Birds of Phillip Island, South Pacific

December 2015



Prepared by the Canberra Ornithologists Group

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Summary

This report describes a survey on 3 December 2015 of birds on Phillip Island conducted by the Canberra Ornithologists Group.

The purpose of the survey was to provide baseline information on the numbers and distribution of birds on Phillip Island. Point counts were chosen as the preferred method for the survey. The data collecting protocol used is one we believe best fits the limitations of time and effort available in the field. The protocol for the survey provides a rigorous method for obtaining statistically sound measures of significant changes in population numbers and distribution of species over time.

Sixteen 200 m paths were allocated across the island with each path chosen to represent various vegetation types. Survey plots were established in the middle and at each end of each path. The abundance of each species using the 50 m radius plot over a 10 minute period was recorded. The presence of other species seen from the plots was also recorded. Each of four teams of three observers was allocated to four paths. Each plot was surveyed in turn by each member of a team. Due to time restrictions on the island only 15 of the paths were surveyed and not all plots were surveyed three times, giving a total of 44 plots and 127 observations.

The mean abundance, mean reporting rate, frequency and group size for each of the ten species of seabirds and nine species of landbirds recorded using the plots during the survey was calculated. Maps for 21 species are presented.

Using presence data only, the results of the survey are compared with surveys at the same time of year and with similar effort conducted in 1978 and 2005. The distribution of 14 seabirds were compared with increases recorded in Black-winged Petrel, Red-tailed Tropicbird and Sooty Tern while for thirteen landbirds the distribution of Swamphen, Feral Pigeon, Swallow, Sacred Kingfisher, Greenfinch, Silvereye, Blackbird and House Sparrow increased. A Tattler *spp*, probably Wandering Tattler, and a White-faced Heron had not been listed previously for the island whilst the Australasian Gannet was not recorded.

Introduction

This report describes the birds of Phillip Island, South Pacific (latitude 29^{o} 07' S; longitude 167^{o} 57' E) during a single visit on 3rd December 2015.

A history of the fauna of Phillip Island is provided by Peter Coyne (2009). From the earliest days of European settlement there are many records of the birds of the area and Coyne lists 15 species of seabird and 16 landbirds that most likely occurred on the island before the vegetation was disturbed. Schodde *et al.* (1983) also details many of the early bird records listing 13 species for Phillip Island. Rabbits (O*ryctolagus cuniculus*) were removed from the island in 1988 and since then the degradation of the soil and vegetation has ceased.

The first systematic survey of the avifauna was in 1978, ten years before the final removal of the rabbits so the result of this survey probably reflects the nadir of bird species diversity on the island (Schodde *et al*., 1983). In early December that year Norfolk, Nepean and Phillip Islands were surveyed by assessing the presence of birds in 500m x 500m grid cells set across the island group. Seventeen cells covered Phillip Island of which seven were surveyed by over 20 observers on a single day (Hermes *pers. comm*.).

During this survey nine species of seabird and four landbirds were recorded (Schodde *et al*., 1983). The survey was repeated in December 2005 when 13 of the 17 cells were surveyed on one day (Christian *pers. comm.*). At this time 14 species of seabird and 11 landbirds were observed (Christian *et al*., 2012). In November 2006 during a two-day survey of the island 14 species of seabird were reported breeding of which the Providence Petrel, Kermadec Petrel, White-necked Petrel, Flesh-footed Shearwater and Red-tailed Tropicbird were regarded as ecologically significant, (Priddel *et al*., 2010). Also listed were 12 additional bird species that had been reported since 1986.

The purpose of the 2015 survey was to provide a benchmark measure of population numbers and distribution. A rigorous survey method was used so that future surveys using the same method should provide a statistically sound description of any population changes.

Methods

Before our arrival on the island plot locations were allocated to best cover the survey area and vegetation types. Each of 16 paths was set in a straight line with three plots each at a minimum of 100m apart and in the same vegetation type. The survey area for each of the 48 plots was a circle of 50m radius. Wherever possible the paths were set more than 100m apart from each other. Four paths were allocated to each of four teams, each team consisting of three observers. On each path the team members surveyed each of the three

plots in turn such that each plot was surveyed by three different observers. Each plot was surveyed for 10 minutes with sightings of birds recorded both inside and outside the plot.

The 16 paths were selected to represent the broad vegetation types defined by Coyne (2009), see Table 1.

Table 1. Vegetation classification of 16 paths on Phillip Island by group and no. of survey plots.

Vegetation type	***Vegetation group***	***Path***	***No. of plots***
Moo-oo (*Cyperus indicus*)	1	A, G	6
Bare ground	2	B, E, H, I, M	15
Low growing vegetation*	3	C, F, K, L, P	15
Shrubby white oak (*Lagunatia patersonia*)	4	D, O	6
Olive thicket (*Olea africana*)	5	J, N	6
Total	**5**	**16**	**48**

* Mainly grasses and *Achyranthes aspera*

Once on the island it was realised that some plots, due to topography and the time available, were going to be difficult to survey. For some it was possible to re-locate plots but all three plots on path G and one plot on path O (O3) could not be surveyed. Plot D1 was surveyed once only and plots D2, O1 and O2 were only surveyed twice.

In summary 44 plots from 15 paths were surveyed resulting in 127 observations, see Table 2.

Table 2. Path code, no. of survey plots for each path and no. of observations for 44 plots, Phillip Island.

Path code	***No. of plots***	***No. of observations***
A	3	9
B	3	9
C	3	9
D	3	6
E	3	9
F	3	9
G	0	0

H	3	9
I	3	9
J	3	9
K	3	9
L	3	9
M	3	9
N	3	9
O	2	4
P	3	9
Total	**44**	**127**

For location of paths and plots see Figure 1. A description of plot location, and allocated vegetation type for 44 plots is given in Appendix I. Plots and paths were generally around 100 m apart. Due to the steepness of the terrain distances often appear less than 100 m on a plan view of the island, see Figure 1.

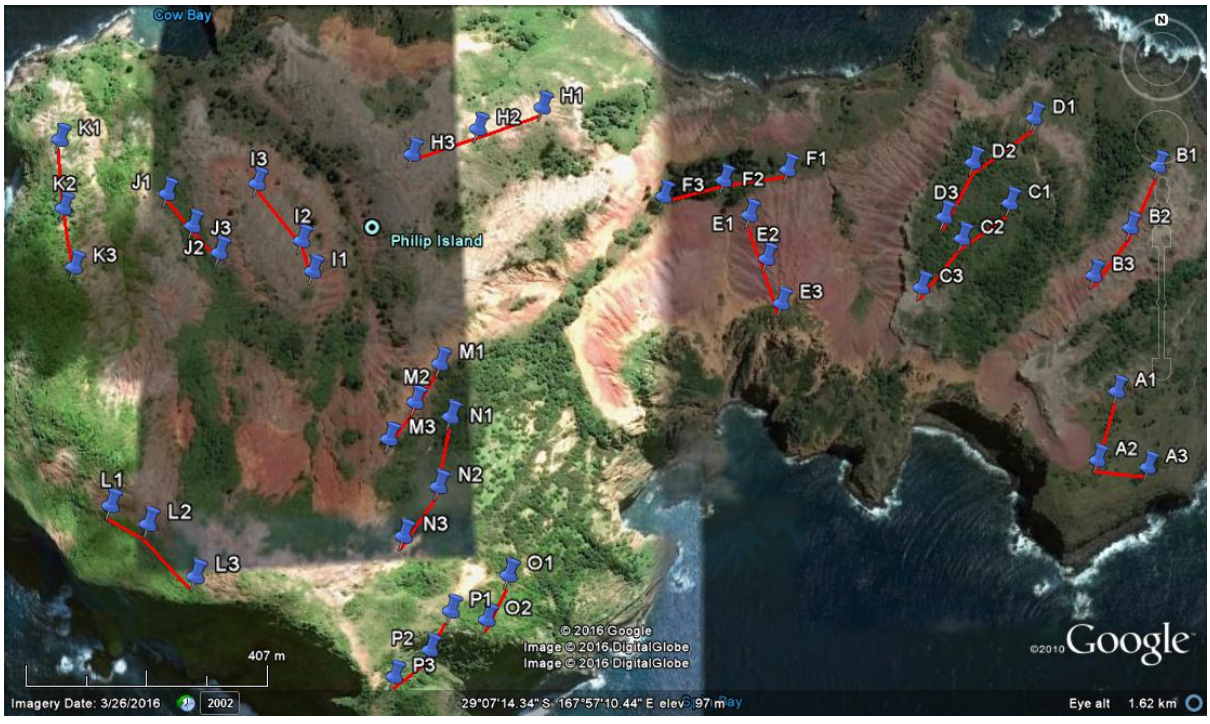


Figure 1. Location of 16 paths and 44 survey plots, Phillip Island.

Statistical treatment of plot counts

Several statistical parameters were used as population indices and this will become useful for comparisons with data collected in future.

- *Mean abundance* (A). The average number of individuals of a species seen per observation and defined as the sum of the number of individuals reported divided by the total number of observations (127).
- *Mean reporting rate* (R). Defined as the number of recorded occurrences divided by the total number of observations (127).
- *Frequency* (F). The plot occupancy rate defined as the number of plots on which a particular species was recorded divided by the total number of plots (44).
- *Group size* (G). Defined as the sum of the number of individuals divided by the number of observations in which a species was recorded.

Species names and data

Species names used in this report follow current preferred internationally accepted nomenclature (see Appendix II). For simplicity some of the common names have been shortened to conform with island usage.

For a list of the observations see Appendix III. Survey instructions and a copy of the data sheet are provided in Appendix IV.

Survey dates and weather conditions

The survey was conducted on 3rd December 2015. Teams were on the island by 08:00. After assembling at the Research Hut teams B, C and D started surveying at 08:30 and were finished by 13:40. Team A, which had the furthest to travel, started and finished one hour later. Some weather observations (Norfolk Island, Station No. 200288) for the day are shown in Table 3.

Table 3. Selected weather observations, Norfolk Island, 3 December 2015.

Cloud at 09:00	*Cloud at 15:00*	*Min °C*	*Max °C*	*Rain (mm)*	*Max wind gust Direction*	*Max wind gust speed (km/h)*
6/8	7/8	18.1	24.7	0.6	ENE	31

Results

Plot counts

The maximum number of times that any one species could be recorded (number of occurrences) was 127; the sum of 40 plots with three visits, three plots with two visits and a plot with a single visit, see Appendix I. Table 4 shows the distribution of the plots in the five vegetation groups.

Table 4. No. of plots surveyed in five vegetation groups, Phillip Island.

Vegetation group	*No. of plots*
1	3
2	15
3	15
4	5
5	6

The distribution of occurrences in five vegetation groups is shown in Table 5.

Table 5. No. of occurrences in five vegetation groups, Phillip Island.

Vegetation group	*No. of occurrences*
1	9
2	45
3	45
4	10
5	18

Abundance, reporting rate, frequency and group size

Each plot was surveyed over a 10 minute period and the abundance of each species using a plot was assessed. 'Using' means birds using the plot for feeding, resting etc. Birds flying overhead, through or just over the plot, not stopping in the trees or shrubs or not feeding are not 'using' the site.

Table 6 shows the abundance, reporting rate, frequency and group size, irrespective of vegetation, for 10 species of seabird and nine landbirds. The reporting rate is given in descending order.

Table 6. Abundance, reporting rate, frequency and group size for 19 bird species recorded in 44 survey plots, Phillip Island.

Species name	*Abundance*	*Reporting rate*	*Frequency*	*Group size*
Seabirds				
Masked Booby	2.72	0.38	0.45	7.19
Black-winged Petrel	0.20	0.14	0.36	1.44
Black Noddy	0.76	0.13	0.23	6.00
Red-tailed Tropicbird	0.13	0.07	0.16	1.89
Brown Noddy	0.06	0.03	0.09	1.75
Little Shearwater	0.03	0.02	0.07	1.33
Sooty Tern	0.02	0.02	0.07	1.00
Wedge-tailed Shearwater	0.02	0.02	0.05	1.00
White Tern	0.01	0.01	0.02	1.00
Grey Ternlet	0.01	0.01	0.02	1.00
Landbirds				
Silvereye	1.09	0.40	0.66	2.71
Sacred Kingfisher	0.26	0.24	0.50	1.10
Greenfinch	0.27	0.18	0.41	1.48
Starling	0.64	0.18	0.30	3.52
Blackbird	0.20	0.16	0.32	1.25
Swallow	0.13	0.10	0.23	1.23
House Sparrow	0.12	0.08	0.23	1.50
Swamphen	0.09	0.06	0.11	1.38
Feral Pigeon	0.06	0.02	0.07	2.67

Seabirds

The most reported species on the island were the Black-winged Petrel and the Masked Booby. The Masked Booby, Black-winged Petrel, Red-tailed Tropicbird, Black Noddy and Sooty Tern were found breeding on the island. In addition, the Little Shearwater was recorded calling in burrows and likely to be breeding. Additional species recorded on the island but not within the survey plots were Kermadec Petrel and Tattler spp, most likely Wandering Tattler. A White-necked Petrel was observed as we approached the island.

Landbirds

Nine species were recorded using the plots with an additional two, Kestrel and White-faced Heron, reported as being present outside the plot. The most commonly reported species were Silvereye followed by Sacred Kingfisher. Observations of a Sacred Kingfisher using a hollow on a cliff face and the begging calls of Starling were the only records of breeding amongst landbirds.

The seabirds and landbirds were not evenly distributed across the island with many species reported in some vegetation groups more than in others, see Table 7.

Table 7. Reporting rate of 19 species using the survey plots defined by vegetation group.

Species name	***Vegetation groups***				
	1	***2***	***3***	***4***	***5***
Seabirds					
Black-winged Petrel	0.11	0.16	0.11	0.00	0.28
Wedge-tailed Shearwater	0.00	0.00	0.04	0.00	0.00
Little Shearwater	0.00	0.00	0.00	0.10	0.11
Red-tailed Tropicbird	0.00	0.07	0.11	0.00	0.06
Masked Booby	0.78	0.27	0.49	0.50	0.11
Brown Noddy	0.11	0.00	0.04	0.00	0.06
Black Noddy	0.00	0.02	0.13	0.30	0.33
Grey Ternlet	0.00	0.00	0.02	0.00	0.00
White Tern	0.00	0.00	0.02	0.00	0.00
Sooty Tern	0.00	0.04	0.02	0.00	0.00
Landbirds					
Swamphen	0.00	0.02	0.13	0.00	0.06
Feral Pigeon	0.33	0.00	0.00	0.00	0.00
Sacred Kingfisher	0.22	0.24	0.20	0.30	0.28
Swallow	0.44	0.13	0.07	0.00	0.00
Silvereye	0.33	0.20	0.51	0.30	0.72
Starling	1.00	0.11	0.11	0.30	0.06
Blackbird	0.22	0.13	0.13	0.30	0.17
House Sparrow	0.33	0.04	0.04	0.20	0.06
Greenfinch	0.22	0.13	0.13	0.00	0.50

Among seabirds, the highest reporting rate for Masked Booby was in vegetation group 1 (Moo-oo) and the lowest in vegetation group 5 (Olive thicket) whilst for the Black-winged Petrel the highest was in vegetation group 5 (Olive thicket). For the Black Noddy the highest reporting rate was from the wooded areas- vegetation group 5 (Olive thicket) and vegetation group 4 (White Oak). For the remaining seven species there was no obvious preference.

For landbirds, the highest reporting rate for the Silvereye and the Greenfinch was for vegetation group 5 (Olive thicket) whilst the Starling, Swallow, House Sparrow and Feral Pigeon were reported mostly in vegetation group 1 (Moo-oo). The Swamphen was reported mainly from vegetation group 3 (Low growing vegetation). The remaining two species, Sacred Kingfisher and Blackbird, were likely to be reported from all vegetation groups.

Survey comparisons

By allocating each survey plot to a grid cell as defined by Schodde *et al.* 1983 and using the 1978 and the 2005 survey it is possible to compare the distribution of species between each of these surveys. For the 2015 survey, each plot was assigned to a grid cell and birds seen during counts or at any time from the count points while in the cell were listed. A comparison of the 1978, 2005 and 2015 survey from the same seven grid cells surveyed in 1978 is shown in Table 8. The survey effort was similar for all three surveys on Phillip Island involving one day ashore, at the same time of year and with a similar number of observers.

Table 8. A comparison of the number of grid cells (maximum seven) for presence of birds recorded on Phillip Island in 1978, 2005 and 2015.

Species name	***Year of Observation***		
	1978	***2005***	***2015***
Seabirds			
Providence Petrel	0	1	0
Kermadec Petrel	0	2	0
White-necked Petrel	0	2	0
Black-winged Petrel	3	4	7
Wedge-tailed Shearwater	3	0	1
Little Shearwater	2	2	2
Red-tailed Tropicbird	1	4	7
Australasian Gannet	1	1	0
Masked Booby	6	5	7
Brown Noddy	0	3	2

Table 8. A comparison of the number of grid cells (maximum seven) for presence of birds recorded on Phillip Island in 1978, 2005 and 2015 (cont.)

Species name	***Year of Observation***		
	1978	***2005***	***2015***
Black Noddy	2	6	6
Grey Ternlet	5	4	3
White Tern	0	2	1
Sooty Tern	5	4	7
Landbirds			
Mallard	0	1	0
White-faced Heron	0	0	1
Swamphen	0	1	7
Feral Pigeon	0	2	2
Shining Bronze-cuckoo	1	0	0
Sacred Kingfisher	0	3	6
Kestrel	1	1	1
Swallow	0	1	5
Silvereye	0	2	5
Starling	2	3	3
Blackbird	0	1	3
House Sparrow	1	2	4
Greenfinch	0	2	5

For seabirds, the distribution of Black-winged Petrel and Red-tailed Tropicbird has increased. For landbirds, the distribution of Swamphen, Feral Pigeon, Swallow, Sacred Kingfisher, Greenfinch, Silvereye, Blackbird and House Sparrow has increased, with no change for the Starling.

Species distribution

By allocating each survey plot to a grid cell it is possible to define the occurrence (%) of plots within each cell from which species were recorded. Species recorded from within plots and seen from the plots during the count were analyzed, see Figure 2 for seabirds and Figure 3 for landbirds. The dot size allocated to each cell was determined by occurrence as follows: 20% or less (the smallest size), 2140%, 4160%, 6180%, and 81100%.

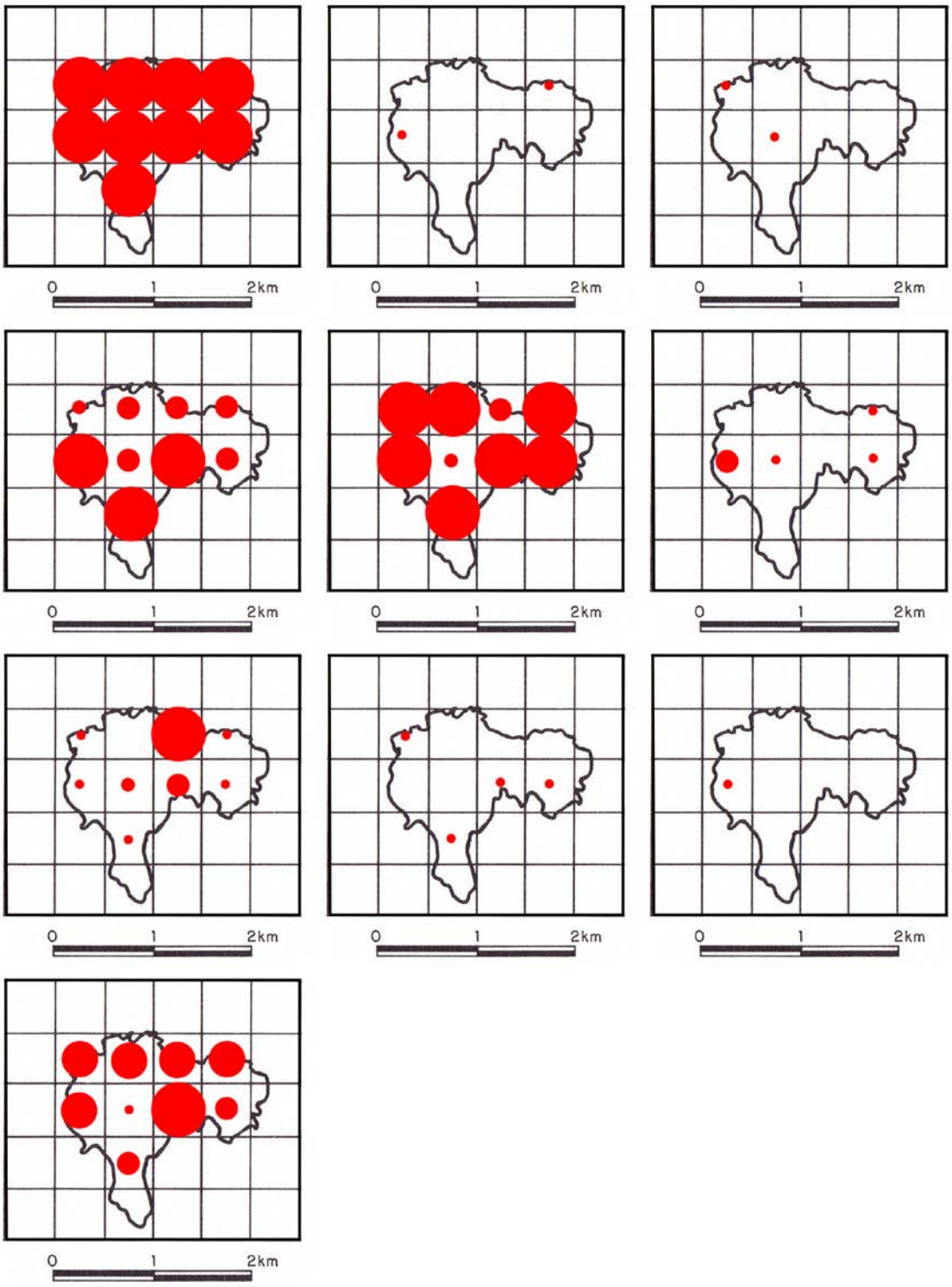


Figure 2. Maps showing distribution of seabirds on Phillip Island in December 2015.

Species shown are (top to bottom and left to right): Black-winged Petrel, Wedge-tailed Shearwater, Little Shearwater, Red-tailed Tropicbird, Masked Booby, Brown Noddy, Black Noddy, Grey Ternlet, White Tern and Sooty Tern.

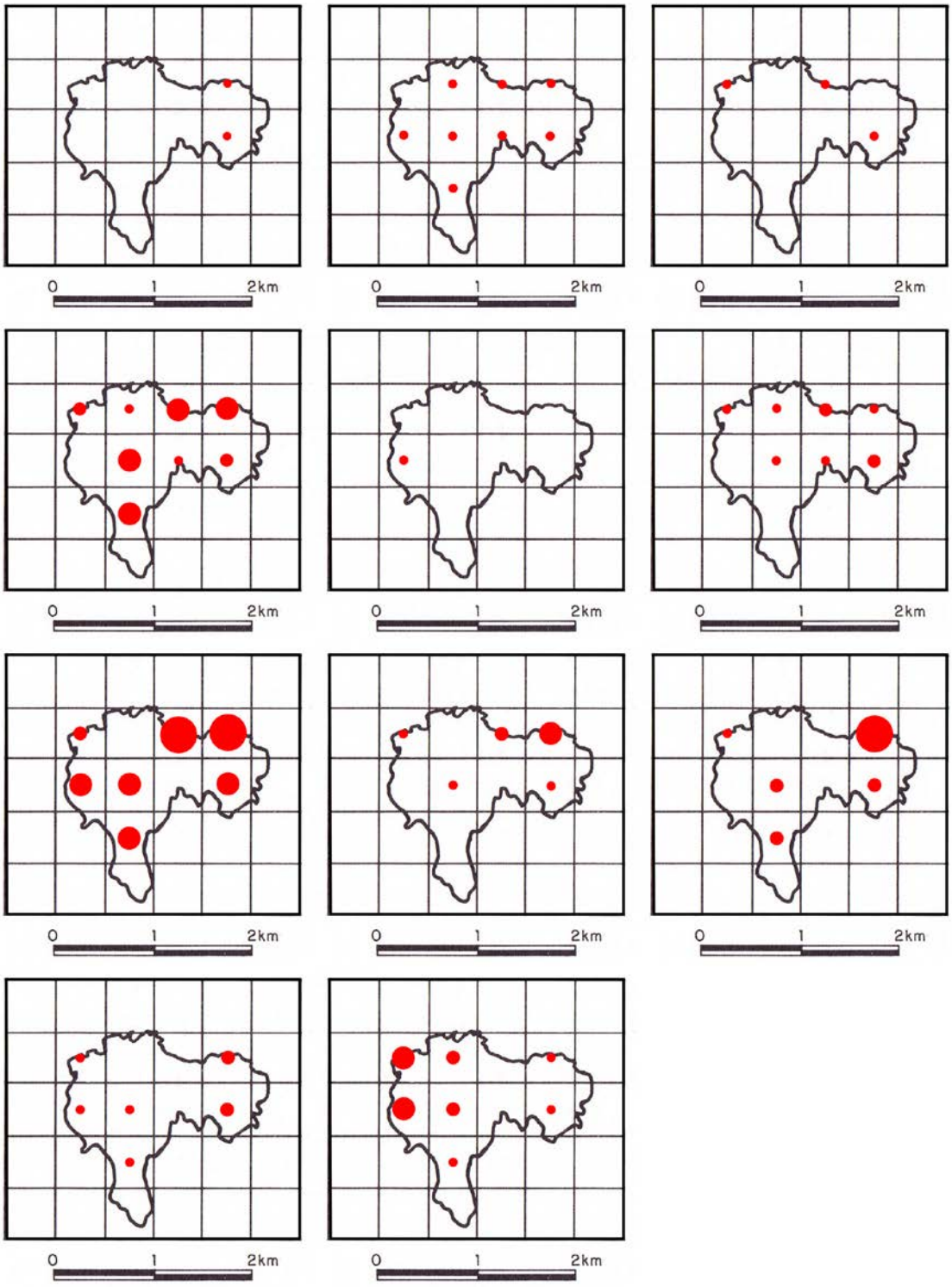


Figure 3. Maps showing distribution of landbirds on Phillip Island in December 2015.

Species shown are (top to bottom and left to right): White-faced Heron, Swamphen, Feral Pigeon, Sacred Kingfisher, Kestrel, Swallow, Silvereye, Starling, Blackbird, House Sparrow and Greenfinch

Discussion

The demise of habitat on Phillip Island has been well documented since the introduction of feral species: pigs were introduced in 1793 and the first mention of rabbits was in 1826, Fullagar (1978), Mills (2009), Coyne (2009). Subsequently, with the removal of the pigs between 1813 and 1848, the goats between 1848 and 1915 and finally the last of the rabbits in January 1988, the vegetation and soil structure have slowly started to recover.

Prior to European involvement, Phillip Island was described by Philip Gidley King in December 1788 as …'*wooded but not thick. I do not suppose that there are about 150 pines trees on the whole island. Most of the hills are covered with a thick entangled kind of reed'*.

Mills (2009) documents the history of the vegetation on Phillip Island and its subsequent recovery. In response to a gradual return of the flora to a more natural condition there has been an increase in the diversity and abundance of the fauna – in particular the birds. Of special relevance to the birdlife on the island has been the gradual increase in structural complexity of the vegetation. With increased structural complexity there will be more shelter and food resources for landbirds and nesting opportunities for burrowing seabirds.

The first systematic bird survey of the island in 1978 listed nine species of seabirds and four landbirds. By the time of the second survey in 2005 bird diversity had increased to 14 and 12 respectively. During the present survey all seabirds and landbirds reported in 2005 were recorded with the exception of Providence Petrel, Australasian Gannet and Mallard. In addition, the Shining Bronze-cuckoo was recorded in 1978 but not 2015. Two species seen in 2015, a Tattler (most likely Wandering Tattler) and the White-faced Heron have not previously been listed for Phillip Island.

Vegetation that has increased most noticeably has been White Oak and Olive. Between October 1968 and May 1977 there was a spectacular increase in the Olive (Fullagar, 1978) and between 1977 and 1987 there was a large increase in the distribution of low growing vegetation with only a small increase in the distribution of *Cyperus* (Moo oo).

By 2008 the Olive had again increased with White Oak being identified in two distinct areas, see Mills 2009, Figures 5-8. It is this increase in the woody vegetation that has allowed for an increase in the landbirds.

Acknowledgements

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All were members of the Canberra Ornithologists Group except for Craig Doolan and Joel Christian. We would like to thank Craig Doolan (Manager, Norfolk Island Park and Botanic Gardens) for approval to survey and to David Brigg for our safe passage to and from Phillip Island.

Thanks go to Helen Topor of TopWords for editing the report.

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APPENDIXES

Appendix I. Location, vegetation code and no. of observations for 44 count plots, Phillip Island

Team number	Site No	Latitude	Longitude	Vegetation code	Number of observations
A	A1	S29 07 15.7	E167 57 38.7	1	3
A	A2	S29 07 19.1	E167 57 37.8	1	3
A	A3	S29 07 19.5	E167 57 40.9	1	3
A	B1	S29 07 04.8	E167 57 41.3	2	3
A	B2	S29 07 07.8	E167 57 39.6	2	3
A	B3	S29 07 10.2	E167 57 37.4	2	3
A	C1	S29 07 06.7	E167 57 32.6	3	3
A	C2	S29 07 08.5	E167 57 29.9	3	3
A	C3	S29 07 10.8	E167 57 27.7	3	3
A	D1	S29 07 02.5	E167 57 34.3	4	3
A	D2	S29 07 04.8	E167 57 30.6	4	2
A	D3	S29 07 07.4	E167 57 28.9	4	1
B	E1	S29 07 07.2	E167 57 18.4	2	3
B	E2	S29 07 09.4	E167 57 19.3	2	3
B	E3	S29 07 11.5	E167 57 20.1	2	3
B	F1	S29 07 05.0	E167 57 20.6	3	3
B	F2	S29 07 05.6	E167 57 17.0	3	3
B	F3	S29 07 06.3	E167 57 13.7	3	3
B	G1			1	0
B	G2			1	0
B	G3			1	0
B	H1	S29 07 02.2	E167 57 07.0	2	3
B	H2	S29 07 03.4	E167 57 03.6	2	3
B	H3	S29 07 04.6	E167 57 00.1	2	3
C	I1	S29 07 10.1	E167 56 54.8	2	3

C	I2	S29 07 08.7	E167 56 54.2	2	3
C	I3	S29 07 05.9	E167 56 51.6	2	3
C	J1	S29 07 06.3	E167 56 46.6	5	3
C	J2	S29 07 07.9	E167 56 48.1	5	3
C	J3	S29 07 09.2	E167 56 49.7	5	3
C	K1	S29 07 03.7	E167 56 40.6	3	3
C	K2	S29 07 07.0	E167 56 41.0	3	3
C	K3	S29 07 09.9	E167 56 41.9	3	3
C	L1	S29 07 20.8	E167 56 44.9	3	3
C	L2	S29 07 21.6	E167 56 47.1	3	3
C	L3	S29 07 23.8	E167 56 49.8	3	3
D	M1	S29 07 14.4	E167 57 01.7	2	3
D	M2	S29 07 16.2	E167 57 00.5	2	3
D	M3	S29 07 16.2	E167 57 00.5	2	3
D	N1	S29 07 16.9	E167 57 02.3	5	3
D	N2	S29 07 16.9	E167 57 02.3	5	3
D	N3	S29 07 22.2	E167 57 00.0	5	3
D	O1	S29 07 24.1	E167 57 05.4	4	2
D	O2	S29 07 26.4	E167 57 04.1	4	2
D	O3			4	0
D	P1	S29 07 25.9	E167 57 02.2	3	3
D	P2	S29 07 27.9	E167 57 01.0	3	3
D	P3	S29 07 29.3	E167 56 59.0	3	3

Appendix II. Bird species recorded on Phillip Island

Species nomenclature and names follow those recommended by the latest IOC listing (see Gill and Wright, 2006, revised 2017 version 7.1). For some species we use a simplified alternative in this report.

Names used in this report	***IOC recommended name, if different***	***Scientific name***	***Subspecies***
Mallard		*Anas platyrhynchos*	
Providence Petrel		*Pterodroma solandri*	
Kermadec Petrel		*Pterodroma neglecta*	
White-necked Petrel		*Pterodroma cervicalis*	
Black-winged Petrel		*Pterodroma nigripennis*	
Wedge-tailed Shearwater		*Ardenna pacifica*	
Little Shearwater		*Puffinus assimilis*	
Red-tailed Tropicbird		*Phaethon rubricauda*	*roseotinctus*
White-faced Heron		*Egretta novaehollandiae*	
Australasian Gannet		*Morus serrator*	
Masked Booby		*Sula dactylatra*	*tasmani*
Swamphen	Australasian Swamphen	*Porphyrio melanotus*	
Tattler spp		*Tringa spp*	
Brown Noddy		*Anous stolidus*	*pileatus*
Black Noddy		*Anous minutus*	
Grey Ternlet	Blue Noddy	*Procelsterna cerulea*	
White Tern		*Gygis alba*	*candida*
Sooty Tern		*Onychopprion fuscatus*	*kermadeci*
Feral Pigeon	Rock Dove	*Columba livia*	
Shining Bronze Cuckoo		*Chrysococcyx lucidus*	
Sacred Kingfisher		*Todiramphus sanctus*	*norfolkiensis*
Kestrel	Nankeen Kestrel	*Falco cenchroides*	
Swallow	Welcome Swallow	*Hirundo neoxena*	
Silvereye		*Zosterops lateralis*	
Starling	Common Starling	*Sturnus vulgaris*	

Blackbird	Common Blackbird	*Turdus merula*	
House Sparrow		*Passer domesticus*	
Greenfinch	European Greenfinch	*Chloris choloris*	

Appendix III. Observation records, Phillip Island 3rd December 2015

A zero abundance shows species recorded during plot survey but not within plot

Team No.	*Site No.*	*Observer*	*Species name*	*Abundance*	*Start time*
A	A1	1	Silvereye	3	10:00
A	A1	1	Black-winged Petrel	0	
A	A1	1	Grey Ternlet	0	
A	A1	1	Common Starling	2	
A	A1	1	Masked Booby	0	
A	A1	2	Common Starling	4	?
A	A1	2	Sacred Kingfisher	1	
A	A1	2	Feral Pigeon	2	
A	A1	2	Sooty Tern	0	
A	A1	2	Masked Booby	1	
A	A1	2	Black-winged Petrel	0	
A	A1	3	Blackbird	1	?
A	A1	3	Masked Booby	2	
A	A1	3	Brown Noddy	0	
A	A1	3	House Sparrow	1	
A	A1	3	Common Starling	22	
A	A1	3	Sooty Tern	0	
A	A1	3	Red-tailed Tropicbird	0	
A	A1	3	Black-winged Petrel	0	
A	A2	1	Common Starling	2	10:20
A	A2	1	Red-tailed Tropicbird	0	
A	A2	1	Black-winged Petrel	0	
A	A2	1	Masked Booby	10	
A	A2	1	Grey Ternlet	0	
A	A2	1	Feral Pigeon	0	
A	A2	2	Swallow	1	?
A	A2	2	Greenfinch	1	
A	A2	2	Brown Noddy	2	
A	A2	2	Feral Pigeon	2	
A	A2	2	Red-tailed Tropicbird	0	
A	A2	2	Common Starling	1	
A	A2	2	Masked Booby	5	
A	A2	2	Black-winged Petrel	0	
A	A2	2	Sooty Tern	0	
A	A2	3	Common Starling	1	?
A	A2	3	House Sparrow	1	
A	A2	3	Swallow	1	
A	A2	3	White-faced Heron	0	
A	A2	3	Feral Pigeon	0	

A	A2	3	Sooty Tern	0	
A	A2	3	Masked Booby	10	
A	A2	3	Red-tailed Tropicbird	0	
A	A2	3	Black-winged Petrel	0	
A	A3	1	Grey Ternlet	0	9:40
A	A3	1	Black Noddy	0	
A	A3	1	Masked Booby	0	
A	A3	1	Black-winged Petrel	0	
A	A3	1	Common Starling	3	
A	A3	1	Sacred Kingfisher	1	
A	A3	2	Greenfinch	2	?
A	A3	2	Common Starling	1	
A	A3	2	Swallow	1	
A	A3	2	Masked Booby	4	
A	A3	2	Feral Pigeon	4	
A	A3	2	Sooty Tern	0	
A	A3	2	Silvereye	2	
A	A3	2	Red-tailed Tropicbird	0	
A	A3	2	Black-winged Petrel	0	
A	A3	3	Black-winged Petrel	1	?
A	A3	3	Red-tailed Tropicbird	0	
A	A3	3	Masked Booby	3	
A	A3	3	Sooty Tern	0	
A	A3	3	Swallow	1	
A	A3	3	Silvereye	5	
A	A3	3	Blackbird	1	
A	A3	3	House Sparrow	2	
A	A3	3	Common Starling	3	
A	A3	3	Feral Pigeon	0	
A	B1	1	Black-winged Petrel	0	11:21
A	B1	1	Sooty Tern	0	
A	B1	1	Masked Booby	3	
A	B1	1	Silvereye	3	
A	B1	1	Common Starling	4	
A	B1	1	Sacred Kingfisher	1	
A	B1	1	Swamphen	1	
A	B1	2	Black-winged Petrel	0	11:54
A	B1	2	Sooty Tern	1	
A	B1	2	Red-tailed Tropicbird	1	
A	B1	2	Sacred Kingfisher	1	
A	B1	2	Common Starling	2	
A	B1	2	Masked Booby	4	
A	B1	3	Sacred Kingfisher	1	?
A	B1	3	Blackbird	1	

A	B1	3	Silvereye	2	
A	B1	3	Swallow	1	
A	B1	3	Sooty Tern	0	
A	B1	3	Masked Booby	5	
A	B1	3	Red-tailed Tropicbird	0	
A	B1	3	White-faced Heron	0	
A	B1	3	House Sparrow	0	
A	B1	3	Black-winged Petrel	0	
A	B1	3	Common Starling	3	
A	B2	1	Blackbird	2	?
A	B2	1	House Sparrow	3	
A	B2	1	Silvereye	5	
A	B2	1	Sacred Kingfisher	1	
A	B2	1	Brown Noddy	0	
A	B2	1	Sooty Tern	0	
A	B2	1	Masked Booby	0	
A	B2	2	Black-winged Petrel	0	11:38
A	B2	2	Black Noddy	3	
A	B2	2	Masked Booby	0	
A	B2	2	Sooty Tern	1	
A	B2	2	Sacred Kingfisher	1	
A	B2	2	Blackbird	1	
A	B2	2	Red-tailed Tropicbird	1	
A	B2	3	Silvereye	1	?
A	B2	3	Common Starling	1	
A	B2	3	Blackbird	1	
A	B2	3	Sooty Tern	0	
A	B2	3	Black-winged Petrel	0	
A	B2	3	Red-tailed Tropicbird	0	
A	B2	3	Masked Booby	0	
A	B2	3	Sacred Kingfisher	1	
A	B3	1	Black-winged Petrel	0	?
A	B3	1	Masked Booby	0	
A	B3	1	Common Starling	0	
A	B3	1	Blackbird	3	
A	B3	1	Silvereye	2	
A	B3	1	Sooty Tern	0	
A	B3	2	Black-winged Petrel	1	11:22
A	B3	2	Masked Booby	0	
A	B3	2	Greenfinch	1	
A	B3	3	Sacred Kingfisher	1	?
A	B3	3	Silvereye	5	
A	B3	3	Blackbird	0	
A	B3	3	House Sparrow	0	

A	B3	3	Common Starling	1	
A	B3	3	Sooty Tern	0	
A	B3	3	Black-winged Petrel	0	
A	B3	3	Red-tailed Tropicbird	0	
A	B3	3	Masked Booby	0	
A	C1	1	Blackbird	3	13:05
A	C1	1	Masked Booby	4	
A	C1	1	Black-winged Petrel	0	
A	C1	2	Silvereye	4	13:35
A	C1	2	Greenfinch	1	
A	C1	2	Masked Booby	3	
A	C1	2	Black-winged Petrel	1	
A	C1	2	Blackbird	1	
A	C1	3	Common Starling	0	?
A	C1	3	Sacred Kingfisher	1	
A	C1	3	Black-winged Petrel	0	
A	C1	3	Red-tailed Tropicbird	0	
A	C1	3	Sooty Tern	1	
A	C1	3	Silvereye	5	
A	C1	3	Blackbird	1	
A	C1	3	Masked Booby	2	
A	C2	1	Black-winged Petrel	0	13:35
A	C2	1	Blackbird	1	
A	C2	1	Masked Booby	0	
A	C2	1	Silvereye	3	
A	C2	2	Masked Booby	0	12::36
A	C2	2	Red-tailed Tropicbird	0	
A	C2	2	Black-winged Petrel	1	
A	C2	2	Greenfinch	2	
A	C2	2	Silvereye	1	
A	C2	2	Common Starling	1	
A	C2	3	House Sparrow	0	?
A	C2	3	Blackbird	0	
A	C2	3	Wedge-tailed Shearwater	1	
A	C2	3	Silvereye	0	
A	C2	3	Black-winged Petrel	0	
A	C2	3	Red-tailed Tropicbird	0	
A	C2	3	Masked Booby	2	
A	C2	3	Sooty Tern	0	
A	C2	3	Common Starling	3	
A	C3	1	Black-winged Petrel	0	12:35
A	C3	1	Blackbird	1	
A	C3	1	Swamphen	1	

A	C3	1	Masked Booby	16	
A	C3	1	Sooty Tern	0	
A	C3	2	Silvereye	1	13:06
A	C3	2	Black-winged Petrel	0	
A	C3	2	Swamphen	1	
A	C3	2	Sacred Kingfisher	1	
A	C3	2	Masked Booby	9	
A	C3	3	Black-winged Petrel	0	?
A	C3	3	Common Starling	10	
A	C3	3	Silvereye	2	
A	C3	3	Swallow	1	
A	C3	3	Black Noddy	0	
A	C3	3	Red-tailed Tropicbird	0	
A	C3	3	Masked Booby	25	
A	D1	1	Masked Booby	11	14:32
A	D1	1	Red-tailed Tropicbird	0	
A	D1	1	Sooty Tern	0	
A	D1	1	Black-winged Petrel	0	
A	D1	2	Red-tailed Tropicbird	0	14:12
A	D1	2	Black-winged Petrel	0	
A	D1	2	Common Starling	1	
A	D1	2	Blackbird	1	
A	D1	2	Black Noddy	3	
A	D1	2	Sooty Tern	0	
A	D1	2	Masked Booby	7	
A	D1	3	Sooty Tern	0	?
A	D1	3	Common Starling	2	
A	D1	3	Blackbird	1	
A	D1	3	House Sparrow	1	
A	D1	3	Black-winged Petrel	0	
A	D1	3	Silvereye	2	
A	D1	3	Greenfinch	0	
A	D1	3	Brown Noddy	0	
A	D1	3	Masked Booby	2	
A	D1	3	Sacred Kingfisher	0	
A	D2	2	Blackbird	1	14:32
A	D2	2	Masked Booby	1	
A	D2	2	Black-winged Petrel	0	
A	D2	3	Blackbird	0	?
A	D2	3	Black-winged Petrel	0	
A	D2	3	Red-tailed Tropicbird	0	
A	D2	3	Common Starling	10	
A	D2	3	Silvereye	6	
A	D2	3	Sacred Kingfisher	1	

A	D2	3	House Sparrow	3	
A	D2	3	Masked Booby	2	
A	D2	3	Sooty Tern	0	
A	D3	1	Masked Booby	0	14:12
A	D3	1	Black-winged Petrel	0	
A	D3	1	Silvereye	8	
B	E1	4	Black-winged Petrel	0	11:10
B	E1	4	Silvereye	1	
B	E1	4	Swallow	2	
B	E1	4	Feral Pigeon	0	
B	E1	4	Sooty Tern	0	
B	E1	4	Masked Booby	0	
B	E1	4	Red-tailed Tropicbird	0	
B	E1	5	Masked Booby	0	11:20
B	E1	5	Sooty Tern	0	
B	E1	5	Red-tailed Tropicbird	0	
B	E1	5	Black-winged Petrel	0	
B	E1	5	Swallow	1	
B	E1	5	Black Noddy	0	
B	E1	6	Black Noddy	0	11:36
B	E1	6	Black-winged Petrel	0	
B	E1	6	Masked Booby	0	
B	E1	6	Sooty Tern	0	
B	E2	4	Black Noddy	0	11:34
B	E2	4	Sooty Tern	0	
B	E2	4	Masked Booby	0	
B	E2	4	Black-winged Petrel	0	
B	E2	4	Red-tailed Tropicbird	0	
B	E2	5	Red-tailed Tropicbird	0	11:09
B	E2	5	Black Noddy	0	
B	E2	5	Masked Booby	0	
B	E2	5	Black-winged Petrel	0	
B	E2	5	Swallow	3	
B	E2	5	Sooty Tern	0	
B	E2	6	Masked Booby	0	11:24
B	E2	6	Red-tailed Tropicbird	0	
B	E2	6	Black-winged Petrel	0	
B	E2	6	Sooty Tern	0	
B	E3	4	Black-winged Petrel	0	11:23
B	E3	4	Red-tailed Tropicbird	0	
B	E3	4	Masked Booby	21	
B	E3	4	Sooty Tern	0	
B	E3	4	Grey Ternlet	0	
B	E3	5	Sooty Tern	0	11:33

B	E3	5	Red-tailed Tropicbird	0	
B	E3	5	Masked Booby	25	
B	E3	5	Black Noddy	0	
B	E3	5	Swamphen	0	
B	E3	5	Sacred Kingfisher	1	
B	E3	5	Black-winged Petrel	0	
B	E3	6	Black-winged Petrel	0	11:10
B	E3	6	Masked Booby	20	
B	E3	6	Red-tailed Tropicbird	0	
B	F1	4	Sacred Kingfisher	1	9:50
B	F1	4	Black Noddy	0	
B	F1	4	Silvereye	1	
B	F1	4	Sooty Tern	0	
B	F1	4	Black-winged Petrel	2	
B	F1	5	Common Starling	0	10:04
B	F1	5	Red-tailed Tropicbird	0	
B	F1	5	Sacred Kingfisher	2	
B	F1	5	Feral Pigeon	0	
B	F1	5	Silvereye	2	
B	F1	5	Black-winged Petrel	0	
B	F1	5	Swallow	1	
B	F1	5	Black Noddy	2	
B	F1	5	Masked Booby	0	
B	F1	6	Black-winged Petrel	0	10:20
B	F1	6	Masked Booby	0	
B	F1	6	Black Noddy	0	
B	F1	6	Sacred Kingfisher	0	
B	F1	6	Silvereye	8	
B	F2	4	Black-winged Petrel	0	10:20
B	F2	4	Silvereye	4	
B	F2	4	Sooty Tern	0	
B	F2	4	Black Noddy	17	
B	F2	5	Common Starling	0	9:50
B	F2	5	Black-winged Petrel	0	
B	F2	5	Swamphen	0	
B	F2	5	Silvereye	2	
B	F2	5	Black Noddy	13	
B	F2	5	Sooty Tern	0	
B	F2	5	Masked Booby	0	
B	F2	5	Red-tailed Tropicbird	0	
B	F2	6	Black Noddy	30	10:05
B	F2	6	Sooty Tern	0	
B	F2	6	Black-winged Petrel	0	
B	F2	6	Silvereye	2	

B	F3	4	Common Starling	0	10:05
B	F3	4	Black-winged Petrel	0	
B	F3	4	Silvereye	5	
B	F3	4	Black Noddy	2	
B	F3	5	Sacred Kingfisher	1	10:20
B	F3	5	Black Noddy	7	
B	F3	5	Masked Booby	0	
B	F3	5	Red-tailed Tropicbird	0	
B	F3	5	Black-winged Petrel	0	
B	F3	6	Silvereye	2	9:50
B	F3	6	Sooty Tern	0	
B	F3	6	Sacred Kingfisher	1	
B	F3	6	Black Noddy	0	
B	F3	6	Common Starling	1	
B	F3	6	Red-tailed Tropicbird	0	
B	F3	6	Black-winged Petrel	0	
B	H1	4	Masked Booby	2	8:28
B	H1	4	Black-winged Petrel	0	
B	H1	5	Masked Booby	0	8:43
B	H1	5	Sooty Tern	0	
B	H1	5	Red-tailed Tropicbird	0	
B	H1	5	Black-winged Petrel	2	
B	H1	5	Swallow	1	
B	H1	6	Masked Booby	1	8:56
B	H1	6	Black-winged Petrel	0	
B	H2	4	Black-winged Petrel	0	8:56
B	H2	4	Sooty Tern	0	
B	H2	4	Masked Booby	14	
B	H2	4	Red-tailed Tropicbird	1	
B	H2	5	Red-tailed Tropicbird	0	8:28
B	H2	5	Masked Booby	6	
B	H2	5	Black-winged Petrel	2	
B	H2	5	Sooty Tern	0	
B	H2	6	Masked Booby	8	8:43
B	H2	6	Black-winged Petrel	1	
B	H3	4	Sooty Tern	0	8:43
B	H3	4	Black-winged Petrel	0	
B	H3	4	Masked Booby	0	
B	H3	5	Masked Booby	0	8:56
B	H3	5	Red-tailed Tropicbird	0	
B	H3	5	Black-winged Petrel	0	
B	H3	5	Swallow	1	
B	H3	5	Sooty Tern	0	
B	H3	6	Sooty Tern	0	8:28

B	H3	6	Black-winged Petrel	0	
B	H3	6	Masked Booby	1	
C	I1	7	Sacred Kingfisher	0	8:58
C	I1	7	Sooty Tern	0	
C	I1	7	Red-tailed Tropicbird	0	
C	I1	7	Black-winged Petrel	2	
C	I1	8	Black-winged Petrel	0	8:30
C	I1	8	Red-tailed Tropicbird	0	
C	I1	8	Masked Booby	0	
C	I1	8	Sooty Tern	0	
C	I1	8	Greenfinch	0	
C	I1	8	Sacred Kingfisher	1	
C	I1	8	Swamphen	0	
C	I1	9	Black-winged Petrel	0	?
C	I1	9	Sacred Kingfisher	0	
C	I1	9	Greenfinch	1	
C	I2	7	Black-winged Petrel	2	8:30
C	I2	7	Masked Booby	0	
C	I2	7	Sooty Tern	0	
C	I2	8	Sooty Tern	0	8:44
C	I2	8	Sacred Kingfisher	0	
C	I2	8	Masked Booby	0	
C	I2	8	Red-tailed Tropicbird	0	
C	I2	8	Black-winged Petrel	0	
C	I2	8	Greenfinch	1	
C	I2	9	Black-winged Petrel	0	?
C	I2	9	Sooty Tern	0	
C	I2	9	Greenfinch	1	
C	I3	7	Greenfinch	0	8:44
C	I3	7	Masked Booby	0	
C	I3	7	Sooty Tern	0	
C	I3	7	Red-tailed Tropicbird	0	
C	I3	7	Black-winged Petrel	0	
C	I3	8	Black-winged Petrel	0	8:58
C	I3	8	Greenfinch	0	
C	I3	8	Sacred Kingfisher	0	
C	I3	8	Swamphen	0	
C	I3	8	Sooty Tern	0	
C	I3	8	Red-tailed Tropicbird	0	
C	I3	8	Masked Booby	0	
C	I3	9	Greenfinch	1	?
C	I3	9	Black-winged Petrel	0	
C	J1	7	Masked Booby	0	9:48
C	J1	7	Sooty Tern	0	

C	J1	7	Little Shearwater	1	
C	J1	7	Black-winged Petrel	0	
C	J1	8	Swamphen	0	9:31
C	J1	8	Black-winged Petrel	2	
C	J1	8	Silvereye	1	
C	J1	8	Sooty Tern	0	
C	J1	8	Greenfinch	3	
C	J1	8	Sacred Kingfisher	0	
C	J1	8	Masked Booby	0	
C	J1	9	Sooty Tern	0	?
C	J1	9	Black Noddy	0	
C	J1	9	Black-winged Petrel	0	
C	J1	9	Masked Booby	0	
C	J1	9	Swamphen	0	
C	J1	9	Greenfinch	1	
C	J1	9	Sacred Kingfisher	1	
C	J1	9	Common Starling	0	
C	J1	9	House Sparrow	1	
C	J1	9	Silvereye	1	
C	J2	7	Black-winged Petrel	2	9:32
C	J2	7	Sooty Tern	0	
C	J2	7	Red-tailed Tropicbird	0	
C	J2	7	Masked Booby	0	
C	J2	8	Greenfinch	0	9:47
C	J2	8	Sacred Kingfisher	0	
C	J2	8	Swamphen	0	
C	J2	8	Sooty Tern	0	
C	J2	8	Masked Booby	0	
C	J2	8	Black-winged Petrel	0	
C	J2	8	Red-tailed Tropicbird	0	
C	J2	9	Black-winged Petrel	0	?
C	J2	9	Masked Booby	0	
C	J2	9	Sacred Kingfisher	0	
C	J2	9	Greenfinch	1	
C	J2	9	Silvereye	4	
C	J3	7	Black-winged Petrel	0	10:05
C	J3	7	Swamphen	1	
C	J3	7	Sacred Kingfisher	1	
C	J3	8	Silvereye	2	10:04
C	J3	8	Greenfinch	2	
C	J3	8	Black-winged Petrel	0	
C	J3	8	Sooty Tern	0	
C	J3	8	Masked Booby	0	
C	J3	8	Red-tailed Tropicbird	0	

C	J3	9	Greenfinch	2	?
C	J3	9	Sacred Kingfisher	0	
C	J3	9	Sooty Tern	0	
C	J3	9	Masked Booby	0	
C	J3	9	Silvereye	1	
C	J3	9	Black-winged Petrel	0	
C	K1	7	Swamphen	1	11:13
C	K1	7	Masked Booby	7	
C	K1	7	Red-tailed Tropicbird	0	
C	K1	7	Black-winged Petrel	0	
C	K1	8	Sooty Tern	0	11:32
C	K1	8	Red-tailed Tropicbird	0	
C	K1	8	Masked Booby	17	
C	K1	8	Grey Ternlet	0	
C	K1	8	Swamphen	1	
C	K1	8	Black-winged Petrel	0	
C	K1	9	Sooty Tern	0	?
C	K1	9	Masked Booby	18	
C	K1	9	Black-winged Petrel	0	
C	K1	9	Swamphen	4	
C	K1	9	Greenfinch	0	
C	K2	7	Masked Booby	4	10:54
C	K2	7	Sooty Tern	0	
C	K2	7	Swamphen	0	
C	K2	7	Blackbird	0	
C	K2	7	Black-winged Petrel	0	
C	K2	8	Sooty Tern	0	11:12
C	K2	8	Black-winged Petrel	0	
C	K2	8	Masked Booby	6	
C	K2	8	Common Starling	1	
C	K2	8	Red-tailed Tropicbird	0	
C	K2	9	Common Starling	0	?
C	K2	9	Masked Booby	12	
C	K2	9	Feral Pigeon	0	
C	K2	9	Swallow	1	
C	K2	9	Silvereye	3	
C	K2	9	House Sparrow	1	
C	K3	7	Swamphen	0	11:33
C	K3	7	Masked Booby	1	
C	K3	7	Black-winged Petrel	0	
C	K3	8	Silvereye	1	10:53
C	K3	8	Greenfinch	1	
C	K3	8	Sooty Tern	0	
C	K3	8	Black-winged Petrel	0	

C	K3	8	Red-tailed Tropicbird	0	
C	K3	8	Masked Booby	14	
C	K3	9	Silvereye	3	?
C	K3	9	Masked Booby	1	
C	K3	9	Wedge-tailed Shearwater	1	
C	K3	9	Greenfinch	1	
C	K3	9	Black-winged Petrel	1	
C	K3	9	Wedge-tailed Shearwater	0	
C	L1	7	White Tern	1	13:09
C	L1	7	Black-winged Petrel	0	
C	L1	7	Red-tailed Tropicbird	0	
C	L1	7	Sooty Tern	0	
C	L1	7	Brown Noddy	2	
C	L1	7	Black Noddy	0	
C	L1	7	Greenfinch	0	
C	L1	7	Masked Booby	0	
C	L1	8	Silvereye	1	13:26
C	L1	8	Greenfinch	1	
C	L1	8	Brown Noddy	0	
C	L1	8	Sooty Tern	0	
C	L1	8	Masked Booby	0	
C	L1	8	Red-tailed Tropicbird	0	
C	L1	8	Black-winged Petrel	0	
C	L1	9	Silvereye	1	?
C	L1	9	Black-winged Petrel	0	
C	L1	9	Red-tailed Tropicbird	0	
C	L1	9	Masked Booby	0	
C	L1	9	Kestrel	0	
C	L1	9	Brown Noddy	0	
C	L2	7	Black-winged Petrel	0	12:51
C	L2	7	Red-tailed Tropicbird	0	
C	L2	7	Sooty Tern	0	
C	L2	7	Kestrel	0	
C	L2	7	Greenfinch	0	
C	L2	7	Masked Booby	0	
C	L2	8	Sooty Tern	0	13:06
C	L2	8	Swamphen	0	
C	L2	8	Black-winged Petrel	0	
C	L2	8	Masked Booby	0	
C	L2	8	Brown Noddy	2	
C	L2	8	Red-tailed Tropicbird	0	
C	L2	9	Sooty Tern	0	?

C	L2	9	Masked Booby	0	
C	L2	9	Red-tailed Tropicbird	0	
C	L2	9	Black-winged Petrel	0	
C	L3	7	Black-winged Petrel	0	13:28
C	L3	7	Red-tailed Tropicbird	0	
C	L3	7	Masked Booby	0	
C	L3	7	Sooty Tern	0	
C	L3	7	Greenfinch	0	
C	L3	7	Silvereye	0	
C	L3	8	Sooty Tern	0	12:50
C	L3	8	Black-winged Petrel	1	
C	L3	8	Masked Booby	0	
C	L3	8	Brown Noddy	0	
C	L3	8	Red-tailed Tropicbird	0	
C	L3	9	House Sparrow	1	?
C	L3	9	Black-winged Petrel	0	
C	L3	9	Red-tailed Tropicbird	0	
C	L3	9	Masked Booby	0	
C	L3	9	Sooty Tern	0	
D	M1	10	Silvereye	0	8:55
D	M1	10	Sacred Kingfisher	0	
D	M1	10	Black-winged Petrel	0	
D	M1	10	Red-tailed Tropicbird	0	
D	M1	10	Masked Booby	0	
D	M1	11	Red-tailed Tropicbird	0	8:43
D	M1	11	Black-winged Petrel	0	
D	M1	12	Black-winged Petrel	0	8:25
D	M1	12	Sacred Kingfisher	1	
D	M1	12	House Sparrow	1	
D	M2	10	Sacred Kingfisher	0	8:26
D	M2	10	Black-winged Petrel	0	
D	M2	10	Masked Booby	0	
D	M2	10	Greenfinch	0	
D	M2	10	Red-tailed Tropicbird	0	
D	M2	11	Black-winged Petrel	0	8:56
D	M2	12	Black-winged Petrel	0	8:42
D	M2	12	Sacred Kingfisher	2	
D	M2	12	Silvereye	2	
D	M2	12	Sooty Tern	0	
D	M2	12	Red-tailed Tropicbird	0	
D	M3	10	Sacred Kingfisher	0	8:41
D	M3	11	Swamphen	0	8:30
D	M3	11	Silvereye	0	
D	M3	11	Black-winged Petrel	0	

D	M3	12	Common Starling	0	8:55
D	M3	12	Blackbird	1	
D	M3	12	Silvereye	1	
D	M3	12	Greenfinch	3	
D	M3	12	Red-tailed Tropicbird	0	
D	M3	12	Black-winged Petrel	1	
D	N1	10	Silvereye	3	10:17
D	N1	10	Black Noddy	3	
D	N1	10	Masked Booby	0	
D	N1	10	Black-winged Petrel	0	
D	N1	11	Brown Noddy	1	10:42
D	N1	11	Sacred Kingfisher	1	
D	N1	11	Silvereye	3	
D	N1	11	Blackbird	1	
D	N1	11	Black-winged Petrel	2	
D	N1	11	Red-tailed Tropicbird	0	
D	N1	12	Sacred Kingfisher	1	9:55
D	N1	12	Black Noddy	3	
D	N1	12	Greenfinch	2	
D	N1	12	Silvereye	4	
D	N1	12	Blackbird	1	
D	N1	12	Black-winged Petrel	0	
D	N1	12	Little Shearwater	0	
D	N2	10	Black-winged Petrel	0	9:54
D	N2	10	Red-tailed Tropicbird	0	
D	N2	10	Masked Booby	0	
D	N2	10	Black Noddy	2	
D	N2	10	Silvereye	4	
D	N2	11	Black-winged Petrel	0	10:18
D	N2	11	Masked Booby	2	
D	N2	11	Silvereye	3	
D	N2	12	Black Noddy	2	10:40
D	N2	12	Blackbird	0	
D	N2	12	Greenfinch	1	
D	N2	12	Masked Booby	2	
D	N2	12	Red-tailed Tropicbird	1	
D	N2	12	Little Shearwater	1	
D	N2	12	Black-winged Petrel	0	
D	N2	12	Silvereye	1	
D	N3	10	Blackbird	1	10:40
D	N3	10	Silvereye	5	
D	N3	10	Greenfinch	2	
D	N3	10	Sooty Tern	0	
D	N3	10	Black-winged Petrel	1	

D	N3	11	Blackbird	0	9:55
D	N3	11	Black Noddy	1	
D	N3	11	Black-winged Petrel	0	
D	N3	11	Swamphen	0	
D	N3	11	Sacred Kingfisher	0	
D	N3	11	Silvereye	0	
D	N3	12	Silvereye	1	10:18
D	N3	12	Greenfinch	2	
D	N3	12	Sacred Kingfisher	1	
D	N3	12	Black Noddy	3	
D	N3	12	Masked Booby	0	
D	N3	12	Black-winged Petrel	1	
D	N3	12	Common Starling	2	
D	O1	10	Black Noddy	3	13:13
D	O1	10	Red-tailed Tropicbird	0	
D	O1	10	Black-winged Petrel	0	
D	O1	10	Masked Booby	0	
D	O1	10	Sacred Kingfisher	1	
D	O1	11	Black-winged Petrel	0	13:10
D	O1	11	Swallow	0	
D	O1	11	Sacred Kingfisher	0	
D	O1	11	Blackbird	0	
D	O1	11	Black Noddy	0	
D	O2	10	Masked Booby	0	13:31
D	O2	10	Black-winged Petrel	0	
D	O2	10	Red-tailed Tropicbird	0	
D	O2	12	Little Shearwater	2	?
D	O2	12	Sacred Kingfisher	1	
D	O2	12	Red-tailed Tropicbird	0	
D	O2	12	Black-winged Petrel	0	
D	O2	12	Black Noddy	2	
D	P1	10	Masked Booby	0	12:09
D	P1	10	Black-winged Petrel	0	
D	P1	10	Sooty Tern	0	
D	P1	10	Sacred Kingfisher	1	
D	P1	10	Greenfinch	1	
D	P1	10	Silvereye	1	
D	P1	10	Red-tailed Tropicbird	0	
D	P1	11	Black Noddy	0	11:55
D	P1	11	Sacred Kingfisher	0	
D	P1	11	Sooty Tern	0	
D	P1	11	Masked Booby	2	
D	P1	11	Red-tailed Tropicbird	0	
D	P1	11	Black-winged Petrel	0	

D	P1	12	Black-winged Petrel	0	12:24
D	P1	12	Silvereye	1	
D	P1	12	Sacred Kingfisher	1	
D	P1	12	Masked Booby	0	
D	P1	12	Red-tailed Tropicbird	1	
D	P2	10	Swamphen	1	11:54
D	P2	10	Sooty Tern	0	
D	P2	10	Masked Booby	7	
D	P2	10	Red-tailed Tropicbird	4	
D	P2	10	Black-winged Petrel	0	
D	P2	11	Red-tailed Tropicbird	4	13:25
D	P2	11	Masked Booby	8	
D	P2	11	Black-winged Petrel	0	
D	P2	12	Red-tailed Tropicbird	2	12:09
D	P2	12	Black-winged Petrel	0	
D	P2	12	Silvereye	2	
D	P2	12	Masked Booby	9	
D	P2	12	House Sparrow	0	
D	P3	10	Red-tailed Tropicbird	0	12:22
D	P3	10	Blackbird	1	
D	P3	10	Masked Booby	0	
D	P3	11	Red-tailed Tropicbird	0	12:10
D	P3	11	Masked Booby	3	
D	P3	11	Black-winged Petrel	0	
D	P3	12	Blackbird	0	11:55
D	P3	12	Black-winged Petrel	0	
D	P3	12	Red-tailed Tropicbird	2	
D	P3	12	Masked Booby	3	
D	P3	12	Sooty Tern	0	
D	P3	12	Grey Ternlet	1	
D	P3	12	Silvereye	2	
D	P3	12	Sacred Kingfisher	2	

Appendix IV. Instructions and data sheet for Phillip Island bird survey

BIRD SURVEYS ON PHILLIP ISLAND- DECEMBER 2015
Count sites
INSTRUCTIONS TO OBSERVERS

- For ease of access the island has been divided into four areas.
- Each area will be surveyed by a team of three observers. Each team will have at least one GPS unit.
- Within each area 12 sites have been grouped into four representing different vegetation types.
- Each of the four groups involves three survey sites arranged in a line so that the mid-line is a site with another site on either side and 100m away. Each site on a line will therefore represent the same vegetation type.
- The site in the middle of each line has been allocated a waypoint. The sites on each side will be selected in the field and marked with a pole by the first observer. The pole will be removed by the last observer. Each site should be in-line with and 100m from the mid-point. Within each line site 1 will be furthest north, site 2 central and site 3 to the south. The team member with the GPS unit will waypoint the two outer sites for future reference.

How do I do the count

- For each line each of the three sites will be surveyed in turn by the three team members.
- Record all birds seen and heard within the site (a 50m radius from the central site. **Records only birds using the site.**
- If necessary calibrate the 50m radius as half-way to the central site.
- Each 50m radius site will be surveyed for 10 minutes.
- You may move around the site provided you do not unduly disturb birds and certainly do not attempt to attract them to the site
- What does **using the site** mean? Birds must be using the habitat for feeding, resting etc. For example, birds on the ground, in the trees or shrubs, flying between trees or shrubs. Birds feeding over the site, such as hovering or hawking for food, are **using** the site. Birds flying through or just over the site, not stopping in the trees or shrubs, not feeding, or those flying high overhead are **not using** the site.
- Do not double count. The same bird should be recorded once only during a count.
- You should tally birds. For example 1, 1, 2, 1 then give the total: 5. We want to know how many species and how many individuals are present at each site.
- It is imperative that observers do not acquire or seek information about sites before they do their own count at that site. Only pass on information to each other, if you wish, **after** each line has been completed, not before.

What do I put in the Atlas (A) column on the data sheet?

Use the Atlas column to tick off all species you noted in or near the site. This included birds noted before, after or at any time between actually counting at the site. Do not add sightings from well outside the general site nor add from observations made at other times when in the same general region.

BIRD SURVEYS ON PHILLIP ISLAND- DECEMBER 2015

Name _____ Date _____

Line number (A,B,C etc) _____

Species	Site 1	A	Site 2	A	Site 3	A
	north		central		south	
Time start						
Black-winged Petrel						
Wedge-tailed Shearwater						
Little Shearwater						
Red-tailed Tropicbird						
Australasian Gannet						
Masked Booby						
Sooty Tern						
White Tern						
Brown Noddy						
Black Noddy						
Grey Ternlet						
Frigatebirds						
Kermadec Petrel						
Providence Petrel						
White-necked Petrel						
Ruddy Turnstone						
Mallard						
Swamphen						
Swamp Harrier						
Feral Pigeon						
Kestrel						
Swallow						
Shining Bronze-Cuckoo						
Sacred Kingfisher						
Greenfinch						
Silvereye						
Blackbird						
House Sparrow						
Starling						