

Connecting Country's Nest Box Program

Summary of Monitoring Results from 2011-2014 (by Chris Timewell)

Background

In 2009, Connecting Country (CC) commenced its Brush-tailed Phascogale habitat restoration project in Yellow Box Woodland habitats across the Mount Alexander Shire and surrounds. The insectivorous Brush-tailed Phascogale, also known as the Tuan, is an endangered marsupial that occurs in this part of central Victoria. Its Latin name is *Phascogale tapoatafa* subspecies *tapoatafa*.

Part of this project involved installing more than 450 nest boxes, each of which had been designed specifically for use by the Tuan. During 2010 and 2011, these nest boxes were installed in clusters of three at 150+ locations on public and private land.

Autumn 2014 was the third year in which a sample of these nest boxes was formally checked by CC staff and volunteers. A total of 104 sites were checked. For the most part, the boxes checked during 2014 were the same as those checked during 2012, and with much overlap with the 2011 surveys.

Many thanks to all of the land owners and managers who allowed their nest boxes to be checked by CC. Each relevant landholder or Landcare group has been sent detailed results specific to their set of boxes. Thanks also to Bryan McMullan and the many volunteers who also assisted with field work and data entry (Lauren Cogo, Jules Walsh, Nathan Gregory, Kim Peric, Jennifer Pryce, Maldon Urban Landcare group, Philip Hopley, Mel Marshall, John Murray). A special thanks also to Cara Byrt who designed, and continually refines, our database for nest box data.

We hope that this summary of results is of interest to the local community.

Who uses the boxes?

Far and away the most common occupant in our boxes is the Sugar Glider (*Petaurus breviceps*) – a charismatic nectar-feeding marsupial. More than 50% of our boxes either have Sugar Gliders within them (up to 6 animals sometimes!), or their characteristic gum leaf nest is present. They are known to have multiple nesting sites within a locality which they use on different days, so it was not uncommon to find unoccupied nests.

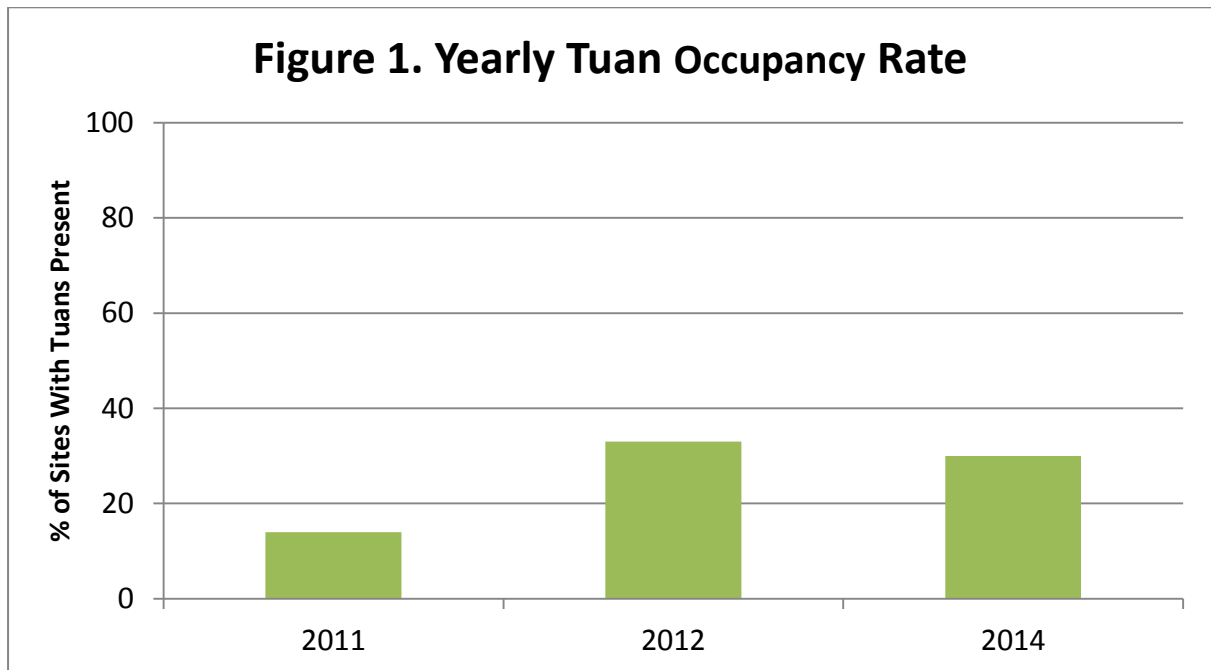


Despite being detected at ~60% fewer locations than Sugar Gliders, and with fewer individuals per box when they are present, Tuans are still relatively common as well.

Other animals occasionally found using the boxes included Feral Bees, Brush-tailed Possum, Common Ringtail Possum, Peron's Tree Frog, ants, parrots and Huntsman Spiders.

Overall Changes in Occurrence each year

For the Brush-tailed Phascogale (the Tuan), the overall proportion of sites found to be occupied was very similar to the previous check in 2012. This data is shown in Figure 1 and the table below.

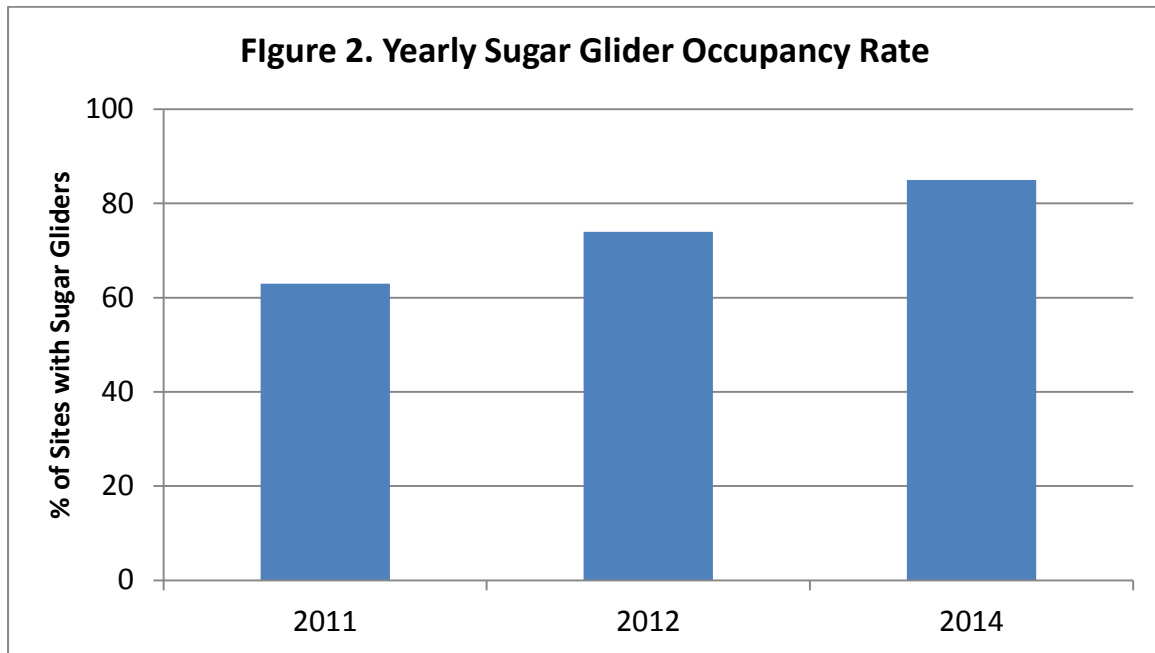


TUANS	2011	2012	2013
Clusters of boxes ('sites') checked	84	106	104
Clusters of boxes ('sites') with Tuans	12	33	30
% of total	14%	31%	29%

The photos below are of typical examples of the 'messy' nests found within boxes used by Tuans, with feathers, leaves and bark, and usually a pile of droppings in the corners. Other 'non-natural' items such as wool and string are also added to the nests, when available.



For the third time in a row, the proportion of sites supporting Sugar Gliders increased. On average, 17 out of every 20 sites checked during 2014 had Sugar Gliders– which is more than twice the frequency of Tuans. This data is shown in Figure 2 and the table below.

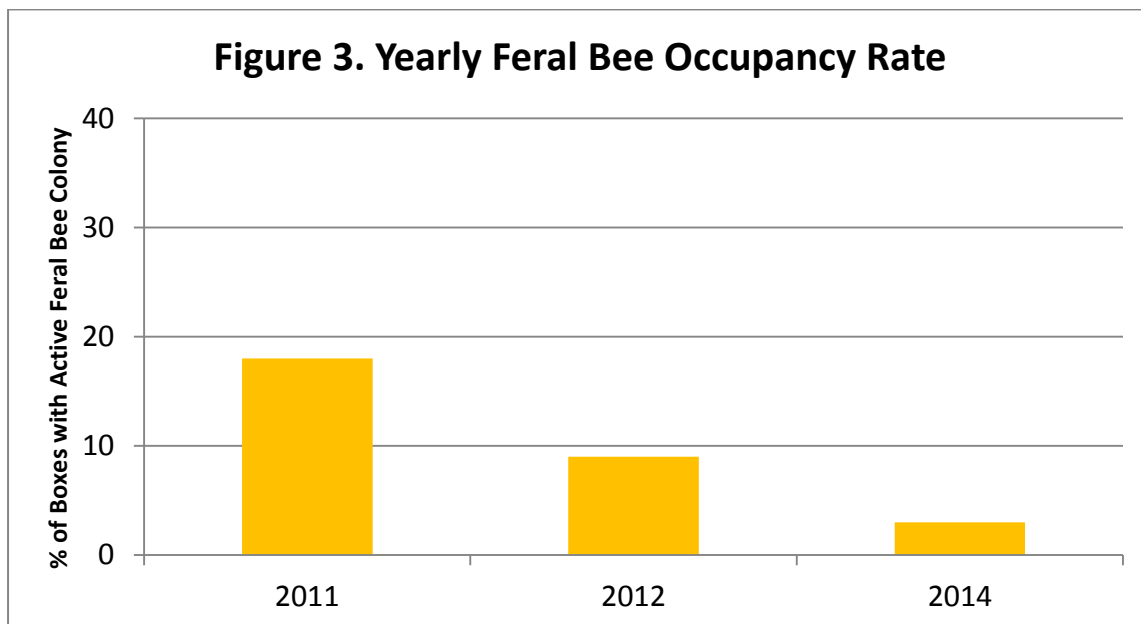


SUGAR GLIDERS	2011	2012	2014
Clusters of boxes ('sites') checked	84	106	104
Clusters of boxes ('sites') with Gliders	53	78	88
% of total	63%	74%	85%

Two typical nests of a Sugar Glider. On the left, is an unoccupied open bowl-shaped nest made of eucalypt leaves. On the right is a more spherical-shaped nest, with a leafy roof and a small opening. It has been suggested that roofs are more commonly seen in Sugar Glider nests when the animals are deeper within a reproductive cycle.



In 2011, we were alarmed to find a high proportion of the boxes being used by feral bees (18%). Feral bees can aggressively take over boxes and natural tree hollows, at the expense of native animals. They also out-compete and exclude native pollinators and nectar-feeders. For the purposes of our program, it has been very encouraging to see a dramatic decrease in active bee hives within the boxes during subsequent surveys. We will continue to watch with interest, and take appropriate management actions if required. The precise reasons for the continued decline are uncertain, and many possibilities have been proposed. This data is shown in Figure 3 below.



FERAL BEES	2011	2012	2014
Number of boxes checked	253	318	306
Number of boxes with active bee hives	45	28	10
% of total	18%	9%	3%

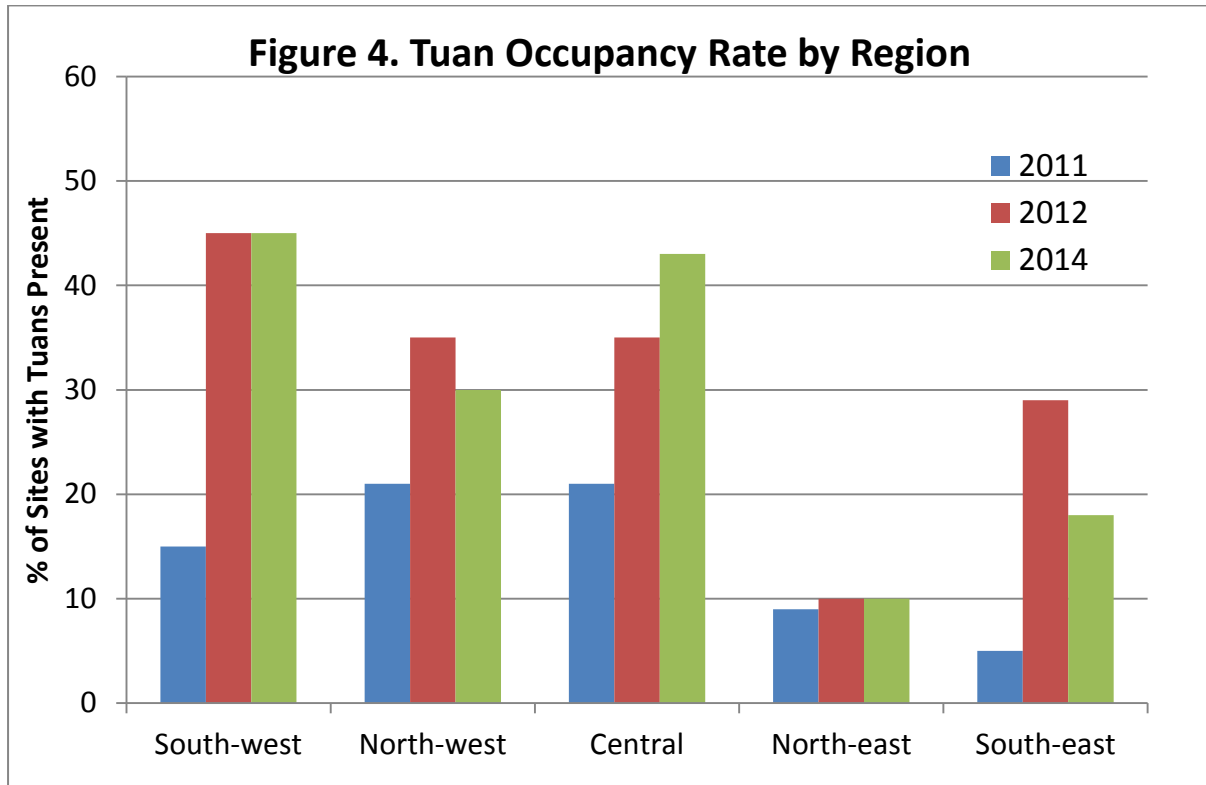
Many boxes have evidence of occupation by a feral bee colony in the past. Attempts to discourage beehive formation within boxes using carpet have been largely unsuccessful. Perspex on the underside of the lid has had more success as a deterrent.



Regional Differences

We have subdivided the Mount Alexander Shire and surrounds into five geographical regions. Each monitoring season, we aim to check at least 20 sites within each of the five regions.

Across the years, the Tuan is found most often in the south-west region, closely followed by the central and north-west regions. The Tuan occupancy rates may be increasing in the central region, and relatively stable or declining elsewhere. The Tuan is consistently found to occur the least in the north-east region. No consistent trends are so far apparent for the south-east region. This data is shown in Figure 4 and the table below.



Sites with Tuans	South-west	North-west	Central	North-east	South-east
2011	2 out of 13 15%	4 out of 19 21%	4 out of 19 21%	1 out of 11 9%	1 out of 22 5%
2012	10 out of 22 45%	7 out of 20 35%	7 out of 20 35%	2 out of 20 10%	7 out of 24 29%
2014	9 out of 20 45%	6 out of 20 30%	9 out of 21 43%	2 out of 21 10%	4 out of 22 18%

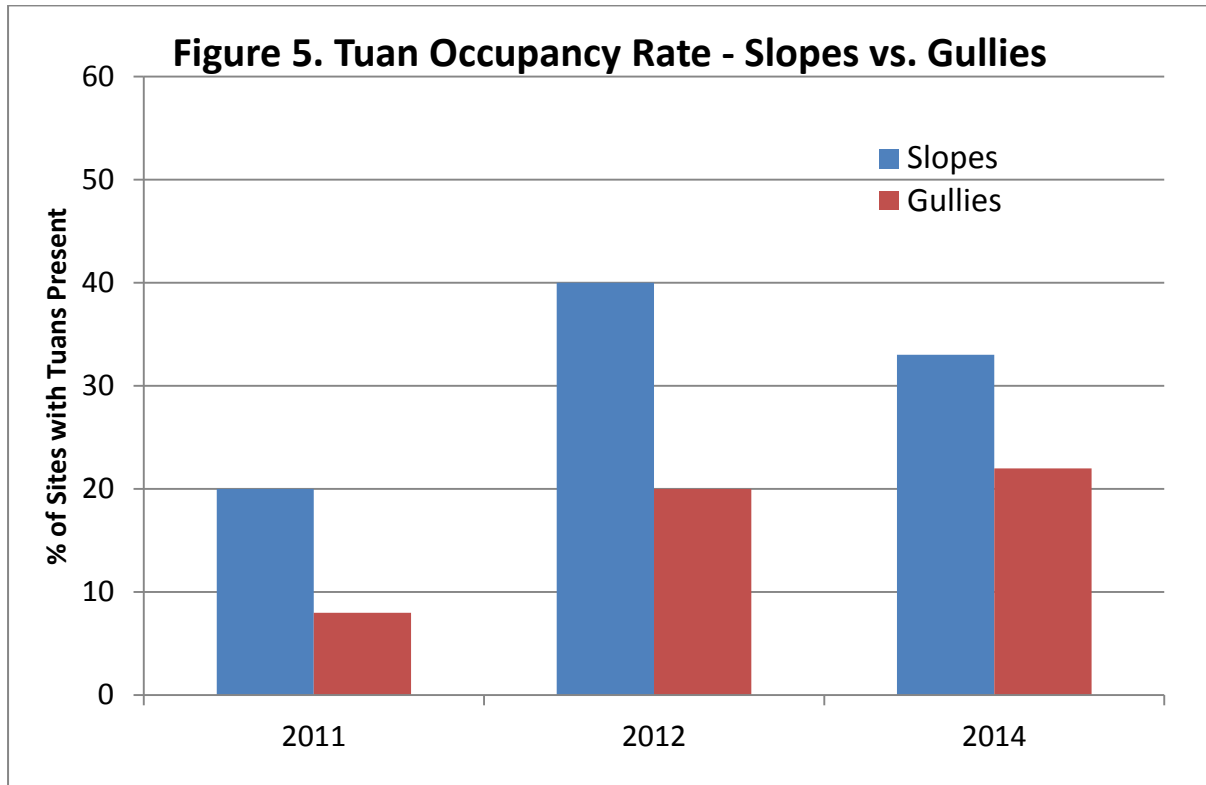
In all regions, ants and spiders occasionally made use of a nest box.



Landscape Position

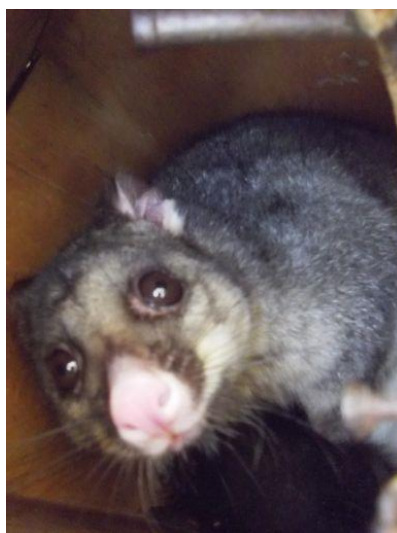
It has been suggested that Tuans may be less common in more fertile gullies, flats and floodplain location. As such, we have categorised each site as being either within a ‘gully’ or on a ‘slope’, and we aim to monitor an approximately equal number of each type during each monitoring season.

As anticipated for each of the three years, Tuans have been much more commonly found on ‘slope’ sites compared to ‘gully’ sites. However, this difference between the sites seems to be shrinking each year. It will be interesting to see the results next time! This data is shown in Figure 5 and the table below.



Sites with Tuans	2011	2012	2014
Slope	9 out of 45 20%	22 out of 55 40%	18 out of 54 33%
Gully	3 out of 38 8%	10 out of 50 20%	11 out of 49 22%

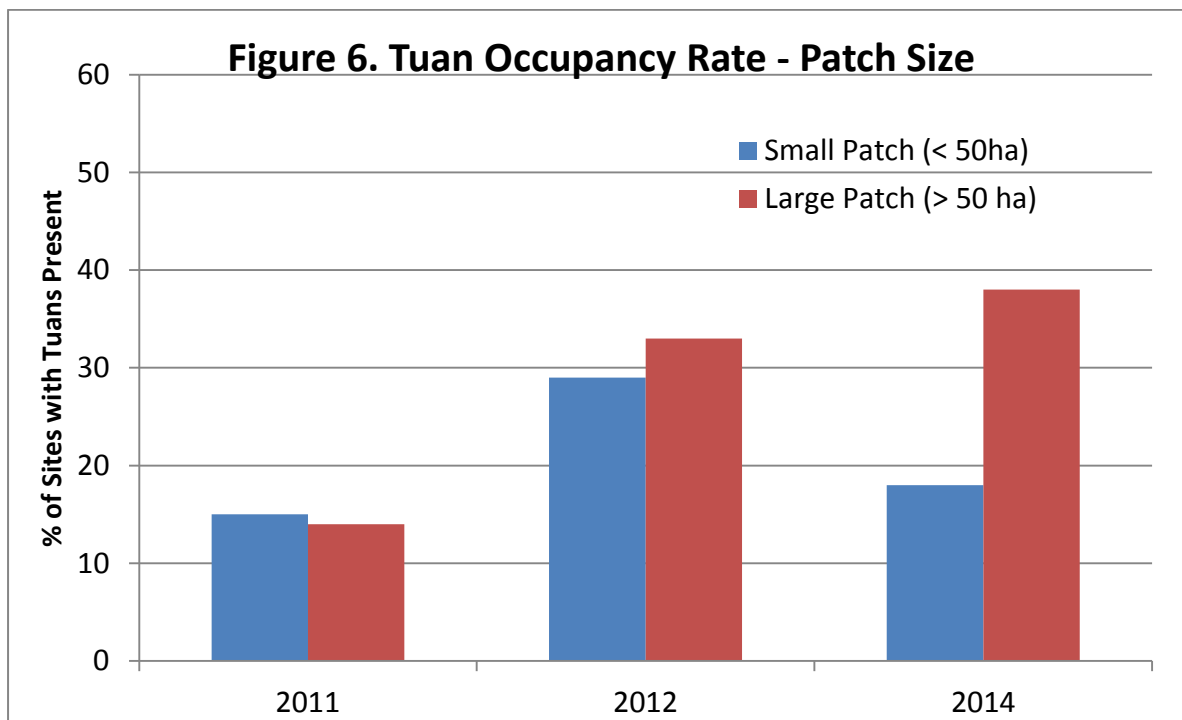
This close-encounter with a Brush-tailed Possum, found in a nest box at a gully site in Muckleford, provided CC’s ecologist with a surprise.



Occupancy Rates in Different Sizes of Woodlands

While some studies have suggested that Tuans need very large areas of continuous bushland to thrive, there have also been some studies in north-eastern Victoria where they are relatively abundant in small roadside woodland remnants. To learn more about the habitat requirements of Tuans in the local area, we aimed to monitor an approximately equal number of sites within small patches of woodland (less than 50ha) and large patches of woodland (more than 50ha).

During the first two years of surveys, very little difference was found between Tuan occupancy rates in large and small patches of woodland. However, in 2014, Tuans were more than twice as likely to be found occupying boxes with larger patches of woodland. It will be interesting to see if this trend continues during future monitoring surveys. This data is shown in Figure 6 and the table below.



Sites with Tuans	2011	2012	2014
Small (<50ha) Woodland Patches	7 out of 48 15%	15 out of 52 29%	9 out of 51 18%
Large (>50ha) Woodland Patches	5 out of 35 14%	17 out of 51 33%	20 out of 52 38%

Conclusion

When compared to previous years, the 2014 monitoring results suggest some interesting trends are emerging – but there are few clear-cut conclusions that can yet be drawn. Further survey in future years is still very necessary. However, most importantly, the Tuan appears to be maintaining a strong foothold in woodland and forest habitat on private and public land across the region.

During 2011, 2012 and 2014, we have largely monitored boxes at the same group of sites for the purposes of consistency and scientific rigour. In 2015, we will instead focus on monitoring those boxes that have been checked only once or not at all in previous years.