



Hunter Bird Observers Club

Affiliated with BirdLife Australia

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Bird Monitoring on Broughton Island Status Report April 2014

Summary

Good progress continues to be made on the assembly of baseline data from which future changes in bird populations and distributions can be identified. To date, 53 species have been recorded in systematic surveys, with an additional four species reported from outside of the spring and autumn survey periods.

Five species, Brown Quail, Golden-headed Cisticola, Tawny Grassbird, Welcome Swallow and Silvereeye, have been recorded at every land-dominated site and with very high recording rates at most of those sites. They are the dominant and ubiquitous land birds of Broughton Island along with some raptor and shoreline/coastal species. Apart from a small number of other species which have been recorded regularly, most of the land birds have been vagrants, present for a short time only. The exception is Yellow-faced Honeyeater, recorded for the first time on Broughton Island in August 2012; some have been present on every subsequent visit. This seems to be the first instance of colonisation (or re-colonisation) post-eradication of Broughton Island's vermin.

An interim bird list for Broughton Island has been constructed for this report. A status (e.g. resident, visitor, vagrant) has been assigned for each species, the population on the island has been estimated and the breeding status noted (where known). This interim list will be refined on an ongoing basis as additional surveys are completed. It is recommended that the survey effort continue for another 12 months (one more set each of the spring and autumn surveys), after which it will be timely to decide about future directions.

Introduction

Surveys of non seabirds on Broughton Island by Hunter Bird Observers Club (HBOC) commenced in spring 2012. The project is a collaborative effort that involves assistance in various ways from NSW NPWS and the Broughton Island Conservation Society. The surveys complement those for nesting seabirds in 2009 (Carlile *et al.* 2012). Feral animals were removed from Broughton Island in 2009 and the island is now vermin-free (Carlile *et al.* 2012). As a result, the vegetation on the island is changing (T. Clarke pers. comm.). The habitat changes and absence of predators/prey (rats, rabbits) may lead to changes in the populations and/or distributions of many bird species.

The intention of the surveys is firstly to establish a set of baseline data about numbers and distribution for each resident, regular visitor or vagrant species on Broughton Island and then monitor for changes. However, it must be noted that vegetation recovery was already well underway when the surveys commenced. Some species may already have been at equilibrium population levels having bred up rapidly, with no further changes occurring.

Methods

The main survey effort is based around structured visits by a dedicated small team of experienced birdwatchers during spring and autumn each year. Factors in selecting the survey methodology were:

- Appropriate for meeting the project objectives;
- Able to be carried out consistently by different observers;
- Compatible with BirdLife Australia's Atlas project, which HBOC uses as its primary means of data storage.

Eleven survey areas have been established on Broughton Island (see Figure 1 for the locations of these sub-areas). The survey areas are:

- Six 2ha land-based sites, BT1-BT6, that are representative of the main vegetation types on the Island. These sites are surveyed for 20 minutes by 1-2 observers. The results are compatible with BirdLife Australia's preferred 2ha/20 min survey method.
- Three predominantly land-based sites, BT7-BT9, each representing approximately 1/3 of the total landmass. These are approximately equivalent in area to 500m radius sites which are another BirdLife Australia option for Atlas surveys. The sites are surveyed for periods typically of 2-3 hours (occasionally longer but always within a single day) by 1-3 observers. The results are compatible with BirdLife Australia's 500m radius survey method. The 2ha sites are embedded within these three sites. Records occurring in the 2ha site within 20 minute period are only included in the 2ha results. All records occurring outside that period, including from within the 2ha site, are used for the "500m area" survey results.
- Two shoreline/bay sites, BT10 and BT11. The former comprises Providence Beach extending from the shore side of the dunes to ~200m out to sea. The latter comprises Esmeralda Cove including the shoreline and the area around the huts. The sites are approximately equivalent to 500m radius sites and are treated as such. BT10 is surveyed by 1-2 observers over a 1-2 hour period. The BT11 surveys involve recording all species during each day or part-day that observers are present.

Numbers for all species are recorded during each survey. The records from the surveys are entered into the BirdLife Australia Atlas database, and also into a purpose-designed Excel file which has dedicated spreadsheets for each of the 11 sites linked to a summary table.

Casual visitors to the island are invited to contribute to the survey effort but unfortunately to date only a few highlight sightings have been reported to us. Data received as the result of casual visits have been used to produce the total birdlist for Broughton Island but not in any of the statistical analyses.

Results and Discussion

To date, 182 sub-area surveys have been conducted, with a total of 53 species recorded. An additional four species have been reported from casual visits outside of the spring and autumn survey periods. The complete current birdlist for Broughton Island is given in **Table 1** which includes an interim description of each species' status (e.g. resident, visitor, vagrant) and the breeding status (if known). Also the population of each species on the island has been estimated – it should be noted that these estimates are based on subjective opinions of the

main surveyors. For at least some species, the status description and population estimate may change as more survey effort is completed.

45 species have been recorded in the spring visits (from 112 surveys) and 41 species in autumn (70 surveys). **Table 2** summarises the recording rates from the systematic surveys for each survey area and for the overall island, while **Tables 3** and **4** provide the spring and autumn data separately.

Land birds

Five species, Brown Quail, Golden-headed Cisticola, Tawny Grassbird, Welcome Swallow and Silvereye, have been recorded at every land-dominated site and with very high recording rates at most of those sites. They are the dominant and ubiquitous land birds of Broughton Island. The recording rates for Golden-headed Cisticola and Tawny Grassbird are slightly greater in the spring surveys, which probably reflect their territorial behaviour in the breeding season, leading to increased visibility. The recording rate for Welcome Swallow is greater in autumn; possibly some of the autumn birds are on migration passage.

Australasian Pipit and Lewin's Rail have also been found at most of the land-based sites, although in small numbers overall. These are the first known records of Lewin's Rail on Broughton Island; however, it is a very cryptic species, easily overlooked by those unfamiliar with its call. It appears to be resident and perhaps has been so for a long time. The recording rate for Lewin's Rail has been higher in spring when birds presumably are more likely to be calling.

3-4 Australian Ravens have been regularly seen in the eastern parts of the island but it is believed that they return to the mainland each night. Almost all the other land birds which have been recorded have been vagrants i.e. present for a relatively short time; however, this is how the list of resident species potentially will grow. The exception is Yellow-faced Honeyeater, which was recorded for the first time in August 2012 (T. Clarke pers. comm.); some birds have been present on every subsequent visit. They are mostly found at or near a large *Grevillia* sp. in area BT3 which has had regular blossom. This seems to be the first instance of colonisation (or re-colonisation) post-eradication of Broughton Island's vermin.

Because Golden-headed Cisticolas and Tawny Grassbirds are relatively abundant, it is unlikely that changes to their population would be detected using the present survey method, unless the changes were very large. An option which involved developing then monitoring an inventory of their territories was investigated. However, this was found not to be suitable for a multi-observer project.

Shorebirds

The most common shorebird is the Sooty Oystercatcher, with several scattered pairs or small parties always present around the shoreline and occasionally larger groups being recorded particularly in spring. The peak count is 17+ birds (including some immatures) in September 2012 – a high count from a regional perspective (Stuart 2013). Red-capped Plovers are also common although they have not been seen away from Providence Beach. Mostly 4-6 of them have been present; however, in March 2014 the peak count was 13 birds. Most other shorebirds appear to have been vagrants, except for Ruddy Turnstones (a migratory shorebird) which have frequently been found foraging along Providence Beach.

Figure 1. Broughton Island showing the survey areas BT1-BT11



Coastal and offshore birds

Pied Cormorants and Great Cormorants have often been seen hunting offshore or roosting on rock platforms, Little Black Cormorants less frequently. Silver Gulls and Crested Terns are also widespread, with the gulls generally favouring the Esmeralda Cove area. Eastern Reef Egrets have frequently been seen foraging on rock platforms; the peak count for them is six birds together on Providence Beach in January 2014 but all other records are of 1-2 birds (sometimes from more than one survey area at the same time).

Raptors

The main birds of prey (raptors) are White-bellied Sea-Eagle, Swamp Harrier, Whistling Kite and Osprey, all with recording rates above 10% and seen all over the island. A further 7 raptor species have been recorded, most of them infrequently. However, Peregrine Falcons (usually 1-2 birds, sometimes more) are common in the area around Pinkatop Head (in the BT9 survey area) and 1-2 Black-shouldered Kites in the western parts of the island. A single Spotted Harrier has been present in the autumn 2013 and autumn 2014 visits – this is a species which is considered to be rare in coastal areas (Stuart 2013).

Seabirds

Seabirds are not the focus of the current surveys, which are conducted outside of the main breeding season for the seabirds of Broughton Island (Carlile *et al.* 2012). However, records of seabirds are noted by the survey teams. Wedge-tailed Shearwaters have been at burrows in large numbers in the spring surveys with some activity persisting into the autumn surveys. The Little Penguin landing site at the western end of Providence Beach has been surveyed twice, with six birds confirmed coming ashore in September 2013 and at least two birds in March 2014. In March 2014, a Gould's Petrel flew low over the island – this is considered probably to have been a newly fledged bird.

Breeding Records

Very few breeding records have been obtained so far. In part this is an outcome of the survey methodology – observers generally do not have much time to look closely at bird behaviour while they are surveying. Also, the spring surveys have been done in mid to late September which may be too early in the breeding season for many species.

A pair of Australian Pied Oystercatchers had a nest with one egg along Providence Beach in September 2012. The outcome of this nesting attempt is unknown. Only one bird was found in November 2102 (possibly the other bird was with a chick); Pied Oystercatchers have not ever been recorded subsequently.

Sooty Oystercatchers possibly breed on secluded rocky parts of Broughton Island but this is not proven. A pair in mid January 2014 was aggressively defending a territory on the north-western side of the island and perhaps had young with them. It is noted that there is a breeding record for Sooty Oystercatcher from one of the nearby islands, Gandja-baa (Carlile *et al.* 2013).

There have been regular breeding records for Welcome Swallow (up to 3 pairs nesting at the huts in spring) and Silver Gull (several records of newly fledged birds begging and being fed, on the beach in front of the huts).

Two large nests in casuarinas near Pinkatop Head are thought to have been built by Whistling Kites but no birds (of any species) have been seen at the nests.

Conclusions

Overall, we consider that good progress has been made on the assembly of baseline data from which future changes in land bird populations and distributions can be identified. The survey effort should continue for another 12 months (one more set each of the spring and autumn surveys), after which it will be timely to take stock as to whether there are enough data to analyse with confidence about the conclusions that are reached, and to decide about future directions.

Very few of the species which are considered to be resident have been confirmed to breed on Broughton Island. At least in part this reflects that the spring surveys have been done early in the breeding season. It is recommended that some future spring visits be a few weeks later, in mid October, when breeding activity might be more readily detected.

As an aside, it is noted that the geology of Broughton Island as described in Carlile *et al.* (2012) is based on extrapolation from a study of coastal dune systems (Thom *et al.* 1992). The extrapolation is considered to be invalid (N. Fraser pers. comm.) and it contradicts other reports about Broughton Island geology e.g. Matson (1975). A focussed study of the island's geology should be considered (N. Fraser pers. comm.).

References

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Acknowledgements

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Alan Stuart

Date tba

Table 1 Broughton Island interim birdlist

Species	Status Description	Estimated Population	Breeding Status
Brown Quail	Common resident	100-200	Breeding not confirmed
Bar-shouldered Dove	Probably resident	5-10	Breeding not confirmed
Wedge-tailed Shearwater	Abundant summer migrant	100,000	Abundant breeding
Gould's Petrel	Rare summer migrant	<10	Probably breeding
Little Penguin	Uncommon summer migrant	<10	Breeding
Australasian Gannet	Uncommon visitor to offshore waters	1-5	Breeds elsewhere
Little Pied Cormorant	Uncommon visitor	1-2	Breeds elsewhere
Great Cormorant	Common visitor	20-30	Breeds elsewhere
Little Black Cormorant	Uncommon visitor	5-10	Breeds elsewhere
Pied Cormorant	Common visitor	20-50	Breeds elsewhere
Australian Pelican	Uncommon visitor	1-2	Breeds elsewhere
Intermediate Egret	Vagrant	1	Breeds elsewhere
White-faced Heron	Vagrant	1	Breeds elsewhere
Eastern Reef Egret	Resident	4-8	Breeding not confirmed
Eastern Osprey	Regular visitor, possibly resident	4-6	Breeding not confirmed
Black-shouldered Kite	Regular visitor	1-2	Breeds elsewhere
White-bellied Sea-Eagle	Regular visitor	4-6	Breeds elsewhere
Whistling Kite	Regular visitor, possibly resident	2-4	Breeding not confirmed
Brahminy Kite	Vagrant	1	Breeds elsewhere
Spotted Harrier	Uncommon autumn visitor?	1	Breeds elsewhere
Swamp Harrier	Common visitor, possibly resident	2-4	Breeding not confirmed
Brown Goshawk	Uncommon visitor	1-2	Breeds elsewhere
Nankeen Kestrel	Rare visitor	1	Breeds elsewhere
Brown Falcon	Rare visitor	1	Breeds elsewhere
Australian Hobby	Vagrant	1	Breeds elsewhere
Peregrine Falcon	Regular visitor, possibly resident	2-4	Breeding not confirmed
Lewin's Rail	Common although cryptic resident	10-20	Breeding not confirmed
Buff-banded Rail	Rare, possibly resident	1-2	Breeding not confirmed
Aust. Pied Oystercatcher	Rare visitor	0-2	Breeding not confirmed
Sooty Oystercatcher	Common, probably resident	10-20	Breeding not confirmed
Red-capped Plover	Common, possibly resident	5-15	Breeding not confirmed
Double-banded Plover	Vagrant or rare autumn/winter visitor	<6	Breeds elsewhere
Bar-tailed Godwit	Vagrant	1	Breeds elsewhere
Eastern Curlew	Vagrant	1	Breeds elsewhere
Ruddy Turnstone	Regular summer visitor	4-6	Breeds elsewhere
Sanderling	Vagrant	1-2	Breeds elsewhere
Red-necked Stint	Vagrant	1-2	Breeds elsewhere
Crested Tern	Common resident	10-20	Breeding not confirmed
Pacific Gull	Vagrant	1	Breeds elsewhere
Silver Gull	Common resident	20-50	Breeding
Pheasant Coucal	Uncommon resident	2-4	Breeding not confirmed
Eastern Koel	Vagrant	1	Breeds elsewhere
Shining Bronze-cuckoo	Vagrant	1	Breeds elsewhere
Sacred Kingfisher	Vagrant	1	Breeds elsewhere
Rainbow Bee-eater	Vagrant	1	Breeds elsewhere
White-throated Gerygone	Vagrant	1	Breeds elsewhere
Yellow-faced Honeyeater	Uncommon, possibly resident	2-10	Breeding not confirmed
Spangled Drongo	Vagrant	1	Breeds elsewhere
Grey Fantail	Vagrant	1	Breeds elsewhere
Willie Wagtail	A vagrant bird seems resident	1	Breeding not confirmed
Australian Raven	Regular visitor	2-4	Breeding not confirmed
Forest Raven	Vagrant	3	Breeds elsewhere
Golden-headed Cisticola	Common resident	200-400	Breeding not confirmed
Tawny-Grassbird	Common resident	150-250	Breeding not confirmed
Silvereye	Common resident	50-100	Breeding not confirmed
Welcome Swallow	Common resident	20-30	Breeding
Australasian Pipit	Uncommon resident	6-10	Breeding not confirmed

BROUGHTON ISLAND SURVEYS 2012-2013: SUMMARY

	# of sites	Max No at a site	Reporting Rates											
			Overall	BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10	BT11
Brown Quail	10	11	49.5%	36.8%	52.6%	42.1%	75.0%	25.0%	27.3%	87.5%	88.9%	75.0%	30.8%	
Bar-shouldered Dove	6	4	15.4%		31.6%	42.1%	10.0%				33.3%	41.7%	7.7%	
Shearwater spp	9	50	9.9%	5.3%	10.5%	5.3%	10.0%			31.3%	16.7%	16.7%	5.3%	7.7%
Australasian Gannet	2	12	3.8%							18.8%		21.1%		
Australian Pelican	2	2	2.7%								8.3%		30.8%	
Great Cormorant	6	41	21.4%		5.3%					81.3%	22.2%	33.3%	47.4%	61.5%
Pied Cormorant	5	20	15.9%							56.3%	22.2%	16.7%	31.6%	61.5%
Little Black Cormorant	4	31	4.9%							25.0%	5.6%		5.3%	23.1%
White-faced Heron	4	2	2.7%							6.3%	5.6%	8.3%		10.5%
Eastern Reef Egret	5	3	13.2%							62.5%	16.7%	25.0%	26.3%	23.1%
Eastern Osprey	6	4	13.2%		10.5%					56.3%	5.6%	16.7%	21.1%	46.2%
Black-shouldered Kite	9	3	17.6%	10.5%	15.8%		10.0%	12.5%	9.1%	62.5%	16.7%	33.3%		38.5%
White-bellied Sea-Eagle	10	5	27.5%	15.8%	10.5%	5.3%	10.0%	18.8%		37.5%	55.6%	50.0%	36.8%	76.9%
Whistling Kite	11	4	29.1%	26.3%	15.8%	10.5%	10.0%	18.8%	9.1%	62.5%	55.6%	50.0%	26.3%	46.2%
Swamp Harrier	10	3	19.8%		5.3%	15.8%	5.0%	6.3%	9.1%	37.5%	44.4%	75.0%	15.8%	23.1%
Brown Falcon	2	2	1.1%					6.3%		6.3%				
Nankeen Kestrel	3	1	1.6%				5.0%		9.1%			8.3%		
Australian Pied Oystercatcher	1	2	2.2%										21.1%	
Sooty Oystercatcher	5	17	34.1%							87.5%	55.6%	75.0%	94.7%	84.6%
Red-capped Plover	1	13	6.6%										63.2%	
Ruddy Turnstone	2	7	7.7%							6.3%			68.4%	
Crested Tern	5	200	9.9%							37.5%	11.1%	16.7%	15.8%	38.5%
Silver Gull	7	350	23.1%		26.3%		5.0%			43.8%	33.3%	16.7%	52.6%	84.6%
Yellow-faced Honeyeater	6	9	19.2%		15.8%	89.5%	30.0%	6.3%			27.8%	25.0%		
Willie Wagtail	5	1	6.0%		5.3%	5.3%					5.6%		15.8%	38.5%
Australian Raven	9	4	32.4%	5.3%	26.3%	31.6%	60.0%			50.0%	61.1%	25.0%	31.6%	53.8%
Golden-headed Cisticola	10	31	73.6%	84.2%	73.7%	84.2%	90.0%	93.8%	90.9%	100.0%	94.4%	91.7%		7.7%
Tawny-Grassbird	9	14	67.0%	78.9%	73.7%	89.5%	75.0%	81.3%	63.6%	100.0%	72.2%	100.0%		
Silvereye	10	27	53.8%	36.8%	52.6%	94.7%	60.0%	56.3%	9.1%	81.3%	83.3%	83.3%		23.1%
Welcome Swallow	11	19	68.7%	26.3%	94.7%	73.7%	65.0%	75.0%	36.4%	87.5%	61.1%	91.7%	57.9%	92.3%
Australian Pipit	7	3	20.9%	5.3%	26.3%					31.3%	16.7%	33.3%	73.7%	46.2%
Little Pied Cormorant	2	3	1.6%							6.3%	11.1%			
Peregrine Falcon	5	4	7.1%											
Lewin's Rail	7	3	12.6%	10.5%	10.5%			6.3%		18.8%	5.6%	41.7%		69.2%
Brahminy Kite	2	1	1.6%								5.6%			15.4%
White-throated Gerygone	1	1	0.5%							6.3%				
Pheasant Coucal	5	2	6.6%		5.3%	21.1%	5.0%				22.2%	16.7%		
Shining Bronze-cuckoo	2	1	1.1%		5.3%									7.7%
Red-necked Stint	1	1	0.5%											7.7%
Brown Goshawk	5	2	3.3%		5.3%		5.0%				11.1%	8.3%		7.7%
Spotted Harrier	2	1	2.7%									25.0%		15.4%
Grey Fantail	2	1	1.1%			5.3%					5.6%			
Sacred Kingfisher	2	1	1.1%		5.3%						5.6%			
Forest Raven	1	3	0.5%									8.3%		
Eastern Koel	1	1	0.5%								5.6%			
Rainbow Bee-eater	1	1	0.5%								5.6%			
Little Penguin	1	6	1.1%										10.5%	
Buff-banded Rail	1	1	0.5%								5.6%			
Double-banded Plover	1	6	2.7%										26.3%	
Intermediate Egret	1	1	0.5%											7.7%
Australian Hobby	2	1	1.1%									8.3%		7.7%
Spangled Drongo	2	1	2.2%			15.8%								7.7%
Gould's Petrel	1	1	0.5%							6.3%				

No of surveys done

BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10	BT11	Total
19	19	19	20	16	11	16	18	12	19	13	182

No of Species recorded

BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10	BT11	Total
12	23	16	17	12	10	28	35	31	24	32	53

No of Species recorded overall: 53

Site coordinates

	Start			Mid			End		
BT1	32	37	16.4	32	37	16.9	32	37	17.3
	152	18	53.4	152	18	50.9	152	18	48.3
BT2	32	37	5.0	32	37	4.5	32	37	3.9
	152	18	51.8	152	18	48.6	152	18	45.4
BT3	32	37	1.0	32	36	58.7	32	36	56.4
	152	18	55.8	152	18	55.9	152	18	56.0
BT4	32	36	52.9	32	36	51.0	32	36	49.0
	152	18	55.3	152	18	54.8	152	18	54.3
BT5	32	36	42.9	32	36	45.2	32	36	47.4
	152	18	28.2	152	18	24.9	152	18	21.6
BT6	32	37	13.1	32	37	11.8	32	37	10.5
	152	19	14.2	152	19	16.0	152	19	17.8
BT7				32	37	18			
				152	18	53			
BT8				32	36	56			
				152	18	44			
BT9				32	37	3			
				152	19	16			
BT10				32	36	46			
				152	18	51			
BT11				32	37	8			
				152	18	59			

BROUGHTON ISLAND AUTUMN SURVEYS 2013-2014: SUMMARY

	# of sites	Max No at a site	Reporting Rates										
			Overall	BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10
Brown Quail	10	11	47.1%	28.6%	42.9%	28.6%	42.9%	42.9%	25.0%	100.0%	85.7%	100.0%	40.0%
Bar-shouldered Dove	5	4	12.9%		42.9%	42.9%	14.3%				14.3%	25.0%	
Shearwater spp	4	50	7.1%							28.6%	14.3%	25.0%	12.5%
Australasian Gannet	2	1	2.9%							14.3%		12.5%	
Australian Pelican	1	1	2.9%										40.0%
Great Cormorant	5	14	20.0%							85.7%	28.6%	50.0%	25.0%
Pied Cormorant	2	3	5.7%							28.6%		25.0%	
Little Black Cormorant	1	1	1.4%							14.3%			
White-faced Heron	4	2	7.1%							14.3%	14.3%	25.0%	25.0%
Eastern Reef Egret	4	2	14.3%							57.1%		25.0%	37.5%
Eastern Osprey	2	4	8.6%							57.1%			40.0%
Black-shouldered Kite	9	2	22.9%	14.3%	14.3%		28.6%	14.3%	25.0%	85.7%	28.6%	25.0%	20.0%
White-bellied Sea-Eagle	8	3	28.6%	14.3%	14.3%		28.6%	28.6%	42.9%	57.1%	50.0%	25.0%	100.0%
Whistling Kite	11	3	31.4%	14.3%	28.6%	28.6%	14.3%	14.3%	25.0%	42.9%	71.4%	50.0%	12.5%
Swamp Harrier	6	2	15.7%			14.3%		14.3%	25.0%	14.3%	57.1%	75.0%	
Brown Falcon	1	1	1.4%					14.3%					
Nankeen Kestrel	0	0	0.0%										
Australian Pied Oystercatcher	0	0	0.0%										
Sooty Oystercatcher	5	9	34.3%							100.0%	14.3%	75.0%	100.0%
Red-capped Plover	1	13	8.6%									75.0%	
Ruddy Turnstone	1	7	10.0%									87.5%	
Crested Tern	4	200	15.7%							57.1%		25.0%	80.0%
Silver Gull	6	35	20.0%		14.3%					14.3%	28.6%	25.0%	50.0%
Yellow-faced Honeyeater	4	3	17.1%		28.6%	85.7%	14.3%				42.9%		
Willie Wagtail	5	1	15.7%		14.3%	14.3%					14.3%		37.5%
Australian Raven	8	4	34.3%		28.6%	42.9%	71.4%			42.9%	57.1%	25.0%	25.0%
Golden-headed Cisticola	10	20	68.6%	85.7%	57.1%	57.1%	85.7%	85.7%	100.0%	100.0%	85.7%	100.0%	20.0%
Tawny-Grassbird	9	7	60.0%	57.1%	57.1%	71.4%	71.4%	85.7%	100.0%	100.0%	42.9%	100.0%	
Silvereye	10	27	52.9%	42.9%	28.6%	100.0%	57.1%	42.9%	25.0%	85.7%	85.7%	75.0%	40.0%
Welcome Swallow	11	19	78.6%	42.9%	85.7%	71.4%	85.7%	71.4%	75.0%	85.7%	85.7%	100.0%	75.0%
Australian Pipit	6	3	25.7%		14.3%					28.6%	28.6%	50.0%	75.0%
Little Pied Cormorant	1	1	1.4%								14.3%		100.0%
Peregrine Falcon	2	2	5.7%									75.0%	20.0%
Lewin's Rail	3	2	7.1%		14.3%					14.3%			60.0%
Brown Goshawk	4	2	7.1%		14.3%		14.3%				28.6%		20.0%
Spotted Harrier	2	1	7.1%								75.0%		40.0%
Grey Fantail	1	1	1.4%			14.3%							
Sacred Kingfisher		0	0.0%										
Eastern Koel		0	0.0%										
Rainbow Bee-eater		0	0.0%										
Little Penguin	1	2	1.4%									12.5%	
Double-banded Plover	1	6	7.1%									62.5%	
Intermediate Egret	1	1	1.4%										20.0%
Australian Hobby	2	1	2.9%								25.0%		20.0%
Spangled Drongo	2	1	5.7%			42.9%							20.0%
Gould's Petrel	1	1	1.4%							14.3%			

No of surveys done

BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10	BT11	Total
7	7	7	7	7	4	7	7	4	8	5	70

No of Species recorded

BT1	BT2	BT3	BT4	BT5	BT6	BT7	BT8	BT9	BT10	BT11	Total
8	16	13	11	10	8	24	21	22	19	24	41

No of Species recorded overall: 41

Site coordinates

	Start			Mid			End		
BT1	32	37	16.4	32	37	16.9	32	37	17.3
	152	18	53.4	152	18	50.9	152	18	48.3
BT2	32	37	5.0	32	37	4.5	32	37	3.9
	152	18	51.8	152	18	48.6	152	18	45.4
BT3	32	37	1.0	32	36	58.7	32	36	56.4
	152	18	55.8	152	18	55.9	152	18	56.0
BT4	32	36	52.9	32	36	51.0	32	36	49.0
	152	18	55.3	152	18	54.8	152	18	54.3
BT5	32	36	42.9	32	36	45.2	32	36	47.4
	152	18	28.2	152	18	24.9	152	18	21.6
BT6	32	37	13.1	32	37	11.8	32	37	10.5
	152	19	14.2	152	19	16.0	152	19	17.8
BT7				32	37	18			
				152	18	53			
BT8				32	36	56			
				152	18	44			
BT9				32	37	3			
				152	19	16			
BT10				32	36	46			
				152	18	51			
BT11				32	37	8			
				152	18	59			