

Bird species at Charlestown Golf Course NSW

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The local golf course is often overlooked as a community asset for sustaining native birdlife. This paper describes a project surveying bird communities at Charlestown Golf Club from 2012-2014. Of the 82 native species identified, 44% are either *Very Common* or *Common* species. 56% are *Uncommon* species and exhibit different patterns and timing to their visits. Neville Cayley's (1987) avian habitat model was adapted to classify the species as birds of *Freshwater*, *Open Forest*, *Forest Scrub* and *Blossoms and Outer Foliage*. Reports of species seen monthly, annual bird numbers and seasonal breeding records in different habitats are posted on the Golf Club's website. Golfers, staff and volunteers now report bird sightings and actively support bird welfare.

INTRODUCTION

Lake Macquarie is the largest permanent saltwater lake (approx. 110km²) in the southern hemisphere - only slightly smaller than Port Stephens estuary 43km to the north-east. The Lake's southern margins are identified by BirdLife International as an Important Bird Area (IBA) because their remnant native eucalypt forests and coastal habitats support significant numbers of endangered species such as Regent Honeyeaters *Anthochaera phrygia* and Swift Parrots *Lathamus discolor* (Roderick & Stuart 2010). However, published inventories of common native birds in any local area adjacent to the Lake are surprisingly rare (Stuart 2009). This project (2012-2014) recorded bird species seen at a suburban golf course surrounded by dry sclerophyll forest on *Awabakal* land near the north-east side of the Lake. It was anticipated that this location would attract a cross-section of woodland, open forest and water-bird species, as well as those seen in blossoms and outer foliage.

Study Region and Site Description

The northern region of Lake Macquarie is mapped as supporting a range of vegetation corridors, rehabilitation corridors, remnant native vegetation and cleared areas (*Lake Macquarie Native Vegetation Corridors Map 2011*). These assist in movement of fauna, including some mammals and birds listed under the NSW *Threatened Species Conservation Act 1995* and known to occur in this area, within pockets of native vegetation.

Latest census data (2011) for suburbs adjacent to the study site show modest growth (6%) in numbers of residents and private dwellings in

Warners Bay to its south-west and Charlestown to its east (<http://www.censusdata.abs.gov.au>). Of more concern are recent developments. Since 2009 large indoor recreational facilities, commercial warehouses and light industrial property were built up to 1km from the golf course. Access to these local facilities and cross-traffic on arterial roads surrounding the course and recreation reserve have dramatically increased traffic volume and background noise. As **Figure 1** shows, Hillsborough Road runs parallel to and only 120m from the course's northern border. Only 50-90m from its eastern side is the Inner City Bypass which links both roads with the Pacific Highway and Motorway (<http://www.rms.nsw.gov.au/projects/hunter/>).

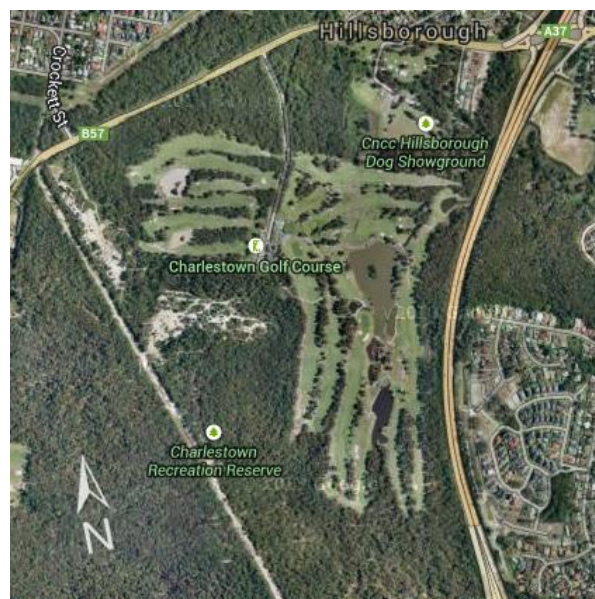


Figure 1. Charlestown Golf Course aerial view showing surrounding forest, main roads and adjacent suburbs (Source: ©Google Maps. Accessed 15 October 2014.)

The study site is Charlestown Golf Club (CGC), an 18-hole public golf course (54ha) surrounded by dry sclerophyll forest (126ha) in suburban Hillsborough. The clubhouse is located at 32°57'44"S, 151°40'21"E, 67m above sea-level, and approximately 3km north-east of the Lake at Warners Bay. The land is leased from Lake Macquarie City Council (LMCC) until 2040, and is essentially open grass-land (fairways and greens) with a range of open-water sites and small areas of remnant native vegetation. Other endemic trees and native shrubs planted since 1974 include Swamp Mahogany *Eucalyptus robusta*, Tallowwood *E. microcorys*, and Turpentine *Syncarpia glomulifera*. The study area also includes a 25m wide perimeter of scrub in the surrounding forest, where birds could be seen or heard.

Recent mapping surveys indicate this whole area consists of three types of native forest (Bell, Driscoll & LMCC 2014). Each forest is defined by its dominant tree species providing a canopy, and has a unique (or *diagnostic*) set of shrubs and groundcover species underneath, as well as species in common with the other forests. The two main forest types overlapping are MU11: Coastal Sheltered Apple-Peppermint Forest and MU30j: Sugarloaf Lowlands Bloodwood-Apple-Scribbly Gum Forest; the third is MU30e: Coastal Plains Stringybark-Apple Forest. Several websites list the characteristic species for each forest type (see <http://www.lakemac.com.au/>). Recent flora surveys have listed well over 140 native species in the surrounding area.

To analyse the distribution of native birds recorded at this site, four avian habitats were adapted from Cayley (1987): *Freshwater* (lakes, streams and swamps), *Open Forest* (including birds of the air), *Forest Scrub* (mid-level shrubs and groundcover under canopy trees), and *Blossoms and Outer Foliage* (seasonal blooms and related food sources at tree, shrub and ground level).

Open Forest Habitat

Fairways and greens (open grasslands) are regularly fertilised, irrigated and mown (<2cm). Traversing natural slopes and gullies, each fairway is approximately 40m wide and bordered by mature trees of the open forest(s) and/or planted species. Their canopy is approximately 20-30m high, suitable for birds which hawk, forage, nest or defend territory along the fairways or course perimeter (approximately 3.8km).

Forest Scrub Habitat

The site has two areas of dense, mid-level vegetation diagnostic of the respective forest(s). One *forest scrub* area occurs 450m along its north-western perimeter, within the Apple-Peppermint Forest (MU11). This 2-6m scrub is mostly Black She-Oak *Allocasuarina littoralis*, Golden Wattle *Acacia longifolia*, Cheese Tree *Glochidion ferdinandi*, Sweet Pittosporum *Pittosporum undulatum*, Prickly-leaf Paperbark *Melaleuca stypheloides*, Egg and Bacon Pea *Dillwynia retorta* and several banksia species (Hairpin Banksia *Banksia spinulosa* var *spinulosa*, Old Man Banksia *B. serrata* and Rusty Banksia *B. oblongifolia*). The other *forest scrub* is a 1ha thin wedge along a wet gully inside the south-east corner of the Apple-Bloodwood-Scribbly Gum Forest (MU30j). Shrubs in this 2-5m tall scrub include Black She-Oak, Golden Wattle, Green Wattle *Acacia decurrens*, Hairpin Banksia and Tree Fern *Cyathea cooperi*. Dense (<1.5m) groundcover contains Bracken Fern *Pteridium esculentum*, Tussock Grass *Poa affinis*, Crofton Weed *Ageratina adenophora*, and Tall Saw-sedge *Gahnia clarkei*. Both areas offer protection, nesting sites and a range of food sources for small passerine species.

Freshwater Habitat

Club management has greatly improved the flow and use of water through the course, increasing its open-water catchment to nearly 4ha. As seen in **Figure 1** the course has a range of reliable water resources, including two main lakes (2.4ha, 0.5ha), three large dams (0.2-0.6ha), natural overflow channels, ponds, reed marshes and wet gullies – as suitable freshwater bird habitats. These come from rainfall, stormwater run-off into Winding Creek catchment and the adjacent Inner City Bypass. Heavy downpours on the course's clay and sandstone substrate can result in temporary surface water on some fairways, making them attractive to wetland birds. Sprinkler systems water fairways from lakes and dams during long, dry spells. This practice not only extends grass-growth periods but also reduces toxins in addition to exposing new foraging areas as water levels drop.

Blossoms and Outer Foliage Habitat

Remnant native vegetation of the respective forests and their understorey provide a range of blossoms and fruit for most of the year. As a general guide in this area, Tallowwood flowers from August to October; Smooth-barked Apple and Scribbly Gum

start from November; Red Bloodwood from February; and stringybark species flower from March into August. Spotted Gum *Corymbia maculata* and planted species like Swamp Mahogany may flower into early winter. Remnant native shrubs like Hairpin Banksia bloom through winter, and Golden Wattle into August (Moore & Fairley 2010). Other native shrub species that bloom prolifically during the year (*Acacia*, *Banksia*, *Callistemon*, *Grevillea spp*) have been planted around the course.

METHOD

Surveys involved (GF) walking a pre-set trail of 4-5 km over the course, spending similar time in nine (6ha) zones. Each survey took 2 hours between 6am and 10am, in fine weather to maximise detection of birds. The number and species, their observed location and activity were noted on a digital tape-recorder, plus comments on unusual sightings and time of day. These data were later transcribed, then became Excel files for analyses. Surveys were completed, typically 10 days apart, between 1 January 2012 and 31 December 2014. All species and the total number of each species on a given survey visit were recorded. This enabled calculations of average number (mean) and reporting rate (RR) for each species, where RR is the percentage of surveys for which each bird was observed. For this report, data from 100 surveys between 4 June 2012 and 31 December 2014 were analysed, although photographic evidence from earlier years was included (e.g. breeding records). Species' reporting rates were calculated from all 100 surveys, and for each season. Seasonal means and reporting rates were calculated for three-month periods (e.g. summer = December to February).

RESULTS AND DISCUSSION

Table 1 summarises the survey statistics. A total of 82 species were observed in the 31-month period, with the largest diversity (37 species) recorded in spring and summer, and the lowest diversity (17

species) in winter (June 2012). The maximum numbers of species recorded in winter and autumn were less than those for spring and summer; it was a similar story for average (mean) number of species per survey. More than 34,000 *bird-observations* were recorded in this period. Mean numbers per survey show a steady increase from winter to spring before peaking in summer. The maximum number of birds was greatest in summer (519 on 17 January 2013). There were abnormal peak numbers of Rainbow Lorikeet *Trichoglossus haematodus* (55), Australian Wood Duck *Chenonetta jubata* (111), Masked Lapwing *Vanellus miles* (38) and Welcome Swallow *Hirundo neoxena* (100+) that morning, compared with 7 January and 30 January 2013. The lowest number of birds seen (208 in winter 2012) coincided with the lowest number of species recorded.

The **Appendix** shows the maximum and mean number of each species recorded, grouped by their Reporting Rates (RR%). Species seen on 80% or more surveys *at this site* are described as *Most Common*. Birds in the second group, *Common* species, were observed on 20-79% of surveys, and those reported on less than 20% are *Uncommon* species. These RR% groupings are similar to the status definitions for reporting species at the (Hunter) regional level (Stuart 2014: 8).

19 species (23%) appear in the *Most Common* group; they are typically birds of Freshwater and Open Forest habitats. Species by species comparisons show their Reporting Rates at least 2-6 times higher than 16-year averages across the Hunter Region. RR% for Hardhead *Aythya australis*, Eurasian Coot *Fulica atra* and Little Corella *Cacatua sanguinea* are 10-13 times greater than regional RR% data. Noisy Miner *Manorina melanocephala* and Rainbow Lorikeet also belong in this group, perhaps due to the range of blossom available year-round, and their flexible diet. Even for this group of species seen almost every survey,

Table 1. Summary of survey statistics

	All Surveys	Winter	Spring	Summer	Autumn
Number of surveys	100	29	31	21	19
Species recorded	82	33	37	37	32
Average/survey	28.5	26.7	30.7	29.3	26.7
Minimum	17	17	22	19	21
Maximum	37	33	37	37	32
Bird observations	34,126	9,193	10,467	8,246	6,220
Average/survey	341	317	338	393	328
Minimum	208	208	223	280	229
Maximum	519	468	445	519	425

variations in their numbers suggest that some individuals are nomadic while others are *sedentary* (remain on site). Survey data also show the numbers of Australian Wood Duck and Pacific Black Duck *Anas superciliosa* peak in mid- to late summer; this may be due to birds returning to more reliable water and food sources on site at that time of season. The *Most Common* water-birds listed (except Dusky Moorhen *Gallinula tenebrosa* and Hardhead) often forage on moist fairways and greens, but these species move to larger water sites if disturbed.

Common species as a group involved similar numbers of species (17 species, 21%) as the *Most Common* group; they also occurred in the same two habitats. Reviews of monthly field notes suggested that the range of several *Common* species characteristic of Open Forest extended beyond the golf course (Nankeen Kestrel *Falco cenchroides*, Black-faced Cuckoo-shrike *Coracina novaehollandiae*, Pied Currawong *Strepera graculina* and Yellow-tailed Black-Cockatoo *Calyptorhynchus funereus*). Many Freshwater birds in this group may also be nomadic, moving locally between the golf course and Lake Macquarie or other wetlands in the vicinity (see e.g. Common Locations given Grid References M10 or L10 on pp. 121-22 of Stuart 2014). This behaviour may be seasonal or nomadic (i.e. unpredictable) involving both species known to reside in the Region and others known to migrate to the Hunter in summer to breed (Dollarbird *Eurystomus orientalis*, and Channel-billed Cuckoo *Scythrops novaehollandiae*).

Uncommon species form the largest group observed at the course (46 species, 56%). It includes many small passerines seen foraging or moving through Blossoms/Outer Foliage or Forest Scrub habitats around the perimeter of the course. Reviews of consecutive survey data and field notes helped differentiate whether such movements were nomadic, migratory or reflected limited observation of timid species. Up to 15 *Uncommon* (and five *Common* species) marked by * in the **Appendix** were spring-summer visitors. This group includes Latham's Snipe *Gallinago hardwickii* and Black-fronted Dotterel *Elseyaornis melanops*, seen foraging on mudflats of large dams and lakes when water levels were down. Small flocks of Musk Lorikeet *Glossopsitta concinna* were seen in May 2014 actively feeding on Swamp Mahogany blossom along fairways. A number of species were seen intermittently in forest scrub on the north-west and south-east perimeters of the

course. These include Eastern Yellow Robin *Eopsaltria australis*, Silveryeye *Zosterops lateralis*, Striated Pardalote *Pardalotus striatus*, White-browed Scrub-wren *Sericornis frontalis* and Rufous Fantail *Rhipidura rufifrons*. More recent surveys suggest that very low reporting rates for some species may be due to low detectability of timid species (Australian King-Parrot *Alisterus scapularis*, Crimson Rosella *Platycercus elegans*, and Red-browed Finch *Neochmia temporalis*).

Plumed Whistling-Duck *Dendrocygna eytoni* was an unusual sighting, occurring as a summer *vagrant*. It is resident in only one or two sites in the Upper Hunter (Stuart 2014). However, over consecutive summers, typically after a north-westerly storm front has passed, small mobs (12-25) suddenly appeared, loafing (warily) for 1-3 days beside the eastern lake.

Table 2 integrates two sets of bird data – the species grouped by relative frequency of occurrence (RR%) and the four avian habitats in which they were seen most often in this study. From this overview it appears that each habitat type on the golf course is used by a range of species. Only two *Most Common* species (Noisy Miner, Rainbow Lorikeet) were predominately found in Blossoms/Outer Foliage, and the *Most Common* group was absent from Forest Scrub. Overall, almost identical numbers of species were seen in Freshwater (27) and Open Forest (28) habitats. Similar numbers of species were observed in Forest Scrub (12) and in Blossoms/Outer Foliage (15) habitats. The row for *Uncommon* species shows a number of species was observed in each of the four avian habitats.

Area surveys done 10 days apart are not ideal for determining which species were breeding, but field notes and digital photographs provide a useful basis for further observations in specific areas. Using the criteria defined in Stuart (2014, p. 1) those species showing unambiguous breeding activity or success are indicated in **Table 2** in bold type, and summarised in column and row margins. For this report Breeding Activity (BA) includes adult pairs on or emerging from a nest site, nestlings, dependent young being fed or accompanied by adult birds, and displaced fledglings. BA was recorded for 30/82 (37%) species, including all *Most Common* species except Hardhead. Pairs of Pacific Black Duck and Australian Wood Duck were recorded as 'tree-nesting' on the course, typically in hollow trunks of Scribbly Gum and Smooth-barked Apple. Some

Table 2. Species and breeding activity grouped by Reporting Rate (RR) and avian habitat type at Charlestown Golf Course 2012-2014

	Freshwater	Open Forest	Forest Scrub	Blossoms/Outer Foliage	Total
Most common RR >80%	Australian Wood Duck Pacific Black Duck Purple Swamphen Dusky Moorhen Eurasian Coot Masked Lapwing Hardhead	Eastern Rosella Laughing Kookaburra Crested Pigeon Australian Magpie Little Corella Sulphur-crested Cockatoo Australian Raven Galah Magpie-lark Pied Butcherbird		Noisy Miner Rainbow Lorikeet	19 (23%) BA=18
Common RR 20-79%	Australasian Grebe Little Black Cormorant Little Pied Cormorant White-faced Heron	Welcome Swallow Grey Butcherbird Pied Currawong Black-faced Cuckoo-shrike Nankeen Kestrel Dollarbird Sacred Kingfisher Yellow-tailed Black-Cockatoo Channel-billed Cuckoo Willie Wagtail	Eastern Whipbird	Yellow-faced Honeyeater Spotted Pardalote	17 (21%) BA=6
Uncommon RR <20%	Chestnut Teal Grey Teal Straw-necked Ibis Latham's Snipe Great Egret Royal Spoonbill Australian White Ibis Black Swan Australian Darter Buff-banded Rail Pied Cormorant Black-fronted Dotterel Plumed Whistling-Duck White-necked Heron Cattle Egret Little Egret	Spotted Dove White-breasted Woodswallow Crimson Rosella Australian King-Parrot Fork-tailed Swift Pacific Baza Swamp Harrier Peregrine Falcon	Superb Fairy-wren Golden Whistler Fan-tailed Cuckoo Eastern Koel Olive-backed Oriole Grey Fantail Variegated Fairy-wren White-browed Scrubwren Red-browed Finch Eastern Yellow Robin Rufous Fantail	Brown Thornbill Eastern Spinebill Scaly-breasted Lorikeet Red Wattlebird Silvereye Musk Lorikeet Noisy Friarbird Striated Pardalote Lewin's Honeyeater Yellow Thornbill Striated Thornbill	46 (56%) BA=6
Total	27 (33%) BA=8	28 (34%) BA=15	12 (15%) BA=3	15 (18%) BA=4	82 BA=30

Species in each category are listed in order of decreasing Reporting Rate (RR%). Breeding Activity (BA) recorded at CGC for a species is indicated in **bold type**.

ground nest sites were also recorded, but most ducklings just ‘appeared’ with adult birds on open grassland or freshwater. Observed at 10-day intervals their numbers seem depleted; potential predators include eels, snakes, lizards, foxes, stray dogs and other bird species.

Records since 2012 show eleven of the golf course’s *Common* and *Uncommon* species bred successfully over spring-summer including: Dollarbird, Sacred Kingfisher *Todiramphus sanctus*, Channel-billed Cuckoo, White-breasted Woodswallow *Artamus leucorhynchus*, Olive-backed Oriole *Oriolus sagittatus*, and Eastern Koel *Eudynamis orientalis*. *Uncommon* species that bred successfully on site include: Superb Fairy-wren *Malurus cyaneus*, Red-browed Finch, Spotted Pardalote *Pardalotus punctatus*, Scaly-breasted Lorikeet *Trichoglossus chlorolepidotus*, and Crimson Rosella. Multiple pairs of some *Common* and *Uncommon* species (Nankeen Kestrel, Dollarbird, Sacred Kingfisher and Olive-backed Oriole) were recorded breeding in the same area each summer.

Digital photographs (©Ken Wells, a ‘golfing photographer’) date-stamped between 2006 and 2011 indicated breeding by a number of species recorded in this study as *Uncommon* visitors. A pair of Black Swan *Cygnus atratus* raised four cygnets on the site in 2010. While surveys record several visits from this species since then, no breeding activity has occurred.

CONCLUSIONS

Morning surveys by a single observer are effective, but preclude seeing some insectivore, raptor and other species reported later in the day, or nocturnal species heard in the local area (Masked Owl *Tyto novaehollandiae*, Tawny Frogmouth *Podargus strigoides* and Powerful Owl *Ninox strenua*). Changes to survey methods, focus areas and time of day would increase the species list. The diversity of species and numbers of birds recorded each season and year seem impressive for a suburban public golf course, especially when reporting rates are compared with Hunter Region data. However, no published lists from similar or nearby sites were found. This study shows 44% of species are in the *Common* and *Most Common* categories on the course or in adjacent forest. Previously-installed nesting boxes, and natural tree hollows by ‘staggering’ dead limbs have attracted not only woodland species (especially parrots, galahs, cockatoos, corellas, lorikeets and rosellas)

but also tree-nesting duck species. The course’s open water sites and watered fairways are also popular with species from different habitat types.

Charlestown Golf Club proactively manages this public course in a manner which is sympathetic to its wildlife and welcomes collaborative support. The surrounding dry sclerophyll forest and its diverse sub-canopy scrub is also an important community asset. One striking outcome of this study is that “green areas” like this maintain a refuge of high species diversity within the cities, thus decreasing the risk of local extinctions. Breeding activity has been recorded for many species on the course or along its perimeter. These results support Lake Macquarie Native Vegetation Corridors Map (2011) showing tracts of remnant native forest are well-used by species moving along, or breeding in, these vegetative corridors. As such, this dry sclerophyll forest with its rich annual floral harvest and protective vegetation should not be compromised by further residential or commercial development. The adverse effects of such rapid exploitation on local and migrant woodland bird populations have been documented (Rayner *et al.* 2015).

The golf course’s role as a breeding site for native species, particularly smaller *Passerines* is still unfolding. More obvious is its attraction to sizeable flocks of *Psittaciformes* and *Anatidae* species. Its lakes and adjacent fairways are well-populated by both *Most Common* and *Common* species seen at this site, particularly in spring-summer. However, due to weed control and golfing requirements the Club cannot provide protected breeding sites for ground-nesting birds. This may explain why some ducks (e.g. Hardhead, Chestnut Teal *Anas castanea*) are not observed breeding on its freshwater sites.

Reporting rates on the 82 observed species were also compared with accumulated survey data (Birddata Atlas Hunter 2012-14) from the 10-minute cell (area M10), in which the golf course is located. Analyses showed only eight species had RR>19% (reflecting regular occurrence) at both the golf course and in this data cell, but the reporting rates for six of them were 2-4 times higher at this golf course than those across all other sites in M10. Such results demonstrate the importance of Charlestown Golf Club and environs in supporting the avian diversity of the area. Data from other golf courses or similar public reserves in M10 may help us better understand how to support bird populations at such sites.

One further outcome of this project is the ongoing interaction with various community members and resources, acknowledged below. Golfers and golf club staff show growing awareness of local birdlife; they often share bird sightings and ask questions. Items of interest are now posted monthly on the Club's website under Newsletter/Birdlife (<http://www.charlestowngolfclub.com/>). Recently (January 2015) ground staff rescued three young Dollarbirds, fallen from separate nests on different days. Contact was made with local bird-rescue volunteers who collected them. Hunter Bird Observers Club members and local veterinarians have also provided relevant information for staff on bird welfare and handling.

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APPENDIX

Species observed during 100 surveys at Charlestown Golf Club from 2012 to 2014, presented by Common and Scientific Names, with Maximum and Mean numbers, and grouped by Reporting Rate (RR %).

Most Common species (RR >80%)

Common Name	Scientific Name	Maximum	Mean	RR (%)
Australian Wood Duck	<i>Chenonetta jubata</i>	159	69.9	100.0
Pacific Black Duck	<i>Anas superciliosa</i>	52	13.4	100.0
Purple Swamphen	<i>Porphyrio porphyrio</i>	27	12.6	100.0
Dusky Moorhen	<i>Gallinula tenebrosa</i>	53	18.5	100.0
Eurasian Coot	<i>Fulica atra</i>	44	22.4	100.0
Masked Lapwing	<i>Vanellus miles</i>	58	26.5	100.0
Eastern Rosella	<i>Platycercus eximius</i>	46	21.4	100.0
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	25	9.1	100.0
Crested Pigeon	<i>Ocyphaps lophotes</i>	23	9.8	99.0
Noisy Miner	<i>Manorina melanocephala</i>	43	17.1	99.0
Australian Magpie	<i>Cracticus tibicen</i>	36	15.0	99.0
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	85	19.7	97.0
Little Corella	<i>Cacatua sanguinea</i>	158	37.9	90.0
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	40	7.3	89.0
Australian Raven	<i>Corvus coronoides</i>	18	5.0	89.0
Galah	<i>Eolophus roseicapillus</i>	18	5.4	87.0
Magpie-lark	<i>Grallina cyanoleuca</i>	10	2.9	86.0
Hardhead	<i>Aythya australis</i>	14	3.7	83.0
Pied Butcherbird	<i>Cracticus nigrogularis</i>	15	4.0	83.0

Common species (RR 20%-79%)

Common Name	Scientific Name	Maximum	Mean	RR(%)
Welcome Swallow*	<i>Hirundo neoxena</i>	100	8.2	76.0
Grey Butcherbird	<i>Cracticus torquatus</i>	8	2.8	72.0
Pied Currawong	<i>Strepera graculina</i>	5	1.8	67.0
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	6	2.3	59.0
Nankeen Kestrel	<i>Falco cenchroides</i>	6	2.0	55.0
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	5	2.0	54.0
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	4	2.1	54.0
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	7	1.4	48.0
Eastern Whipbird	<i>Psophodes olivaceus</i>	3	1.3	32.0
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	15	2.7	28.0
White-faced Heron	<i>Egretta novaehollandiae</i>	9	1.6	27.0
Dollarbird*	<i>Eurystomus orientalis</i>	8	3.4	27.0
Sacred Kingfisher*	<i>Todiramphus sanctus</i>	6	2.0	24.0
Spotted Pardalote	<i>Pardalotus punctatus</i>	9	2.4	24.0
Yellow-tailed Black-Cockatoo*	<i>Calyptorhynchus funereus</i>	50	8.7	23.0
Channel-billed Cuckoo*	<i>Scythrops novaehollandiae</i>	4	2.0	22.0
Willie Wagtail	<i>Rhipidura leucophrys</i>	2	1.2	20.0

Reporting Rate (RR%) is the percentage of surveys that each species was seen. Maximum and mean indicate each species' abundance. Mean number is based only on surveys when the species was seen/recorded. Asterisk * indicates that species was a summer migrant or bird of passage on the course.

Uncommon species (RR <20%)

Common Name	Scientific Name	Maximum	Mean	RR(%)
Chestnut Teal	<i>Anas castanea</i>	2	1.7	19.0
Spotted Dove	<i>Streptopelia chinensis</i>	2	1.5	19.0
Superb Fairy-wren	<i>Malurus cyaneus</i>	5	2.5	19.0
Brown Thornbill	<i>Acanthiza pusilla</i>	6	3.0	19.0
Grey Teal	<i>Anas gracilis</i>	4	1.7	15.0
Golden Whistler*	<i>Pachycephala pectoralis</i>	4	1.5	15.0
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	4	1.5	13.0
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	6	2.4	12.0
Eastern Koel*	<i>Eudynamis orientalis</i>	4	1.4	12.0
Olive-backed Oriole*	<i>Oriolus sagittatus</i>	5	2.2	12.0
Latham's Snipe*	<i>Gallinago hardwickii</i>	2	1.2	11.0
White-breasted Woodswallow*	<i>Artamus leucorhynchus</i>	6	4.0	11.0
Great Egret	<i>Ardea alba</i>	5	1.7	10.0
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	3	1.4	10.0
Crimson Rosella	<i>Platycercus elegans</i>	1	1.0	9.0
Grey Fantail	<i>Rhipidura albiscapa</i>	1	1.0	9.0
Royal Spoonbill*	<i>Platalea regia</i>	2	1.1	8.0
Australian King-Parrot	<i>Alisterus scapularis</i>	6	2.5	8.0
Variegated Fairy-wren	<i>Malarus lamberti</i>	6	4.3	8.0
White-browed Scrubwren*	<i>Sericornis frontalis</i>	2	1.7	7.0
Red-browed Finch	<i>Neochmia temporalis</i>	6	2.4	7.0
Australian White Ibis	<i>Threskiornis molucca</i>	9	2.8	6.0
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	5	2.2	6.0
Red Wattlebird	<i>Anthochaera carunculata</i>	5	3.7	6.0
Silvereye*	<i>Zosterops lateralis</i>	6	2.7	6.0
Black Swan	<i>Cygnus atratus</i>	3	1.8	5.0
Australian Darter*	<i>Anhinga novaehollandiae</i>	1	1.0	4.0
Pied Cormorant	<i>Phalacrocorax varius</i>	2	1.3	4.0
Black-fronted Dotterel*	<i>Elseyaornis melanops</i>	3	1.8	4.0
Musk Lorikeet	<i>Glossopsitta concinna</i>	16	9.0	4.0
Noisy Friarbird	<i>Philemon corniculatus</i>	2	1.3	4.0
Eastern Yellow Robin	<i>Eopsaltria australis</i>	2	1.3	4.0
Plumed Whistling-Duck*	<i>Dendrocygna eytoni</i>	25	12.7	3.0
Fork-tailed Swift*	<i>Apus pacificus</i>	2	1.7	3.0
Pacific Baza	<i>Aviceda subcristata</i>	2	2.0	3.0
Swamp Harrier*	<i>Circus approximans</i>	1	1.0	3.0
Peregrine Falcon	<i>Falco peregrinus</i>	1	1.0	3.0
Buff-banded Rail	<i>Gallirallus philippensis</i>	1	1.0	3.0
Striated Pardalote*	<i>Pardalotus striatus</i>	6	3.3	3.0
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	2	1.3	3.0
Yellow Thornbill	<i>Acanthiza nana</i>	2	2.0	2.0
White-necked Heron*	<i>Ardea pacifica</i>	1	1.0	1.0
Cattle Egret	<i>Ardea ibis</i>	1	1.0	1.0
Little Egret	<i>Egretta garzetta</i>	1	1.0	1.0
Rufous Fantail*	<i>Rhipidura rufifrons</i>	1	1.0	1.0
Striated Thornbill*	<i>Acanthiza lineata</i>	3	3.0	1.0

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