

ARTICLES

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SOUTHERN BOOBOOKS IN THE BLACK MOUNTAIN, ARANDA, COOK AREA 2019

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Abstract. *Southern Boobooks are said to be declining. The number of territories we previously found on Black Mountain had declined, and a female banded there in 2014 was found dead in 2018. Toxicology analysis by the ACT Environment, Planning and Sustainable Development Directorate showed a heavy load of the second-generation rodenticide Brodifacoum, and other rodenticides. In 2019 we found two successful (fledged young) breeding pairs on Black Mountain, where the dead female had been replaced, and one pair in Wybalena Grove, Cook, more successful pairs than we found from 2014 to 2016. During the winter, before she left to breed, the successful Wybalena Grove female preyed on at least 28 Black rats, 28 small birds, and 17 insects.*

A recent BirdLife Australia *State of Australia's Birds* reported that Southern Boobooks (*Ninox boobook*) had declined throughout most of BirdLife's reporting period (BirdLife Australia 2015). Since 1993 we have been checking Southern Boobook territories in an area comprising Aranda Bushland, Black Mountain, Bruce Ridge and Cook. There were, on average, about 9 breeding pairs in this area each year. We have not been able to check these territories carefully in the past few years but we did search the area in the December 2014-January 2015 and December 2015-January 2016 breeding seasons, a good time of year to find adults with nestlings or fledged young. We found only one breeding pair in 2014-2015, and no breeding pairs in 2015-2016, so our results mirrored the BirdLife Australia claims.

On 29 Dec 2014, the one breeding female we found on the east side of Black Mountain appeared to be ill. At dusk she was attacked at her nest by Pied Currawongs (*Strepera graculina*), and we were able to capture her by hand, keep her safe for one night, then band and release her. She was feeding young after her release, and continued the following night, and finished the season without incident. But on 10 Sep 2018, a little over 44 months later, she was found dead in the Australian National Botanic Gardens, not far from her nest. She was sent to the ACT Environment, Planning and Sustainable Development Directorate for toxicology analysis and the results from Melissa Snape were:

Brodifacoum	886.7 ng.g ⁻¹ *
Bromadiolone	16.8 ng.g ⁻¹
Coumatetralyl	<2.0 ng.g ⁻¹
Difenacoum	<2.5 ng.g ⁻¹
Difenathialone	<10.0 ng.g ⁻¹
Flocoumafen	8.5 ng.g ⁻¹
Pindone	<25.0 ng.g ⁻¹
Warfarin	<2.0 ng.g ⁻¹

(*ng.g⁻¹ = nanogram/gram = 0.001 milligram/kilogram)

Brodifacoum, the largest concentration found in this Boobook, is a second-generation rodenticide containing highly lethal 4-hydroxycoumarin vitamin K antagonist anticoagulant poison. In recent years, it has become one of the world's most widely used rodenticides, and is also used to kill larger animals such as Brushtail Possums (*Trichosurus vulpecula*) in New Zealand (Eason and Wickstrom 2001).

The December 2019-January 2020 breeding season was better. We found a pair on the west side of Black Mountain with two fledglings, and another pair on the east side with two more fledglings. So the dead female found in 2018 at the ANBG was replaced by another breeding female. We also found a pair in Cook feeding three nestlings, making at least three breeding pairs in the 2019-2020 season. The Cook adult female moved with her fledged young (Fig. 1) to her favourite winter roost in a Wybalena Grove backyard. She and her mate fed the fledglings there during the summer until they dispersed, and she settled into her winter roost.



Figure 1. Juvenile Southern Boobook in Wybalena Grove 2019 (Jerry Olsen).

During the 2019 winter, before she travelled to her nest in October and bred, we collected egested pellets and prey remains from under her roost (Table 1). She took at least 28 Black Rats (*Rattus rattus*) and other *Rattus* species (probably Bush Rats (*Rattus fuscipes*), two House Mice (*Mus musculus*), and a Common Ringtail Possum (*Pseudocheirus peregrinus*) (38.75% mammals), 32 small birds (40%), 17 invertebrates, all insects (21.25%). In a larger sample, Trost *et al.* (2008) found wintering Boobooks in Canberra took 33.6% mammals, 6.7% birds, and 59% invertebrates. The higher proportion of birds in the diet of this female, we think, reflects the high number of small birds wintering in Wybalena Grove. Nicki Taws (personal communication) said that:

Wybalena Grove is particularly rich for small birds in winter, probably due to the density of planted native vegetation. Mixed feeding flocks of fairy-wrens, thornbills, pardalotes, silvereys, whistlers are encountered on a daily basis. In contrast, the adjacent nature parks (Aranda, Mt Painter) seem to have a lower density of small birds, particularly at this time of year.

The lower proportion of invertebrates in the Wybalena female's diet may be an artefact of the small sample, but could also represent a proportional decline in available invertebrate prey.

Table 1. Prey found at the winter roost of a female Southern Boobook at Wybalena Grove 17 Mar to 19 Sep 2019, before she bred in Cook in the spring of 2019.

Prey	Number found	%
Black Rat, and other <i>Rattus</i> species	28	35.00
House Mouse	2	2.50
Ringtail Possum	1	1.25
Small birds	32	40.00
Grasshoppers, beetles, and moths	17	21.25
Total	80	100.00

Three successful pairs in 2019-2020 is an improvement over the 2014-2015 and 2015-2016 breeding seasons, but still lower than the 9 breeding pairs found in the 1990s and early 2000s. Reasons for the decline of breeding pairs in the Black Mountain, Aranda Bushland, Bruce Ridge, Cook area are unclear, but we can float some possible hypotheses to explore: 1) the Gungahlin Drive Extension pushed through in 2004 reduced habitat and caused disturbance; 2) breeding Boobooks rely on woodland birds as prey (Olsen *et al.* 2006.), and some woodland birds are declining across Australia (BirdLife Australia 2015); 3) loss of nest hollows to increasing populations of species such as Sulphur-crested Cockatoos (*Cacatua galerita*) and Brushtail Possums (Olsen and Trost 2009) might reduce the number of successfully breeding pairs; 4) declining insect prey in Australia (Debus *et al.* in press) might reduce prey availability for breeding Boobooks; 5) second-generation anticoagulant rodenticides such as Brodifacoum, Flocoumafen, Difenacoum, Bromadiolone, Coumatetralyl, (sold as Racumin) have previously been implicated in owl deaths (Debus 2009, Olsen 2011, Mooney 2017, Lohr 2018). Closely related Tasman Moreporks (*Ninox novaeseelandiae*) have apparently died from Brodifacoum campaigns against rodents in New Zealand (Stephenson *et al.* 1999).

The Wybalena female appeared ill for a week in early January 2020 while she was still feeding her three young, and we thought she might have ingested something toxic. We kept an eye on her and she came good after a week and is roosting and foraging in the Grove on 15 Jul 2020 as we write.

So, it's not all bad news. We still have breeding Boobooks in Belconnen. And it's a positive step that the ACT Environment, Planning and Sustainable Development Directorate now tests dead raptors found in and outside of various ACT raptor field studies.

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