

Bird surveys of Blue Gum Hills Regional Park 2012-2016

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The community of diurnal birds at Blue Gum Hills Regional Park was surveyed monthly between 2012 and 2016. Birds were surveyed using six survey areas located in vegetation with various levels of disturbance condition. Most of the birds recorded were common local woodland and forest species although some less-common species were also recorded. A finding of the survey was the greater diversity and abundance of species in disturbed habitat. The results of this survey will provide baseline information for future comparison, particularly as nearby areas of native vegetation are cleared for urban development.

INTRODUCTION

Blue Gum Hills Regional Park (“the park”; 32° 53' S 151° 38' E) is located near Minmi NSW (**Figure 1**). The park, of approximately 129 ha, was first gazetted in February 2007. Population growth in the lower Hunter Valley in recent years has resulted in considerable loss of habitat from adjacent areas, plus habitat fragmentation (**Figure 2**). However, the park itself continues to provide a range of habitat types for native bird species. During any visit to the park, a range of bird species can be readily found.

The aim of the present study was to compare the bird species diversity occurring within the main vegetation habitat types of the park, to consider possible reasons for any differences found and to provide baseline information for future studies.

Main topographic and vegetation features

The park is located within a gently sloping valley from 60 m AHD (Australian Height Datum) in the southwest to 20 m AHD to the southeast. A minor watercourse drains the park and there are several small shallow man-made ponds associated with it. These ponds are fringed with water plants. The watercourse (apparently unnamed) flows into nearby Back Creek, which is a permanent water source.

The park has a history of disturbances, mainly for coal mining but it appears that some parts of the park were partially cleared or logged. Soil mapping studies (Matthei 1995) indicate that nearly 70% of the park (**Figure 3**) was affected by mining. According to the Newcastle Soil Landscapes (Matthei 1995) the Killingworth landscape is described as undulating to rolling low hills on the

Newcastle Coal Measures with predominantly uncleared tall open forest.

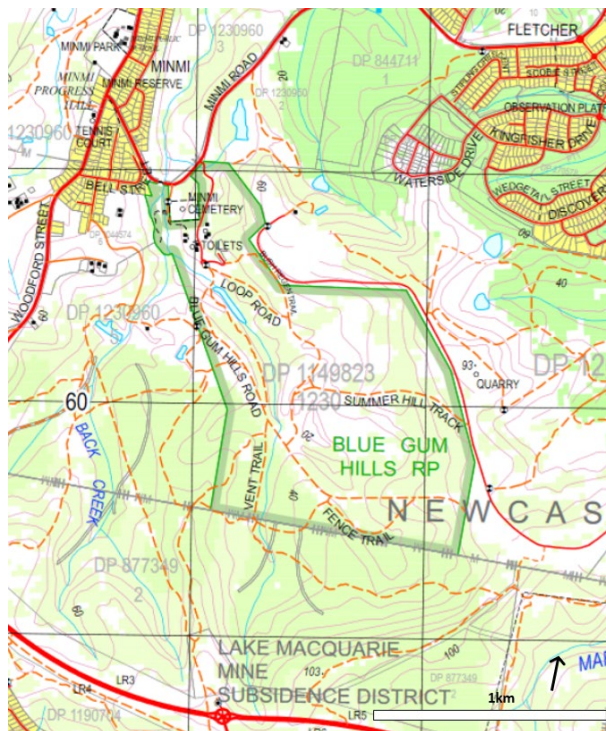


Figure 1. Location of Blue Gum Hills Regional Park in relation to the local area.

The park contains a mix of natural native vegetation, rehabilitated vegetation and cleared areas. There are some hollow-bearing trees; however, these are not numerous, possibly due to past logging activities. In vegetation mapping as part of the Lower Hunter and Central Coast Regional Environmental Management Strategy the main vegetation for the park was described as Spotted Gum - Ironbark Forest and Smooth-barked Apple Woodland plus small areas of Alluvial Tall Moist Forest (House 2003). More recently, the

park's vegetation was classified as a mix of Dry Open Forest and Cleared areas, with areas also of regenerating Dry Open Forest and Dry Open Forest with regenerating acacias (Cockerill *et al.* 2013).



Figure 2. The six survey sites BP1-BP6 in Blue Gum Hills Regional Park, plotted onto an aerial image (courtesy Google Earth).

METHODS

After an initial reconnaissance, six sites (here designated as BP1 to BP6) were selected as being representative of the main vegetation types (plus they were conveniently located near to the park's main walking tracks). Between July 2012 and November 2016, surveys were conducted on an approximately monthly basis. The six sites were visited in random order i.e. a different route was used each month. A standard 2-ha/20-minute survey (www.birddata.birdlife.org.au) was conducted at each of the six sites. During the 20-minute survey each bird species present was recorded, and their total numbers noted. Thus, the two parameters for each site in each survey were the species diversity i.e. how many species were recorded during that survey, and the total abundance i.e. the total number of birds of all species.

All species encountered while moving between the sites were recorded separately (as an "All park" list) but their numbers were not estimated.

Surveys commenced at about 7.00 am and took *c.* four hours to complete.

Reporting Rates (RR) for each species at each site were calculated. The RR is the number of times the species was recorded divided by the number of surveys conducted, expressed as a percentage. The RR is based on presence/absence; records of multiple birds within the same survey do not affect the RR.

Location of sites BP1-BP6

The locations for the six survey sites are shown in **Figures 2-4** in relation to:

- An aerial view of the park (**Figure 2**).
- Previous site disturbance (**Figure 3**, based on Matthei (1995)).
- Vegetation types within the park. (**Figure 4**, based on Cockerill *et al.* (2013)).

Most of the central and northern portions of the park have been disturbed, as indicated in the soil map (**Figure 3**). From on-site inspection the extent of site disturbance appears to be mostly correct, however, BP1 is located in a narrow section of undisturbed native forest in relatively good condition, and BP6 is within a disturbed and rehabilitated location supporting many introduced weeds. The vegetation type at each survey site is shown in **Figure 4** and described below.

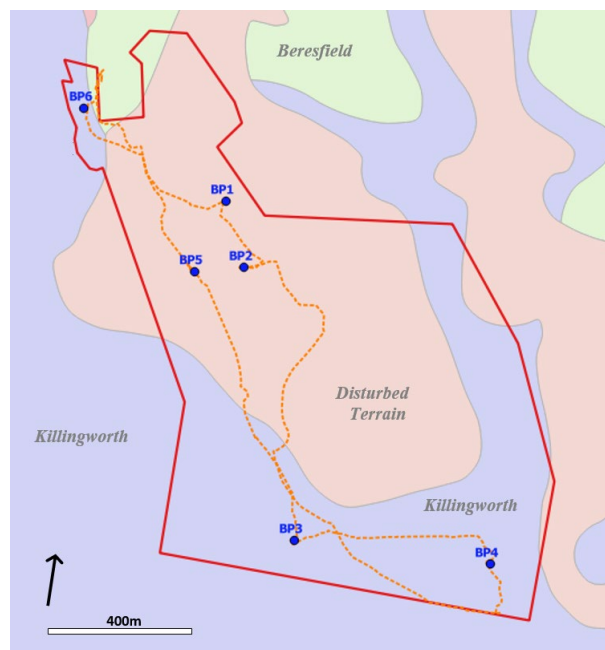


Figure 3. The six survey sites BP1-BP6 in Blue Gum Hills Regional Park, overlaid on a soil map from the Soil Landscapes of Newcastle 1:100,000 sheet (taken from Matthei 1995).

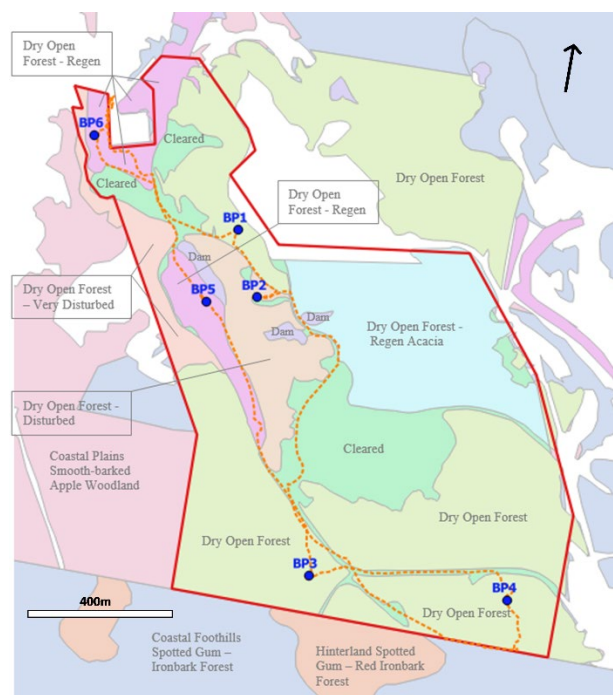


Figure 4. The six survey sites BP1-BP6 in Blue Gum Hills Regional Park, overlaid on a vegetation map from Lower Hunter vegetation mapping (taken from Cockerill *et al.* 2013).

Description of sites BP1-BP6

BP1 (Figure 4) is in a narrow strip of native forest vegetation between completely cleared land to the north-east and disturbed areas to the south. This plot supports a range of Eucalypt tree species of mixed ages, a relatively open understorey with good horizontal visibility, low open mostly fine leaved shrubs and a groundcover of mixed native grasses and herbs.

BP3, BP4 (Figure 4) are located within larger areas of native forest vegetation in relatively good condition with disturbance limited mainly to partial clearing and tracks. Partial clearing is evidenced by the lack of larger hollow-bearing trees. BP3 supports mostly young Spotted Gum *Corymbia maculata* with some Ironbark *Eucalyptus sp.* and Stringybark *Eucalyptus sp.*, an understorey of Prickly-leaved Paperbark *Melaleuca nodosa* and limited groundcover. BP4 also supports mostly young Spotted Gum but has a very open understorey and some groundcover of low shrubs, grasses, herbs and rushes. The canopy of both BP3 and BP4 appears the same from aerial photographs. However, the understorey and groundcover horizontal views are different. Within BP3 the horizontal view through the canopy is somewhat restricted due to the melaleucas and the groundcover is open, whereas in BP4 the understorey is very open, and the groundcover is of grasses and low shrubs etc.

BP2, BP5 (Figure 4) are located in disturbed and regenerating native forest vegetation with open areas and areas of replanting and numerous weeds. BP2 includes a cleared open area with only thick grass and grassy weeds plus an area of mostly young Spotted Gum trees and an

area of tree replanting with a relatively open understorey plus dense clumps of Lantana *Lantana camara* and some wattles *Acacia sp.* below which is a groundcover of grasses and herbs. BP5, which appears to have undergone disturbance to the ground, also has open cleared areas, young eucalypt trees, a range of understorey shrubs plus clumps of Lantana and groundcover of grasses and herbs. The horizontal view in both plots is very open in some parts and closed in other areas due to broad-leaved vegetation, such as Lantana. Both sites are located close to a source of water in a shallow man-made dam.

BP6 (Figure 4) is on land that appears to have been completely cleared and heavily disturbed with much of the existing vegetation having been replanted and now weed-infested. A sign indicates this location is the “Minmi Heritage Garden” and was probably subject to revegetation. BP6 has a ridge, ephemeral watercourse, tracks, fencing and what appears to be the base of an old rail line. Taller planted Eucalypt trees with a dense understorey of shrubs and Lantana grow on the ridge. Shorter plants, including Cheese Tree *Glochidion ferdinandi*, Sweet Pittosporum *Pittosporum undulatum* and Small-leaved Privet *Ligustrum sinense*, grow on the lower ground and over the watercourse. The horizontal view throughout much of this site, except along the tracks, is closed due to the density of broad-leaved vegetation. There is a heavily weed-infested but shady location close to a permanent source of water in Back Creek.

RESULTS

Of the 53 possible monthly surveys during the 2012-2016 study period, 45 were carried out. A survey was missed in 2014, two were missed in 2015 and five in 2016. Overall, 91 bird species were recorded in the park, with 64 species recorded in the 2-ha sites and an additional 27 species incidentally while walking between sites. **Table 1** has a list of species including the RRs for each of the 2-ha sites and for the park overall. Twenty-one species were recorded at all six 2-ha sites and ten species at only a single site.

The Spotted Dove *Streptopelia chinensis* was the only non-native bird recorded at the park during the surveys. There were records for four species listed as threatened under the NSW *Biodiversity Conservation Act 2016*: White-bellied Sea-Eagle (recorded flying over the park), Little Lorikeet *Glossopsitta pusilla*, recorded twice in BP2 and five times in BP5, Varied Sittella *Daphoenositta chrysoptera*, recorded once incidentally on 21 June 2012, and White-throated Needletail *Hirundapus caudacutus*, recorded incidentally three times – on 28 February 2013, 26 February 2014 and 30 January 2015.

The total species diversity recorded at the 2-ha survey sites ranged from a low of 29 species at site BP3 to a maximum of 51 species at BP6 (Figure 5). Fewer species were recorded at sites BP3 and BP4 than at the other four sites. BP3 and BP4 also had

lower average monthly species diversity counts, and lower average monthly total abundance of birds, than the other sites.

Table 1. Species recorded during the surveys, with Reporting Rates (RR) at each of the 2-ha sites and overall.

Common Name	Scientific Name	RR (%)						
		All park	BP1	BP2	BP3	BP4	BP5	BP6
Australian Wood Duck	<i>Chenonetta jubata</i>	13.3						
Hardhead	<i>Aythya australis</i>	2.2						
Pacific Black Duck	<i>Anas superciliosa</i>	28.9						
Chestnut Teal	<i>Anas castanea</i>	20.0						
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	11.1						
Spotted Dove	<i>Streptopelia chinensis</i>	2.2						2.2
Brown Cuckoo-Dove	<i>Macropygia phasianella</i>	22.2		4.4				4.4
Wonga Pigeon	<i>Leucosarcia melanoleuca</i>	22.2						
Bar-shouldered Dove	<i>Geopelia humeralis</i>	77.8		4.4			15.6	24.4
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	4.4						
White-throated Needletail	<i>Hirundapus caudacutus</i>	6.7						
Eastern Koel	<i>Eudynamys orientalis</i>	26.7						2.2
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>	35.6						
Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	26.7	2.2	4.4			2.2	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	66.7	6.7	8.9	2.2	6.7	11.1	2.2
White-necked Heron	<i>Ardea pacifica</i>	2.2						
White-faced Heron	<i>Egretta novaehollandiae</i>	6.7						
Masked Lapwing	<i>Vanellus miles</i>	11.1						
Black-shouldered Kite	<i>Elanus axillaris</i>	11.1						
Pacific Baza	<i>Aviceda subcristata</i>	4.4						
Grey Goshawk	<i>Accipiter novaehollandiae</i>	35.6					6.7	
Brown Goshawk	<i>Accipiter fasciatus</i>	2.2						2.2
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	4.4					2.2	
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	4.4						
Whistling Kite	<i>Haliastur sphenurus</i>	8.9						
Oriental Dollarbird	<i>Eurystomus orientalis</i>	20.0					2.2	2.2
Sacred Kingfisher	<i>Todiramphus sanctus</i>	40.0	11.1	4.4	13.3	2.2	2.2	4.4
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	86.7	15.6	8.9		2.2	6.7	15.6
Yellow-tailed Black-Cockatoo	<i>Zanda funereus</i>	15.6						
Galah	<i>Eolophus roseicapilla</i>	4.4						
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	35.6						
Crimson Rosella	<i>Platycercus elegans</i>	2.2						
Eastern Rosella	<i>Platycercus eximius</i>	91.1	6.7				33.3	8.9
Little Lorikeet	<i>Glossopsitta pusilla</i>	28.9		4.4			11.1	
Rainbow Lorikeet	<i>Trichoglossus moluccanus</i>	91.1	11.1	6.7	8.9	4.4	4.4	6.7
Australian King-Parrot	<i>Alisterus scapularis</i>	73.3	6.7	4.4			33.3	8.9
Noisy Pitta	<i>Pitta versicolor</i>	2.2						
Regent Bowerbird	<i>Sericulus chrysocephalus</i>	8.9		2.2				6.7
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	71.1	2.2				51.1	15.6
White-throated Treecreeper	<i>Cormobates leucophaea</i>	91.1	17.8	11.1	33.3	31.1	2.2	
Variegated Fairy-wren	<i>Malurus lamberti</i>	66.7	20.0	15.6	2.2	4.4	4.4	13.3
Superb Fairy-wren	<i>Malurus cyaneus</i>	95.6		22.2			11.1	68.9
Southern Emu-wren	<i>Stipiturus malachurus</i>	2.2						

Table 1. Species recorded during the surveys, with Reporting Rates (RR) at each of the 2-ha sites and overall (cont.)

Common Name	Scientific Name	RR (%)						
		All park	BP1	BP2	BP3	BP4	BP5	BP6
White-cheeked Honeyeater	<i>Phylidonyris nigra</i>	71.1		55.6			24.4	22.2
White-naped Honeyeater	<i>Melithreptus lunatus</i>	84.4	35.6	64.4	13.3		28.9	6.7
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	6.7	2.2	4.4				
Noisy Friarbird	<i>Philemon corniculatus</i>	64.4	13.3	15.6	20.0	31.1	8.9	8.9
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	64.4	26.7	46.7	15.6	8.9	13.3	37.8
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	91.1	20.0	53.3	11.1	20.0	26.7	55.6
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	100.0	4.4	48.9	4.4	13.3	51.1	73.3
Little Wattlebird	<i>Anthochaera chrysoptera</i>	6.7		4.4				2.2
Red Wattlebird	<i>Anthochaera carunculata</i>	37.8	4.4	6.7			2.2	11.1
Yellow-faced Honeyeater	<i>Caligavis chrysops</i>	100.0	71.1	77.8	64.4	62.2	15.6	66.7
Bell Miner	<i>Manorina melanophrys</i>	100.0	15.6	95.6			100	60.0
Noisy Miner	<i>Manorina melanocephala</i>	53.3	13.3					2.2
Spotted Pardalote	<i>Pardalotus punctatus</i>	80.0	33.3	33.3	42.2	26.7	4.4	42.2
Brown Gerygone	<i>Gerygone mouki</i>	88.9		11.1			4.4	75.6
White-browed Scrubwren	<i>Sericornis frontalis</i>	95.6	4.4	33.3	2.2	2.2	57.8	55.6
Yellow Thornbill	<i>Acanthiza nana</i>	40.0	8.9	8.9				11.1
Striated Thornbill	<i>Acanthiza lineata</i>	93.3	20.0	46.7	4.4	24.4		15.6
Brown Thornbill	<i>Acanthiza pusilla</i>	91.1	26.7	42.2	2.2	8.9	4.4	26.7
Varied Sittella	<i>Daphoenositta chrysoptera</i>	2.2						
Olive-backed Oriole	<i>Oriolus sagittatus</i>	51.1	13.3	11.1	8.9	13.3	13.3	11.1
Eastern Shrike-tit	<i>Falcunculus frontatus</i>	4.4			2.2			
Rufous Whistler	<i>Pachycephala rufiventris</i>	40.0	4.4	13.3		2.2		2.2
Golden Whistler	<i>Pachycephala pectoralis</i>	100.0	35.6	62.2	40.0	51.1	26.7	71.1
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	75.6	2.2	17.8	11.1	2.2	8.9	4.4
Eastern Whipbird	<i>Psophodes olivaceus</i>	100.0		55.6			57.8	37.8
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	60.0	8.9	4.4	11.1	11.1	6.7	4.4
Common Cicadabird	<i>Edolisoma tenuirostris</i>	17.8				2.2		
Pied Currawong	<i>Strepera graculina</i>	73.3	4.4	2.2		4.4	11.1	4.4
Australian Magpie	<i>Gymnorhina tibicen</i>	80.0				2.2		4.4
Pied Butcherbird	<i>Cracticus nigrogularis</i>	31.1						
Grey Butcherbird	<i>Cracticus torquatus</i>	88.9	4.4		6.7	17.8	4.4	
White-browed Woodswallow	<i>Artamus superciliosus</i>	2.2						
Willie Wagtail	<i>Rhipidura leucophrys</i>	24.4					13.3	
Rufous Fantail	<i>Rhipidura rufifrons</i>	15.6		2.2	2.2			6.7
Grey Fantail	<i>Rhipidura albiscapa</i>	100.0	51.1	55.6	33.3	28.9	4.4	77.8
Spangled Drongo	<i>Dicrurus bracteatus</i>	11.1				2.2		
Leaden Flycatcher	<i>Myiagra rubecula</i>	17.8	4.4		4.4	2.2		
Magpie-lark	<i>Grallina cyanoleuca</i>	46.7	2.2					
Black-faced Monarch	<i>Monarcha melanopsis</i>	13.3		2.2	2.2			4.4
Australian Raven	<i>Corvus coronoides</i>	93.3	6.7	8.9	6.7	31.1	2.2	15.6
White-winged Chough	<i>Corcorax melanorhamphos</i>	4.4						
Rose Robin	<i>Petroica rosea</i>	22.2	6.7	2.2				2.2
Eastern Yellow Robin	<i>Eopsaltria australis</i>	91.1	8.9	31.1	13.3	13.3	6.7	64.4
Tawny Grassbird	<i>Cincloramphus timoriensis</i>	15.6						
Welcome Swallow	<i>Hirundo neoxena</i>	55.6					11.1	28.9
Silveryeye	<i>Zosterops lateralis</i>	100.0	28.9	73.3	13.3	11.1	37.8	91.1
Mistletoebird	<i>Dicaeum hirundinaceum</i>	77.8	28.9	44.4	26.7	15.6	26.7	11.1
Red-browed Finch	<i>Neochmia temporalis</i>	95.6	2.2	42.2			35.6	60.0

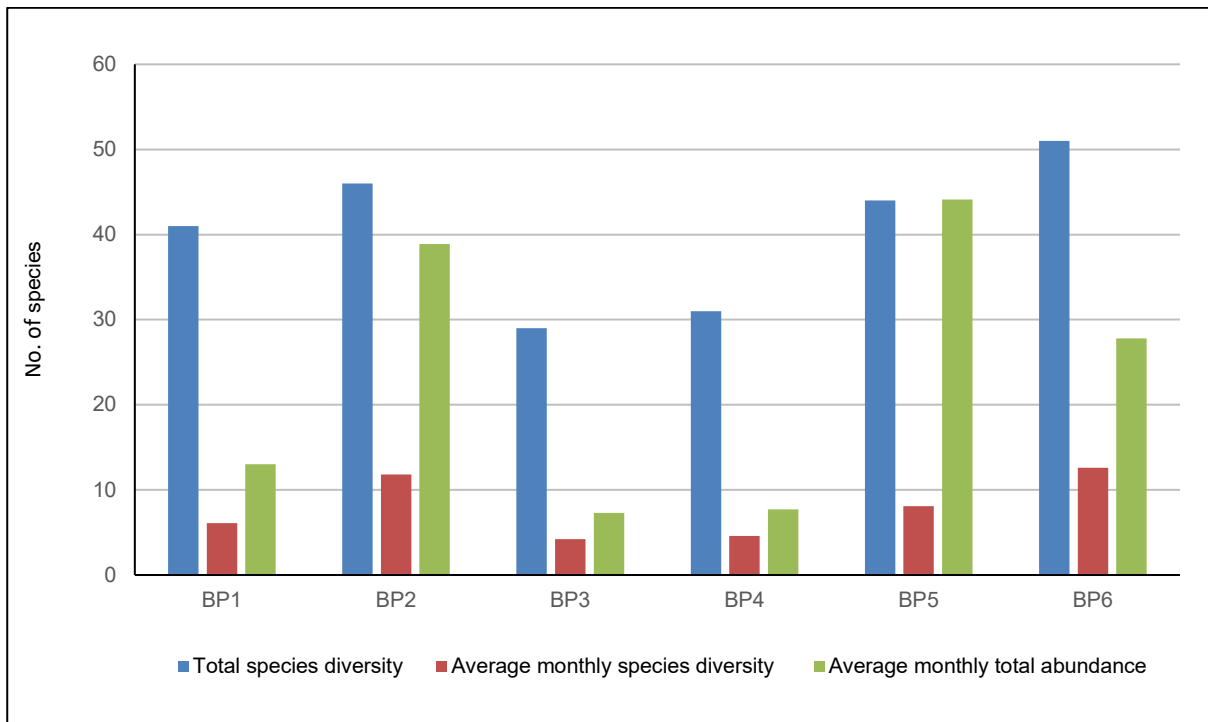


Figure 5. Total number of bird species recorded at each 2-ha site.

DISCUSSION

Bird species diversity was greater at sites BP2, BP5 and BP6. A contributing factor for higher abundance at BP2 and BP5 was because these sites were located within (BP5) or at the edge of (BP2) a large colony of Bell Miners *Manorina melanophrys*. Many Bell Miners from the colony were recorded during the surveys of BP2 and BP5, inflating the overall counts for those two sites.

The reason why bird species diversity and total abundance numbers were lowest at sites BP3 and BP4 is unclear, given that both sites were located within larger sections of native forest vegetation in relatively good condition. However, BP3 has an understorey dominated by fine-leaved paperbarks and minimal groundcover while BP4 has a very open understorey and grassy groundcover. It is possible that a higher density of broad-leaved shrubs (Creagh *et al.* 2004), even if weeds such as Lantana, in the understorey of BP2, BP5 and BP6 provides safer refuge from predators and weather extremes plus potentially better foraging habitat for some birds.

Of the 91 species recorded in this survey, most were resident, that is they occur and live their lives year-round in the local area. At least sixteen of the species recorded were known north-south seasonal migrants (e.g. Eastern Koel *Eudynamis orientalis*

and Common Cicadabird *Edolisoma tenuirostris*), altitudinal migrants (e.g. Rose Robin *Petroica rosea*) or nomadic / irruptive (e.g. White-browed Woodswallow *Artamus superciliosus*).

The only introduced bird species recorded in the park during this survey was the Spotted Dove *Streptopelia chinensis*, recorded at BP6 which is the survey site closest to the residential area of Minmi. Exotic species may currently be deterred from using those parts of the park consisting mostly of either natural or regrowth native vegetation. The extent of native vegetation contiguous with the park probably helps. Future clearing and residential development around the park might lead to additional introduced species using the park.

Across the whole park, 18 bird species had RRs above 80%, while *c.* 35 species had RRs below 20%. Only seven species had RRs of 100%, these being Bell Miner *Manorina melanophrys*, Lewin's Honeyeater *Meliphaga lewinii*, Yellow-faced Honeyeater *Caligavis chrysops*, Eastern Whipbird *Psophodes olivaceus*, Golden Whistler *Pachycephala pectoralis*, Grey Fantail *Rhipidura albiscapa* and Silvereye *Zosterops lateralis*. For the 2-ha sites, only two species had high RRs at any site: namely, the Bell Miner at sites BP5 and BP2 and the Silvereye at BP6. Most of the common species had rather variable RRs. The Yellow-faced Honeyeater had a consistent moderately high (61-

80%) RR at all 2-ha sites except BP5 where its RR was low. All other bird species had variable RRs, reflecting differences in availability of foraging, refuge and breeding habitats within each site.

Noisy Miners were recorded a few times at BP1 and once at BP6. They are recognised as an aggressive native species that harasses other birds in their territory. They are common in urban areas where the heavily disturbed vegetation is opened and providing them with favourable habitat. Further clearing in and adjacent to the park could potentially attract greater numbers of this species.

Only a small number of threatened species were recorded during this survey. Two of those, White-bellied Sea-Eagle and White-throated Needletail, were only recorded flying over the park. Little Lorikeet and Varied Sittella were recorded and potentially might breed in the park although they are mobile and wide-ranging species and were not recorded regularly. Sedentary threatened woodland species such as Brown Treecreeper *Climacteris picumnus* and Speckled Warbler *Pyrrholaemus sagittatus* were not recorded, nor were more mobile species such as Dusky Woodswallow *Artamus cyanopterus* and Scarlet Robin *Petroica boodang*. The habitat may be suitable for forest owls including Masked Owl *Tyto novaehollandiae* and Powerful Owl *Ninox strenua*; however, there were no nocturnal surveys to check for the presence of night birds.

CONCLUSIONS

Blue Gum Hills Regional Park is a small, mostly disturbed area of local native vegetation which is likely to become a more important remnant in the future due to clearing of nearby land for housing. The bird surveys between 2012 and 2016 found that the park supports a good variety of native bird species, both local resident species and migratory ones. Very few introduced bird species were recorded. This report provides some baseline information for future studies.

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