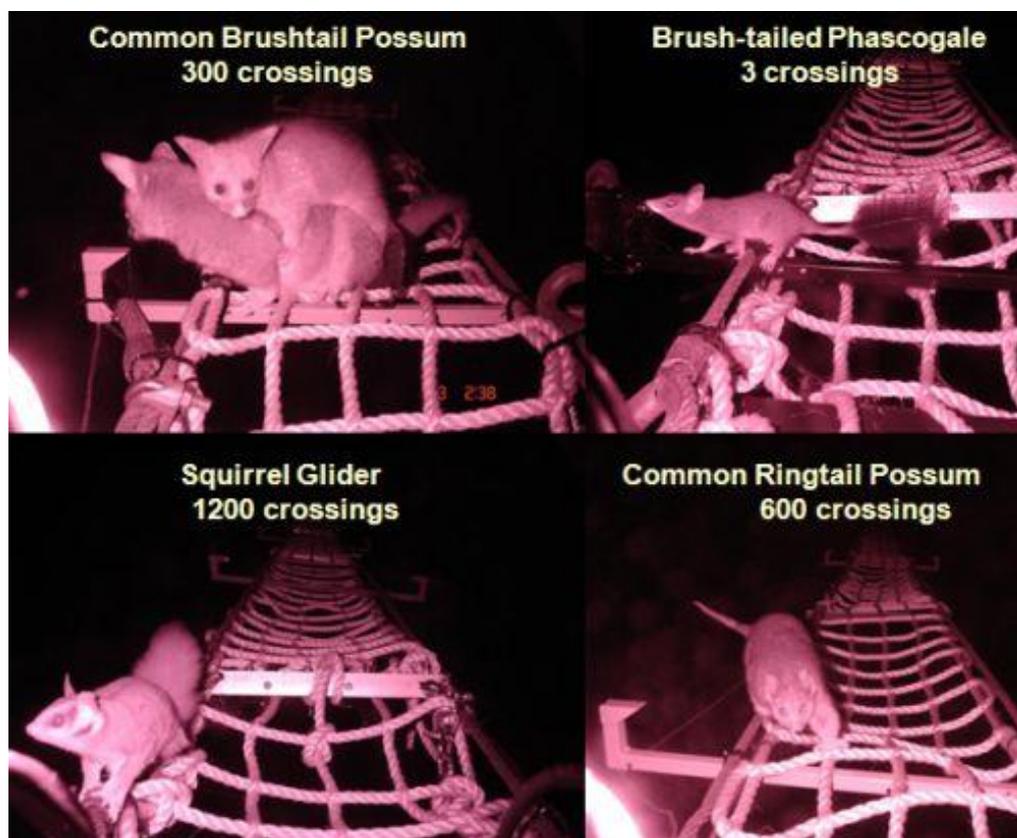


- 87 m buffer adds 60% of park area

- 87 m buffer adds 240% of park area

## Effects of roads and traffic on wildlife

The most common impacts are direct mortality, noise avoidance, lighting, pollution, barrier effect, weed invasion and habitat loss. Rodney has been focusing on the barrier effect and has studied the Hume Highway near Euroa. He found where there is a gap in the canopy greater than 50 m (i.e. no trees in the centre median strip) Sugar Gliders will not cross the highway.



A number of different Sugar Glider crossing structures have been trailed including canopy rope bridges and glider poles. The rate of usage increases over time. It took about one year before there was any usage but by the second year the rope bridges had 2 -3 crossings per night and the glider poles about 0.5 crossing per night.

### Growling Grass Frog

Rodney raised an issue relating to Growling Grass Frogs and roads and road crossing mitigation measures that are generally applied such as providing culverts and/or shade mesh fencing. Unfortunately he has been unable to find any evidence to suggest that Growling Grass Frogs use culvert underpasses to move from one side of the road to the other.

### Insectivorous bats

There are about 15 species of insectivorous bats in Greater Melbourne. Research through the ARCUE has found the diversity of species falls closer to the city. The research is particularly aimed at developing recommendation for actions to maintain bats in the new suburbs. Studies include a wide variety of sites across Melbourne from back yards to industrial sites.

Microbat populations and species richness increase according to the abundance of insects. In 2009-11 radio transmitters were fitted to 60 Gould's Wattle Bats in Melbourne to determine where they

might be roosting. It was found that they roosted in dead and living trees along with a variety of man made structures.



*Gould's Wattle Bat roost*

### Take home messages

- Mammal decline/extinction is significant and ongoing.
- We need to protect existing habitat for mammals.
- Conservation of habitat outside formal reserves is important e.g. buffers around bushland for gliders and foraging habitat in the matrix for bats.
- Encourage the development of large wattles (particularly *A. mearnsii*) and eucalypts because they provide the important resources of food and hollows.
- For road issues we need to understand the specific impact / problem (noise, barrier, mortality etc.), identify solutions and evaluate effectiveness of solutions.
- We need to educate and inspire the community in wildlife conservation.

### Key points from questions

- The Hume Highway glider crossing research was an experimental site with results intended for other sites where new roads may be built.
- It is difficult to get wildlife road crossing measures incorporated into existing roads unless there is a clear case of an endangered species being threatened. The research is more applicable to the planning of new roads.
- It is necessary to clarify what the issue is regarding wildlife and road crossing before a solution can be formulated, e.g. is the problem an animal welfare issue, a conservation issue or a human safety issue?
- The collection of wildlife mortality data will be enhanced through the development of phone apps to allow citizens to record wildlife mortality on roads. This technology should be available in Australia in the near future.
- There is an on-going need for researchers to engage with local communities, raising awareness and understanding of issues and possible conservation measures.

## **Living on the edge – Threatened species in peri-urban landscapes** - Gary French, Senior Strategic Planner, Parks Victoria, Melbourne Region

Gary introduced his presentation by highlighting Melbourne's population growth and how this is leading to changes in the character of the urban area. Suburban allotments are supporting higher density developments, back yards are disappearing and new suburbs are engulfing previous open spaces all leading to reduced greenspace in and around Melbourne. Gary felt the loss of private open space is leading to increased pressure on public open space which is impacting on the conservation values of Parks.



Gary spoke about the variety of areas managed by Parks Victoria which includes areas as large as Bunyip State Park 16,000 Ha down to Patterson River wetlands 0.0035 Ha. Park planning has to deal with the interface between urban growth and the reserve system.

### **Park planning issues**

#### **Park interface**

There has been a move away from having backyards directly adjoining reserves to having more of a landscape approach to the reserve boundary by incorporating roads as buffers with no fencing.

#### **Stormwater**

Parks in the lower catchment are subject to issues from urban stormwater. Plains grassy wetland communities are being replaced with permanent wetlands but Gary said there is recognition of this problem in new developments and measures are being incorporated to improve retention and management of intermittent grassy wetlands.

## Fire

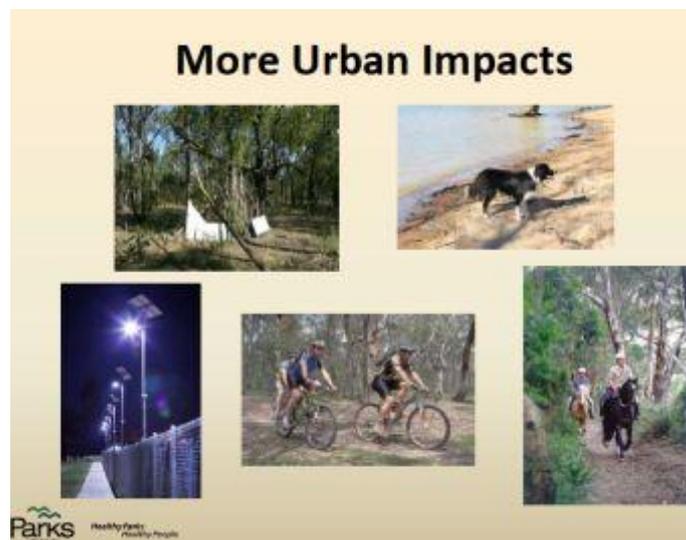
There is increasing pressure to burn more reserve areas in proximity to residential areas and increase the size of fuel breaks. Frequent burning and habitat removal can impact on biodiversity values, there a challenge to ensure the needs of fire protection and biodiversity conservation are taken into account.

## Urban impacts



*Melbourne has a rapidly expanding urban sprawl engulfing pockets of native grasslands.*

The rate of new housing developments and landscape change has accelerated faster than the capacity to adequately plan and implement measures for recreational use of reserves. This has meant people are creating their own usage patterns, in reserves particularly with trail bikes, four wheel drives, unleashed dog walking and mountain bike riding. Other issues with maintaining the conservation values in reserves include cats, dogs, weeds, horse droppings, dumping of rubbish, illegal structures, bmx tracks and permanent flood lighting.



## Threats to biodiversity

Gary spoke about threats to some significant orchid sites in Parks in the urban area. A significant issue is the large volume of people moving in and around some of the sites wanting to take photos etc. Trampling is causing loss of problems and Park managers have to factor this into conservation efforts.

Urban sprawl is confining Kangaroos to small parks and reserves, resulting in intensive grazing and impacting on floristic values. Grazing exclusion fencing has been used in some cases to protect important areas.

Gary said there are several species which have been the focus of attention by Parks Victoria in the Melbourne area.

- Common Dunnart – suffered habitat degradation and habitat loss. Rock removal has been a particular problem. Efforts to supplement habitat refuge by using paving tiles have proven successful.
- Rosella Spider-orchid, Emerald Lip-greenhood and Matted Flax-lily – translocation and re-introductions have been done but there is still a problem with trampling by photographers. Parks Victoria has maintained confidentiality for some reintroduction sites which has resulted in improved outcomes.
- Powerful Owl – this species has benefited from ‘green wedges’ planning in Melbourne which provides corridors across parts of Melbourne. Gary said there are several breeding pairs along the Yarra corridor even in places such as Ivanhoe and Heidelberg.

Gary said there is an increasing trend for developers to request the removal of threatened species to an alternative site so developments can proceed. This is not always feasible and there is a risk that reintroductions will fail. He spoke about five years of research into *Caladenia amoena* in the Plenty Gorge area and found that the reintroduced populations have a reduced growing season and a propensity to enter a dormant state compared to natural populations.

## Key points from questions

- Developers deal with DSE regarding threatened species on developments but Parks Victoria can become involved to see if suitable translocation sites can be found within reserved areas.
- The setting up of artificial areas or special access sites for viewing threatened flora has some merit as it takes pressure off trampling of natural or reintroduced populations.
- Developers should be more accountable for formulating arrangements to protect threatened species rather than pushing the problem onto Parks Victoria or DSE to find translocation sites and carry out monitoring.

See: [www.swifft.net.au](http://www.swifft.net.au) for more videoconference notes.