

SPECIES RICHNESS AND ABUNDANCE OF BIRDS IN MT LOFTY RANGES GUM WOODLAND HABITAT: YEAR 2001 SURVEY

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ABSTRACT

As a part on the on-going bird survey of the Mt Lofty Ranges in South Australia, we surveyed 72 sites in 48 patches of gum woodland from early September 2001 to early January 2002. Each patch contained one or more 2 ha sites that were visited for three 20 minute periods on different days. This is an abridged version of the report format used previously for the years 1999 and 2000 stringybark woodland and the year 2000 gum woodland surveys. Its purpose is to place basic processing of the records in the public forum. The report is only available on the Web.

Three lists summarise the data; one categorises the records by species, another by site and the third by sample.

INTRODUCTION

During spring and summer of 2001-2002, the third season of the long-term survey of the Mt Lofty Ranges in South Australia, we covered the stringybark and gum woodland habitats. This report gives the results of basic processing of the records from the gum woodland habitat. Previous reports are Possingham, M. L., Field, S. A., Possingham, H. P. (2004), Possingham, M. L., Field, S. A. and Possingham, H. P. (2006) on the stringybark woodland habitat and Possingham, M. L. and Possingham, H. P. (2007) on the gum woodland habitat. More recent versions of these reports are available from the Web Site.

This report is concerned with the survey of gum woodland habitat during 2001-2002 and is referred to as the GUM01-02 survey. The survey used a reduced version of the survey design used for the previous year, ie there were three independent 20 min samples rather than the nine samples from three independent 1 hr visits divided into 20 min periods used previously for the SB00-01/GUM00-01 surveys.

Three tables are the result of processing the basic records for all species:

- Table 1 reduces all the records of bird numbers categorised by species and sample, ignoring the sites; this is termed a species list,
- Table 2 reduces all the records of the species counts categorised by site and sample, ignoring the actual species names, this is termed a site list,
- Table 3 lists the on-site bird numbers categorised by species and the three independent samples of each of the 72 sites; this is termed a sample list. NB. THIS FILE IS AVAILABLE FOR DOWNLOAD FROM THE WEB www.ecology.uq.edu.au/index.html?page=44639

METHODS

From the 6th of September 2001 to the 4th of January 2002, nine observers visited 72 sites in 48 patches of gum woodland. Figure 1 in the GUM00-01 survey report (Possingham and Possingham (2007), submitted) effectively shows the location of the sites and Table 2 in this report gives the coordinates. Birds were recorded for three 20 minute periods on different days by different observers in the 5 hours following sunrise. The three 20 minute visits to each site are termed Sessions 1, 2 and 3 with each Session having one Pass, each termed a Sample. This somewhat cumbersome naming system is used to retain consistency with the previous surveys.

The observers used an unstructured plan to make the required 216 visits of 20 minutes. See the Methods Section in the reports on the SB99-00 survey (Possingham, Field and Possingham 2004) for definitions of patch and site and the techniques used to record the on-site, overhead-transient and off-site observations. The Record Sheets and recording procedure were the same as used previously for these yearly surveys.

Table 1 Basic Issue A. All birds recorded on all samples of 72 gum woodland sites: year 2001 survey.

The data given are for on-site records, except where denoted as overhead transients or off-site. Note that one sighting means that one or more single birds or several groups of birds were recorded during one single 20 min sample of a 2 hectare site. The probability of recording a species P_{re} for the GUM01-02 survey is the total on-site sightings for the three independent samples (Sessions 1, 2 and 3, Sample 1) divided by the number of samples (ie $72 \times 3 = 216$). The total on-site sightings for these 3 visits are not given in this table, but can be obtained from $216 \times P_{re}$. The species marked #, ## and ### indicate species commonly, uncommonly and rarely recorded respectively; values of P_{re} equal to 0.60 and 0.13 are used for these divisions. Species marked #### were not recorded in any of the 3 independent sample, so P_{re} is not computed. One species marked \$ is a wetland on-site species and is ignored in the analyses. Of the 9 species recorded not occupying a site, three (marked +) are waterbirds, one (++) could be classed as not a bush bird, and five (+++) are bush birds that could have been recorded on-site. Three records of Bronzewing species have been deleted from this table.

COMMON NAME						Totals			Probability of recording
		Total sightings	Sample 1 birds	Sample 2 birds	Sample 3 birds	On-site birds	Overhead birds	Off-site birds	GUM 01-02
Emu	###	1			1				0.005
Australian Wood Duck	###	3	3	1	4	4	5		0.014
Pacific Black Duck	###	1	2		2	4	5		0.005
Little Pied Cormorant	+					1			
Great Cormorant	+							16	
White-faced Heron	\$	2		1	1	2	1	1	0.009
Straw-necked Ibis	+						1	2	
Brown Goshawk	###	3		2	1	3	2	2	0.014
Collared Sparrowhawk	###	4	2	1	1	4	2	2	0.019
Wedge-tailed Eagle	++						2		
Brown Falcon	+++							1	
Painted Button-quail	###	1	1			1		2	0.005
Rock Dove	###	1	4			4			0.005
Spotted Turtle-Dove	###	2		2		2		2	0.009
Common Bronzewing	###	21	6	15	15	36		33	0.097
Brush Bronzewing	###	12	2	9	6	17		11	0.056
Crested Pigeon	###	3		3	1	4	1	5	0.014
Peaceful Dove	###	7		5	6	11		13	0.032
Yellow-tailed Black-Cockatoo	###	6	2	4	24	30	7	60	0.028
Galah	##	30	42	17	24	83	78	238	0.139
Little Corella	+++						2	17	
Sulphur-crested Cockatoo	###	1		1		1	10	62	0.005
Rainbow Lorikeet	##	30	66	43	36	145	160	252	0.139
Musk Lorikeet	##	44	83	48	95	226	129	125	0.204
Purple-crowned Lorikeet	###	22	51	44	42	137	121	71	0.102

Crimson Rosella	##	128	210	173	185	568	51	242	0.593
Eastern Rosella	###	2	4	6		10		1	0.009
Red-rumped Parrot	###	16	13	8	18	39		15	0.074
Elegant Parrot	###	1	1			1	8	5	0.005
Pallid Cuckoo	###	1	1			1		1	0.005
Fan-tailed Cuckoo	###	15	5	5	8	18		38	0.069
Horsfield's Bronze-Cuckoo	##	34	19	11	14	44	1	41	0.157
Shining Bronze-Cuckoo	###	4		2	5	7		15	0.019
Southern Boobook	###	1		1		1			0.005
Tawny Frogmouth	+++							4	
Australian Owlet-nightjar	###	2		1	1	2		1	0.009
Laughing Kookaburra	###	15	5	7	10	22		61	0.069
Sacred Kingfisher	###	13	6	3	6	15		27	0.060
Rainbow Bee-eater	###	2		1	1	2		6	0.009
White-throated Treecreeper	##	40	25	13	22	60		81	0.185
Brown Treecreeper	###	9	7	5	7	19		9	0.042
Superb Fairy-wren	#	144	280	220	257	757		78	0.667
Spotted Pardalote	##	31	27	16	30	73		14	0.144
Striated Pardalote	#	143	207	198	185	590	1	267	0.662
White-browed Scrubwren	##	36	30	33	15	78		10	0.167
Weebill	###	23	26	22	33	81		22	0.106
Brown Thornbill	##	58	44	53	83	180		17	0.269
Buff-rumped Thornbill	##	49	86	94	55	235	3	29	0.227
Yellow-rumped Thornbill	###	13	2	10	24	36		3	0.060
Yellow Thornbill	###	7	1	14	5	20		3	0.032
Striated Thornbill	##	123	304	220	256	780		46	0.569
Red Wattlebird	##	116	128	135	176	439	8	350	0.537
Little Wattlebird	+++							1	
Noisy Miner	###	1	9			9		15	0.005
Yellow-faced Honeyeater	##	123	161	121	179	461	1	424	0.569
White-plumed Honeyeater	###	21	35	23	20	78	4	5	0.097
Black-chinned Honeyeater	###	2	4			4		1	0.009
Brown-headed Honeyeater	###	28	38	15	26	79	7	29	0.130
White-naped Honeyeater	##	36	40	39	20	99	5	24	0.167
Crescent Honeyeater	##	115	149	120	170	439	1	191	0.532
New Holland Honeyeater	##	102	358	279	308	945	2	205	0.472
Tawny-crowned Honeyeater	+++							2	
Eastern Spinebill	##	74	53	40	62	155		65	0.343
Jacky Winter	###	1	2			2		3	0.005
Scarlet Robin	###	26	14	12	12	38		16	0.120

Red-capped Robin	###	2	2	1		3			0.009
Hooded Robin	###	2	1		1	2			0.009
White-browed Babbler	###	12	11	22	11	44		7	0.056
Varied Sittella	###	11	6	17	13	36	2	14	0.051
Crested Shrike-tit	###	2	1		1	2		2	0.009
Golden Whistler	##	76	37	31	51	119		103	0.352
Rufous Whistler	###	38	10	20	32	62		54	0.176
Grey Shrike-thrush	##	117	55	53	70	178	3	272	0.542
Magpie-lark	###	5	2	8	2	12	1	14	0.023
Grey Fantail	#	139	96	88	89	273		130	0.644
Willie Wagtail	###	5	2	1	3	6		5	0.023
Black-faced Cuckoo-shrike	###	27	10	13	19	42	5	14	0.125
White-winged Triller	###	10	5	4	16	25		11	0.046
Dusky Woodswallow	###	12	9	11	6	26		10	0.056
White-backed Magpie	###	55	45	49	50	144	7	314	0.255
Grey Currawong	###	53	34	21	36	91	4	183	0.245
Australian Raven	###	3		1	2	3			0.014
Little Raven	###	50	29	31	28	88	48	289	0.231
White-winged Chough	###	16	36	11	11	58		83	0.074
Red-browed Finch	###	19	15	20	18	53		7	0.088
Diamond Firetail	###	3	2	2	2	6		4	0.014
European Goldfinch	###	13	5	11	9	25	20	22	0.060
Mistletoebird	##	73	46	52	40	138	1	48	0.338
Welcome Swallow	###	3	4		6	10		1	0.014
Tree Martin	###	45	91	120	113	324	34	93	0.208
Rufous Songlark	###	5	5	7	1	13		4	0.023
Brown Songlark	###	1			1	1			0.005
Silvereye	##	87	175	134	144	453	23	70	0.403
Common Blackbird	###	52	19	18	35	72		83	0.241
Common Starling	###	13	7	9	4	20	6	15	0.060
Species count	95	86	73	73	72	86	40	86	86

Table 2 Species counts for all samples of all 72 gum woodland sites: year 2001 survey. HA = Heritage Agreement. CP = Conservation Park. Note: Site area data is not available.

Patch-Site data				SPECIES COUNT				Totals		
Patch-Site number	Site Name	Site Coords AGD66		Session 1	Session 2	Session 3	Average	On-Site	OHT	Off-Site
15201	Scott CP Site 1	6078930	294210	11	13	17	13.67	23	6	19
15202	Scott CP Site 2	6079200	294775	9	15	14	12.67	19	9	14
15203	Scott CP Site 3	6078950	294875	24	18	15	19.00	29	6	15
15204	Scott CP Site 4	6077600	293025	21	21	19	20.33	33	1	9
15205	Scott CP Site 5	6077500	293600	21	21	19	20.33	30	4	7
22201	Watts Gully	6152430	309920	12	12	12	12.00	19	2	21
50001	Glenara HA	6147785	294701	11	11	19	13.67	25	6	25
50101	Mawson Rd	6133620	297480	17	9	11	12.33	23		15
50201	Charleston CP	6134120	312490	13	14	15	14.00	21	3	12
50301	Airstrip Rd	6150320	297960	16	11	14	13.67	24	2	27
50501	Ridge Rd	6151970	311400	13	8	17	12.67	22	2	19
50601	Roachdale Sanctuary	6150830	304580	10	9	11	10.00	20	3	29
50701	Ironstone Rd	6150890	311960	12	3	13	9.33	18	3	15
50801	Nugget Rd	6151410	308020	13	4	11	9.33	19	2	15
50901	Sandy Creek CP	6168080	303440	17	24	28	23.00	42	2	20
51001	Mount Rd	6156350	313180	12	8	15	11.67	24	4	21
51101	Altona HA	6170950	307400	18	21	24	21.00	43	3	29
51201	Tilley's Hill Rd, Brownhill	6125130	286450	9	12	2	7.67	15	3	17
51301	New Norton Summit Rd	6134360	290900	12	15	10	12.33	19	2	15
51401	Morialta CP	6136480	291860	11	15	3	9.67	22	3	22
51501	Montacute Rd	6137080	290380	9	12	6	9.00	19	3	10
51601	Anstey Hill RP, Site 1	6142990	293740	15	9	11	11.67	20	3	20
51701	Horsnell's Gully CP	6131660	289770	9	10	11	10.00	19	8	31
51801	Cleland CP	6129530	288970	5	12	12	9.67	16	6	27
51901	Peter Creek Rd, Kuitpo	6101440	289700	16	15	15	15.33	24	3	26
52001	Rocky Creek, Kuitpo Forest	6108090	293790	12	14	11	12.33	21	2	18
52101	Belair RP North	6123990	285970	9	9	7	8.33	15	4	12
52102	Belair RP South	6121920	287220	10	11	11	10.67	19	3	21
52201	Onkaparinga RP, Site 1	6105170	280430	11	11	19	13.67	26	4	14
52202	Onkaparinga RP, Site 2	6105585	280178	17	15	13	15.00	23	1	20
52301	Manning Reserve	6103050	279180	14	22	13	16.33	26	4	22
52401	Mt Barker Summit	6117410	310170	11	14	10	11.67	20	2	8
52501	Aldinga Scrub CP	6090516	268580	12	10	9	10.33	21	7	13
52601	Douglas Scrub	6103720	281350	11	16	10	12.33	21	4	17
52701	Bulloch Hill CP	6090670	297900	7	10	17	11.33	24	3	26
52801	Polwarth Rd	6070920	271800	21	20	20	20.33	29	3	9
52901	Mosquito Hill Rd	6076820	290110	20	12	10	14.00	23	6	9
53001	Mt Billy CP	6073090	282480	20	19	15	18.00	27	7	9
53101	James Track	6077650	269110	14	12	12	12.67	22	6	14
53301	Onkaparinga Gorge	6109180	280190	13	18	14	15.00	24	5	19
53401	Corkscrew Rd	6138600	294850	8	3	3	4.67	8	4	25

53502	Cromer CP, Site 2	6150126	315126	10	9	15	11.33	21	2	12
53701	Bullaparinga Hill	6061680	248910	8	10	8	8.67	16	1	14
53801	Meadows	6104250	296940	10	10	10	10.00	18	8	10
53901	Springs Rd Sanctuary	6063730	253280	15	16	15	15.33	23	4	11
54001	Mt Hayfield Track	6067076	257802	17	18	15	16.67	26	4	16
54101	Mt Scrub Rd	6057160	267810	13	14	17	14.67	24	3	3
54501	Tugwell Rd	6062190	277530	16	20	18	18.00	26	5	8
54701	Kaiserstuhl Sanctuary	6171840	316060	12	13	21	15.33	26	6	15
54801	Parra Wirra Site 1	6160960	304430	10	15	18	14.33	31	2	17
54802	Parra Wirra Site 2	6160550	304500	19	8	15	14.00	27	1	16
54803	Parra Wirra Site 3	6161110	304120	10	10	15	11.67	24	2	17
54804	Parra Wirra Site 4	6160350	303540	11	10	16	12.33	22	2	17
54805	Parra Wirra Site 5	6160380	303180	14	12	17	14.33	26	1	16
54806	Parra Wirra Site 6	6160810	303260	11	13	18	14.00	24	2	22
54807	Parra Wirra Site 7	6159400	302120	8	5	15	9.33	20	3	18
54808	Parra Wirra Site 8	6159710	302210	15	14	15	14.67	25	2	19
54809	Parra Wirra Site 9	6159410	302420	12	9	12	11.00	21	1	13
54810	Parra Wirra Site 10	6158940	302380	12	10	10	10.67	19	1	16
54811	Parra Wirra Site 11	6159160	302000	9	17	12	12.67	27	1	15
54812	Parra Wirra Site 12	6158920	301940	14	15	10	13.00	23	1	19
54901	Scott Creek, Almanda Mine	6114830	288230	5	18	12	11.67	23	2	22
55001	Mt Gawler Road Site 1	6147991	301608	6	12	7	8.33	18	2	21
55002	Mt Gawler Road Site 2	6149443	300116	8	7	7	7.33	13		15
55003	Mt Gawler Road Site 3	6149020	299979	7	4	14	8.33	16	2	17
55004	Mt Gawler Road Site 4	6148709	299991	11	9	15	11.67	23		10
55101	Macclesfield Cemetery	6106226	303851	9	8	12	9.67	19	7	17
55201	Old Kersbrook Site 1	6156354	302305	8	7	14	9.67	16	1	9
55202	Old Kersbrook Site 2	6155778	302114	7	11	12	10.00	16	4	9
55203	Old Kersbrook Site 3	6155032	301697	5	9	8	7.33	14	3	16
55204	Old Kersbrook Site 4	6155534	302901	6	3	9	6.00	12	3	10
55205	Old Kersbrook Site 5	6156285	303845	4	7	10	7.00	13	1	12
Average species count				12.1	12.24	13.2	12.5	22.1	3.62	16.9
SD of species count				4.33	4.77	4.58	3.69	5.80	3.26	6.25
90% CI of species count				7.23	7.96	7.65	6.09	9.56	5.45	10.4
90% CI of average species count				0.851	0.939	0.901	0.414	0.651	0.642	1.23

RESULTS

Nine observers completed 216 Record Sheets and contributed 72 hours observation time plus much more travelling time. The observations resulted in 2699 on-site, 1546 off-site and 812 overhead-transient entries on the Record Sheets. For each Sample, records of the number of on-site, overhead transient and off-site birds of each species, and any breeding activity together with other survey parameters. eg site, time and date were entered into a *Microsoft Access 97* database for analysis. A copy of this database in *Access 97* format is available from the Web site.

Species list

Table 1 summarises the records for all species from the nine samples of the 72 sites; scientific names for these species may be obtained from Christides and Boles (1994); a copy of this information appears in SAOA (1996). The table shows the:

- number of birds for each species recorded on-site, off-site and as overhead-transients,
- number of birds for each of the three samples,
- total number of sightings for each Session and overall for all three Sessions,
- number of species sighted for the three samples,
- probability of recording on-site species.

(Note that, in this table, the Total Sightings for the three Samples is the sum over the three samples. So, a species could be sighted a maximum of 216 times (72 sites x 3 samples).

Of the 95 species recorded overall, 86 were recorded on-site, 40 as Overhead Transients and 86 Off-Site. Nine were recorded as not occupying a site; three of these (marked + in Table 1) were obviously associated with a nearby wetland or grassland. Another one (marked ++) could be classed as not being a bush-bird and five (marked +++) are bush-birds that could have been recorded on-site, ie utilising a 2 ha site of the gum woodland habitat. Another species, marked \$, although recorded as occupying a site, is a wetland species and is not considered in any analysis. Five introduced species were recorded On-site; they are Rock Dove *Columba livia*, Spotted Turtle-Dove *Streptopelia chinensis*, European Goldfinch *Carduelis carduelis*, Blackbird *Turdus merula* and Common Starling *Sturnus vulgaris*.

The probability of recording a species in a 2 ha site during a 20 minute sample, P_{re} (last column of Table 1) has been computed directly from the number of sightings for each of the 86 on-site species from the three samples. It is computed from the total number of sightings for these 86 species divided by the total number of samples, ie 216. See the SB99-00 survey report for a discussion of the precision of P_{re} . These three samples are independent in that they are by different observers on different days and at different times past sunrise. On the basis of P_{re} , we divided 85 of these species (White-faced Heron omitted) into three groups: those commonly recorded, those uncommonly recorded and those rarely recorded. The three species marked # in Table 1, are those commonly recorded in this habitat; they were sighted 130 or more times, $P_{re} > 0.6$, during the 216 visits. At the other end of the scale, are the 61 species sighted 28 or less times, $P_{re} < 0.13$, that are rarely recorded; they are marked with ### in Table 1. The remaining 21 species, marked with ## are uncommonly recorded with sightings between 28 and 130 times.

Site List

Table 2 shows how the number of species counted during the three samples vary in space and time. For these three samples combined, Sandy Creek CP (Patch-Site No 50901) and Altona (51101) gave the highest number of on-site species with 42 and 43 respectively. Corkscrew Rd (53401) gave the least with 8.

As well as the species counts in the bulk of the table, the average and the standard deviation for each column is given. The 90% Confidence Intervals for the species count and the average species count is also given.

Sample List

Table 3 gives the on-site bird numbers recorded for each species and each of the three 20 minute samples of each Site. This is the most detailed organised presentation of the data on the bird records that is possible. The table also gives the number of species sighted for each sample and the number of sightings, number of birds and P_{re} for each species over all samples.

DISCUSSION

A direct examination of the three tables and the Results Section in this report will give a reasonable impression of species richness and abundance.

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