

## Listen up – is that an owl calling?

Now is a good time to be out listening for Powerful Owls at night. They call mainly during autumn and winter (April-July), in the earlier part of their breeding season, and more commonly at dusk and dawn. Connecting Country volunteers recently participated in a citizen science project to detect night birds including the Powerful Owl in the Mount Alexander region using bioacoustic monitoring.

The project was one of the “Communities Listening for Nature” projects run by the Victorian National Parks Association (VNPA) in partnership with Museums Victoria at different sites around Victoria. During 2017-2019, in partnership with Connecting Country, a project was conducted in the Mount Alexander region of Central Victoria.

A previous Connecting Country eNews (14 August 2019) announced the launch of an educational video entitled “Why should we listen to nature?” featuring Connecting Country volunteers engaged in this project (available on [YouTube](#)). Museums Victoria has now reported further analysis of the recordings with exciting results for our region.



**Powerful Owl and chick**  
Photo by Damian Kelly

## How was the night bird study designed?

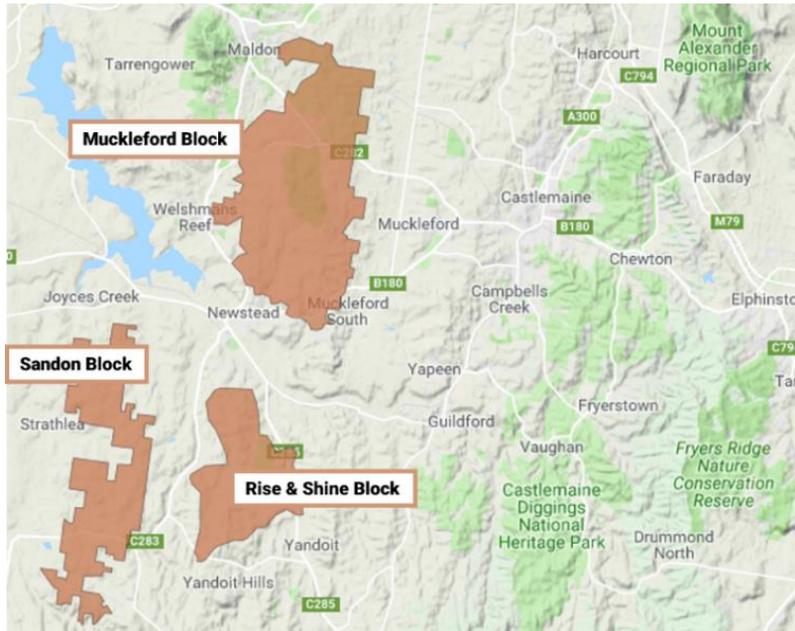
Recording bird calls using song meters is a powerful means for gathering data on bird distributions across wide areas with minimal volunteer time in the field. When the Connecting Country group was presented with the opportunity to use song meters for a local project, they decided that a focus on night birds would address a gap in knowledge from the many daytime surveys being conducted around the region.

Seven target night bird species were selected for study, ranging from common species that were expected to be found, to rarer species with little evidence of local populations (see Table below). Although the Eastern Barn Owl was expected to be found in the area, it was decided that it would be difficult to create an accurate call recogniser due to its very similar call to the Australian Masked Owl which may also be present in the region.

Common Name	Scientific Name	Conservation Status in Study Region
Powerful Owl	<i>Ninox strenua</i>	Relatively common
Barking Owl	<i>Ninox connivens</i>	Rare
Southern Boobook	<i>Ninox boobook</i>	Common
Tawny Frogmouth	<i>Podargus strigoides</i>	Common
Australian Owlet Nightjar	<i>Aegotheles cristatus</i>	Relatively common
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	Relatively common
Spotted Nightjar	<i>Eurostopodus argus</i>	Rare

Following a pilot study to test the methodology in 2017, largely on private properties, the project group decided that a recording time of between one hour before dusk and one hour after dawn for a period of 7 days would give a good chance of detecting the night birds. They then decided to focus recording on the three blocks of the Bendigo Box-Ironbark Key Biodiversity Area (KBA) within the Mount Alexander shire, i.e. the Muckleford, Rise and Shine, and Sandon blocks (see map below). Regular monitoring is important for checking the health of KBAs, so this study would make a valuable contribution to the data collected for this KBA. For more information on KBAs check out the [Birdlife KBA site](#).

Seventeen monitoring sites were selected over the three blocks, 8 in Muckleford, 6 in Sandon and 3 in Rise and Shine. Sites were at least 2 km apart with minimal proximity to competing noise sources such as houses and roads. Each site was monitored three times (winter, spring and early summer) during 2018. This design was supported by preliminary research conducted by Damian Kelly of the project group on the call times and breeding seasons of the target species.



**Map showing the three forest blocks of the Bendigo Box-Ironbark Key Biodiversity Area studied in this project**

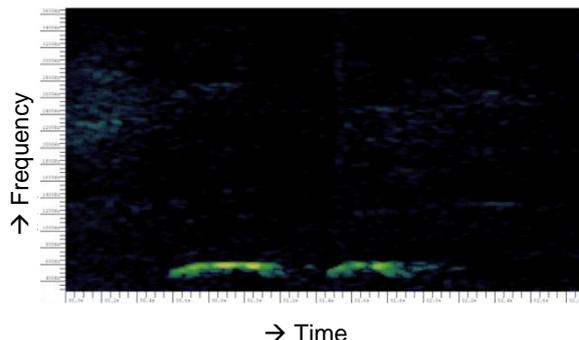
**How was the data analysed?**

A large volume of recordings was collected: 5005 hours (1.6 terabytes). Manual listening to the recordings gave the volunteers an appreciation of the structure and complexity of calls and differences between species, guided by local expert Andrew Skeoch. To listen to the slow, far-carrying 'whoohoo' of the Powerful Owl from the Muckelford forest, [click here](#), and to hear the Barking Owl's low, dog-like 'woof' from the Rise and Shine forest, [click here](#), visit [Connecting Country's project blog post](#).

Night bird calls are at low frequencies compared with other song birds, sometimes presenting a challenge for distinguishing them from background noise, e.g. rain. To analyse the many hours of recordings, Drs Karen Rowe and Amy Adams of Museums Victoria used specialised computer software that interpreted sound frequencies as visual displays called spectrograms. Species-specific recognisers were first generated for the target night bird species using pre-existing high quality, template, vocalisations. The song meter field recordings were then scanned using auto-detection software for vocalisations that matched the template vocalisation.



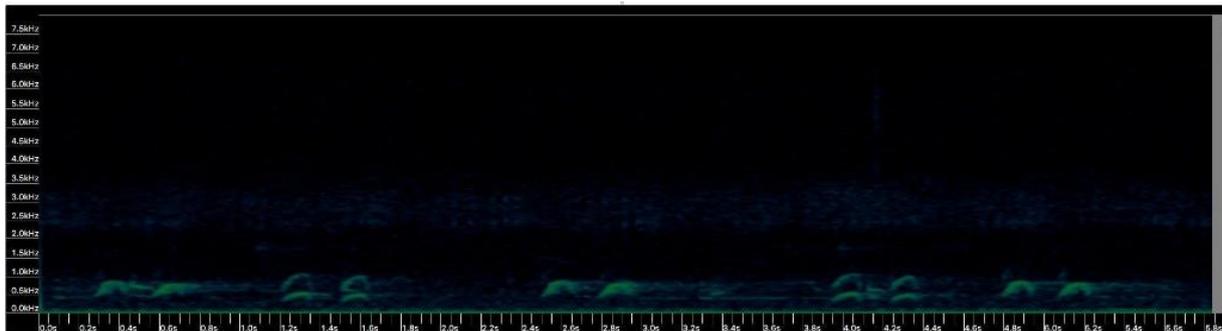
**Song meter securely attached to a tree**



**Spectrogram of Powerful Owl**

**What did the project find out about our night birds?**

Six of the target night bird species were detected in the KBA study. The group was very excited to learn that calls of the Barking Owl (Endangered) had been recorded at four sites: two in the Rise and Shine block and two in the Sandon block. Museums Victoria staff noted that both male and female Barking Owls were heard, the male with a slightly deeper call and the female with a higher and clearer call. A duetting male and female pair was recorded at one site (see below)!



**Spectrogram of Barking Owl.** The first call is the female and the male responds with the lower frequency call (three female calls and two male calls).

Also of importance was the detection of Powerful Owl (Vulnerable) calls at 12 sites, including sites within each of the three forest blocks, reinforcing the importance of these forests in the KBA.

The Australian Owlet Nightjar and Southern Boobook were recorded at all sites in the KBA blocks, the White-throated Nightjar at 10 sites (mainly in the Muckleford block) and the Tawny Frogmouth at 5 sites. The Spotted Nightjar was not detected at any of the sites.

Other information collected by the volunteers during the field deployments included notes on the surrounding habitat. The recording sites spanned a range of Ecological Vegetation Classes (EVCs) demonstrating the diversity of habitat in the area. EVCs where the target night bird species were recorded in both the pilot and KBA studies are shown in the following table.

Ecological Vegetation Community (EVC):	Box-Ironbark Forest	Heathy Dry Forest	Grassy Woodland	Hillcrest Herb-rich Woodland	Wet Forest
<b>Conservation Status of EVC (DELWP 2018):</b>	Vulnerable	Least Concern	Endangered	Depleted	Least Concern
Powerful Owl	x	x	x		
White-throated Nightjar	x	x	x		
Australian Owlet-nightjar	x	x	x		
Southern Boobook	x	x	x	x	x
Tawny Frogmouth	x	x			x
Barking Owl	x		x		
Spotted Nightjar	No detections				

These results provide new information on habitat use for these species in the Mount Alexander region that may assist future monitoring and habitat restoration efforts. Five species were detected in the endangered Grassy Woodland EVC (Powerful Owl, White-throated Nightjar, Australian Owlet-nightjar, Southern Boobook and Barking Owl) and six night bird species were detected in vulnerable Box-Ironbark Forest EVC, highlighting the need to protect habitat values in these woodlands and forests. Further detailed analysis of the data will provide a more fine-scaled seasonal and spatial understanding of habitat and site occupancy by each species.

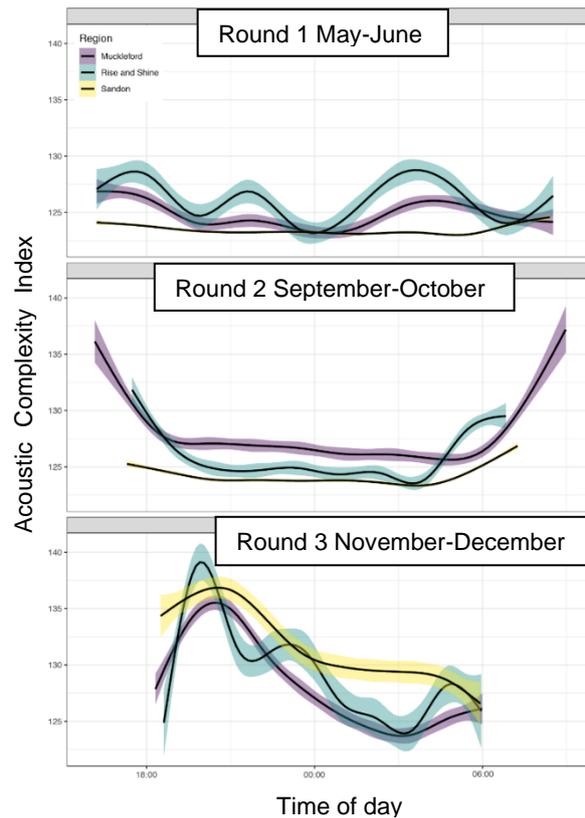
#### Acoustic Complexity Index comparisons

Song meter recordings provide a valuable insight into the environmental health of a monitoring site. Presence/absence records as described above are an essential output, but they do not indicate the numbers of birds in the area. One way to measure the quality of the sound-scape recorded is to determine an Acoustic Complexity Index (ACI). Higher ACI values indicate a higher complexity of both singing activity and diversity of birds present at a site.

ACI values varied across the three KBA forest blocks, with overall values for Rise and Shine slightly greater than for Muckleford and Sandon. ACI values also varied across season, being greatest during Round 3 (late spring into summer), but also most variable, particularly for Rise and Shine. There were also interesting differences for dusk vs dawn at different times of the year, with much higher values around dusk than dawn in Round 3. While

these patterns may reflect differences in species richness across sites and over time, a closer examination of the recordings to explore which species are present within each round will be required to confirm this.

**Overnight (4pm to 9 am) and seasonal pattern of acoustic activity** (as Acoustic Complexity Index) across Muckleford (purple), Sandon (yellow), and Rise and Shine (green). Black lines represent smoothed 10-minute interval 95<sup>th</sup> percentile values across nights, with coloured shading representing 95% confidence intervals around those values.



## Conclusions

The Mount Alexander Region Communities Listening for Nature study has provided a large amount of acoustic data on night birds within the Bendigo Box-Ironbark Key Biodiversity Area. The presence of six of the target night bird species was detected: Powerful Owl, White-throated Nightjar, Australian Owlet-nightjar, Barking Owl, Southern Boobook and Tawny Frogmouth, and associated EVCs identified. The project provided an excellent model for bringing together the local community with scientists and land managers to improve our collective understanding of species and ecosystems and to inform management of natural areas.

More details on this project and similar ones conducted at other regions around Victoria can be seen on the [Victorian National Parks Association website](#).

## Acknowledgements

The bioacoustic project coordinators were Dr Sera Blair, Dr Christine Connelly and Caitlin Griffith from the Victorian National Parks Association, and Dr Karen Rowe and Dr Amy Adams from Museums Victoria. Chris Timewell, Tanya Loos and Ivan Carter ensured a productive partnership for the Mount Alexander project with Connecting Country.

Mount Alexander Project Team: Kerrie Jennings, Damian Kelly, Euan Moore, Jenny Rolland, Jane Rusden, Andrew Skeoch, Chris Timewell and Terri Williams.

The team was very grateful to the private landowners who made their properties available for this project. Songscapes from these properties and an audio made by merging clips from recordings on one property (“A night in the Rise and Shine Bushland Reserve”) can be heard on [VNPATV YouTube](#).

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