

# SPECIES RICHNESS AND ABUNDANCE OF BIRDS IN MT LOFTY RANGES GUM WOODLAND HABITAT: YEAR 2002 SURVEY

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## ABSTRACT

As a part on the on-going bird survey of the Mt Lofty Ranges in South Australia (MLR) 12 observers surveyed 81 sites in 50 patches of gum woodland in the spring and summer of 2002-2003. 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 reports for the three previous yearly surveys published in the SAOA Journal. Its purpose is to place the processing of the basic records in the public forum for further use. Three lists summarise the data; one categorises the records by species, another by site and the third by sample. The report is only available on the Web.

## INTRODUCTION

During the spring and summer of 2002-2003, the fourth season of the long-term survey of the Mt Lofty Ranges in South Australia, we covered the stringybark and gum woodland habitats. This report covers the survey of 50 patches containing 81 sites of gum woodland habitat. Each 2-ha site was visited for 20 minutes. Previous reports of this long-term survey are Possingham, M. L., Field, S. A. and Possingham, H. P. 2004 (the SB 99-00 survey), Possingham, M. L., Field, S. A. and Possingham, H. P. 2006 (the SB00-01 survey) both on the stringybark woodland habitat and Possingham, M. L. and Possingham, H. P. 2008 (the GUM00-01 survey) on the gum woodland habitat. More recent versions of these three reports containing some additions and changes are available from the Web Site. The purpose of these reports in the SAOA Journal and particularly those on the Web is to place the basic data in the form of an Access database, and the results of basic processing of this data, in the public forum for further use.

This survey is referred to as the GUM02-03 survey, and uses a reduced version of the survey design used for the previous 1999 and 2000 surveys, ie there were only three independent 20-minute samples of each site.

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

- Table 1 reduces all the records to bird numbers categorised by species and sample, ignoring the sites; this is termed a species list,
- Table 2 reduces all the records to species counts categorised by site and sample, ignoring the actual species names; this is termed a site list,
- Table 3 lists the on-site, overhead-transient and off-site bird numbers categorised by species and the three independent samples of each of the 81 sites; this is termed a sample list.

Note that the survey considered in this report includes six sites (18 samples) in Cox's Scrub (Patch 143) although it is possible that the habitat is better described as stringybark. Patch 143 is also included in the analysis of the SB002-03 survey.

## METHODS

From the 4th of September 2002 to the 3rd of January 2003, 12 observers visited 81 sites in 50 patches of gum woodland. Figure 1 in the GUM00-01 survey report indicates the extent of the survey and Table 2 in this report gives the site coordinates. Birds were recorded on different days by different observers in the 5 hours following sunrise using an unstructured plan for the 243 visits. The three 20-minute visits to each site are termed Sessions 1, 2 and 3 with each Session having one visit, ie Pass 1, each termed a sample. This somewhat cumbersome naming system is used to retain consistency with the previous surveys.

The reports on the SB99-00 and SB00-01 surveys give: definitions of patch and site, the techniques used to record the on-site, overhead-transient and off-site observations, how to avoid duplicate records, and the methods of extracting species sightings and number of birds recorded during a sample for subsequent analysis. The record sheets and recording procedure were the same as used for the previous surveys.

## RESULTS

The 12 observers completed 243 record sheets and contributed 81 hours observation time plus much more travelling time. The observations resulted in 2841 on-site, 2012 off-site and 357 overhead-transient entries

on the record sheets. For each sample, 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 reference number, time and date were entered into a *Microsoft Access 2000* database at the Nature Conservation Society of S.A.. 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 three samples of the 81 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:

- total number of birds for each species recorded on-site, off-site and as overhead-transients,
- number of birds for each species and for each of the three samples,
- total number of sightings of each species for the three samples combined,
- probability of recording and the density of each of the 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 243 times (81 sites x 3 samples).

Of the 93 species recorded overall, 85 were recorded on-site, 41 overhead-transients and 75 off-site. Of the on-site recordings, eight were recorded as not occupying a site; five of these (marked + in Table 1) were obviously associated with a nearby wetland or grassland. Another two (marked ++) could be classed as not being bush-birds. One (marked +++), was recorded off-site at a very low frequency and could be considered as vagrant in this habitat. Six introduced species were recorded on-site; they are Rock Dove *Columba livia*, Spotted Turtle-Dove *Streptopelia chinensis*, Skylark *Alauda arvensis*, 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 85 species from the three samples. It is computed from the total number of sightings for these 85 on-site species divided by the total number of samples, ie 243. 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. Bird density is computed from the total on-site birds recorded divided by the total area surveyed ie 486 ha (243x2).

On the basis of  $P_{re}$ , we divided these 85 on-site species into three groups: those commonly recorded, those uncommonly recorded and those rarely recorded. The four species marked # in Table 1, are those commonly recorded in this habitat; they were sighted 146 or more times,  $P_{re} > 0.6$ , during the 243 visits. At the other end of the scale, are the 56 species sighted 32 or less times,  $P_{re} < 0.13$ , that are rarely recorded; they are marked with ### in Table 1. The remaining 25 species, marked with ## are uncommonly recorded with sightings between 33 and 145 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, Scott CP Site 2 (Patch-Site 15202), Altona HA (51101) and Mt Billy CP (53001) gave the highest number of on-site species with 32, 33 and 31 respectively. Cox's Scrub Site 8 (14308) 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 bird numbers recorded for each species and each of the three 20-minute samples of each site. Table 3a gives the results for on-site records, 3b for overhead transient-records and 3c for off-site records. The table includes, for each species, the number of sightings, the number of birds, the probability of recording and the density (density for the off-site records is omitted) as well as the species sightings for each sample. Survey parameters such as site name and location, data and time, weather and observer are included. This table represents the most detailed presentation of the records from the survey and is only available as an Excel spreadsheet on this Web site.

## 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. Readers are encouraged to use this data and/or the database for further analysis of the survey records.

## ACKNOWLEDGMENTS

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**Table 1. All birds recorded for all three samples of all 81 gum sites: Year 2002 survey.**  
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The data given are for on-site records, except where denoted as overhead transients or off-site. The Total Sightings for the three samples is obtained by adding the sightings for the three samples, so the maximum is 243 (81x3). Note that one sighting of a species during a single 20-minute sample of a 2-ha site means that one or more single birds or several groups of birds were recorded. The probability of recording a species  $P_{re}$  is the total on-site sightings for the three independent samples (Session 1, Samples 1, 2 and 3) divided by the number of samples (243). Density is computed from the number of birds recorded over the three samples divided by the total area of 486 hectares (243 x 2). 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. Of the 8 species recorded not occupying a site, five (marked +) are water birds, two (++) are not bush birds and the remaining species (+++) could be considered as vagrant in this habitat.

COMMON NAME	On-Site Birds			Totals				Density birds/ha	Probability of Recording $P_{re}$
	Sample 1	Sample 2	Sample 3	On-Site Sightings	On-site Birds	Overhead Birds	Off-site Birds		
Emu ###	4			1	4			0.0082	0.004
Australian Wood Duck +							1		
Little Black Cormorant +									
White-faced Heron +							1		
Straw-necked Ibis +						1			
Black-shouldered Kite ###		1		1	1	3	1	0.0021	0.004
Brown Goshawk ###	1	1		2	2	4	2	0.0041	0.008
Collared Sparrowhawk ###			1	1	1	1		0.0021	0.004
Wedge-tailed Eagle ++						4	1		
Peregrine Falcon ++						1			
Dusky Moorhen +							1		
Painted Button-quail ###			6	3	6			0.0123	0.012
Rock Dove ###	1		1	2	2			0.0041	0.008
Spotted Turtle-Dove ###	4	1	4	4	9		5	0.0185	0.016
Common Bronzewing ###	5	16	13	29	34	1	17	0.0700	0.119
Brush Bronzewing ###	2		3	4	5		4	0.0103	0.016
Crested Pigeon ###	6		1	3	7		4	0.0144	0.012
Peaceful Dove ###	6	1	3	7	10	2	34	0.0206	0.029
Yellow-tailed Black-Cockatoo ###	38	14	10	11	62	45	138	0.1276	0.045
Galah ##	44	22	23	34	89	180	260	0.1831	0.140

Little Corella	###		3	1	3	6	18	0.0062	0.004	
Sulphur-crested Cockatoo	###		2	4	3	6	49	0.0123	0.012	
Rainbow Lorikeet	##	63	69	64	34	196	170	234	0.4033	0.140
Musk Lorikeet	##	60	66	33	34	159	115	113	0.3272	0.140
Purple-crowned Lorikeet	###	38	32	23	12	93	52	28	0.1914	0.049
Adelaide Rosella	#	218	200	184	152	602	64	363	1.2387	0.626
Eastern Rosella	###	3	3	5	4	11		6	0.0226	0.016
Red-rumped Parrot	###	11	8	11	11	30		14	0.0617	0.045
Elegant Parrot	###	6	3		5	9	16	30	0.0185	0.021
Pallid Cuckoo	###	1	1		2	2		1	0.0041	0.008
Fan-tailed Cuckoo	###	5	10	1	11	16		38	0.0329	0.045
Horsfield's Bronze-Cuckoo	##	14	28	9	36	51		81	0.1049	0.148
Shining Bronze-Cuckoo	###	2	2		3	4		7	0.0082	0.012
Southern Boobook	###			1	1	1			0.0021	0.004
Tawny Frogmouth	###	1	1		2	2			0.0041	0.008
Australian Owlet-nightjar	###		1	2	3	3			0.0062	0.012
Laughing Kookaburra	###	8		6	10	14		52	0.0288	0.041
Sacred Kingfisher	###	4	1	6	7	11		18	0.0226	0.029
White-throated Treecreeper	##	36	27	9	49	72		127	0.1481	0.202
Brown Treecreeper	###	6	7	6	6	19		2	0.0391	0.025
Superb Fairy-wren	#	280	306	315	163	901	1	94	1.8539	0.671
Spotted Pardalote	##	55	18	20	56	93		31	0.1914	0.230
Striated Pardalote	#	223	204	181	165	608	1	200	1.2510	0.679
White-browed Scrubwren	##	37	42	45	56	124		10	0.2551	0.230
Chestnut-rumped Heathwren	###		4		2	4			0.0082	0.008
Weebill	###	16	13	20	22	49		12	0.1008	0.091
Brown Thornbill	##	46	50	54	52	150		3	0.3086	0.214
Buff-rumped Thornbill	##	149	75	81	63	305		41	0.6276	0.259
Yellow-rumped Thornbill	###	8	2	8	6	18		3	0.0370	0.025
Yellow Thornbill	###	23	17	18	13	58		15	0.1193	0.053
Striated Thornbill	##	207	238	176	117	621	1	37	1.2778	0.481
Red Wattlebird	##	86	68	67	94	221	36	262	0.4547	0.387
Little Wattlebird	###	1	1		2	2		3	0.0041	0.008
Noisy Miner	###	8		2	2	10		9	0.0206	0.008
Yellow-faced Honeyeater	##	214	170	111	142	495	27	328	1.0185	0.584
White-plumed Honeyeater	###	20	7	12	15	39		1	0.0802	0.062
Black-chinned Honeyeater	###			2	1	2			0.0041	0.004
Brown-headed Honeyeater	###	27	36	9	23	72	4	46	0.1481	0.095
White-naped Honeyeater	##	107	48	31	65	186	17	30	0.3827	0.267
Crescent Honeyeater	##	179	101	80	115	360		231	0.7407	0.473
New Holland Honeyeater	##	228	217	179	98	624	7	111	1.2840	0.403

Eastern Spinebill	##	126	90	79	122	295		131	0.6070	0.502
Jacky Winter	###	2			2	2		2	0.0041	0.008
Scarlet Robin	###	14	13	11	29	38		13	0.0782	0.119
Red-capped Robin	###		4	1	3	5		2	0.0103	0.012
Hooded Robin	###	1		3	3	4			0.0082	0.012
White-browed Babbler	###	24	15	16	17	55		8	0.1132	0.070
Varied Sittella	###	14		11	5	25	2	2	0.0514	0.021
Crested Shrike-tit	###	3	1		3	4		2	0.0082	0.012
Golden Whistler	##	39	47	48	95	134		81	0.2757	0.391
Rufous Whistler	###	12	7	9	20	28		33	0.0576	0.082
Grey Shrike-thrush	##	64	58	41	125	163		262	0.3354	0.514
Magpie-lark	###	2	2	2	4	6	1	20	0.0123	0.016
Grey Fantail	#	90	89	88	146	267		111	0.5494	0.601
Willie Wagtail	###	9	2	2	10	13		3	0.0267	0.041
Black-faced Cuckoo-shrike	###	15	22	4	30	41	5	13	0.0844	0.123
White-winged Triller	###	1		3	3	4			0.0082	0.012
Dusky Woodswallow	###	3		6	5	9	5	4	0.0185	0.021
White-backed Magpie	##	36	28	36	48	100	14	328	0.2058	0.198
Grey Currawong	##	39	38	28	66	105	13	250	0.2160	0.272
Little Raven	##	33	14	21	35	68	63	383	0.1399	0.144
White-winged Chough	###	25	37	29	15	91		73	0.1872	0.062
Skylark	+++							3		
Red-browed Finch	###	8	17	10	14	35			0.0720	0.058
Diamond Firetail	###			4	2	4			0.0082	0.008
Beautiful Firetail	###	1			1	1			0.0021	0.004
European Goldfinch	###	17		2	7	19	2	1	0.0391	0.029
Mistletoebird	##	65	37	36	74	138	4	63	0.2840	0.305
Welcome Swallow	###			2	1	2	4		0.0041	0.004
Tree Martin	##	59	58	64	32	181	29	11	0.3724	0.132
Silvereye	##	116	86	100	86	302	15	70	0.6214	0.354
Common Blackbird	##	32	27	32	62	91	2	52	0.1872	0.255
Common Starling	###	23	10	8	13	41	2	8	0.0844	0.053
<b>Totals</b>	<b>93</b>	<b>73</b>	<b>65</b>	<b>73</b>	<b>85</b>	<b>85</b>	<b>41</b>	<b>75</b>		<b>85</b>

Table 2. Species count for all three samples of the 81 gum sites: Year 2002 survey.  
 CP = Conservation Park, RP = Recreation Park, HA = Heritage Agreement, OHT = Overhead transient.  
 The totals ignore duplicate records in the three samples.

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Patch-Site Data		Site Coords: AGD66		Samples			Average of the 3 samples	Totals		
No	Name	North	East	1	2	3		On-Site	OHT	Off-Site
14301	Cox's Scrub Site 1	6087676	294979	15	11	8	11.33	24	7	17
14304	Cox's Scrub Site 4	6086486	294348	6	7	2	5.00	10	5	21
14308	Cox's Scrub Site 8	6086426	293417	4	5	5	4.67	8	6	17
14310	Cox's Scrub Site 10	6087076	292208	10	7	2	6.33	12	5	13
14312	Cox's Scrub Site 12	6087388	292746	9	11	4	8.00	16	6	12
14318	Cox's Scrub Site 18	6087121	293279	10	7	4	7.00	15	3	18
15201	Scott CP Site 1	6078930	294210	18	21	11	16.67	26	6	16
15202	Scott CP Site 2	6079200	294775	21	19	20	20.00	32	7	10
15203	Scott CP Site 3	6078950	294875	15	15	18	16.00	25	8	12
15204	Scott CP Site 4	6077600	293025	24	21	23	22.67	34	2	5
15205	Scott CP Site 5	6077500	293600	17	22	15	18.00	26	4	9
22201	Watts Gully	6152430	309920	11	9	11	10.33	20	2	18
50001	Glenara HA	6147785	294701	18	14	12	14.67	24	7	10
50101	Mawson Rd	6133620	297480	19	14	16	16.67	25	5	23
50201	Charleston CP	6134120	312490	7	9	10	8.67	20	4	14
50301	Airstrip Rd	6150320	297960	14	17	10	13.67	20	4	26
50501	Ridge Rd	6151970	311400	8	9	13	10.00	18	3	7
50601	Roachdale Sanctuary	6150830	304580	14	10	10	11.33	17	7	25
50701	Ironstone Rd	6150890	311960	15	10	8	11.00	17	4	7
50801	Nugget Rd	6151410	308020	13	16	8	12.33	23	4	22
50901	Sandy Creek CP	6168080	303440	12	6	18	12.00	24	3	18
51001	Mount Rd	6156350	313180	1	8	14	7.67	17	1	17
51101	Altona HA	6170950	307400	16	10	24	16.67	33	1	25
51201	Tilley's Hill Rd, Brownhill	6125130	286450	13	11	12	12.00	17	2	20
51301	New Norton Summit Rd	6134360	290900	13	9	11	11.00	18	5	17
51401	Morialta CP	6136480	291860	17	17	12	15.33	25	6	26
51501	Montacute Rd	6137080	290380	13	13	16	14.00	21	5	17
51601	Anstey Hill RP, Site 1	6142990	293740	10	14	13	12.33	21	3	16
51602	Anstey Hill RP, Site 2	6143283	293205	18	14	5	12.33	19	7	15
51701	Horsnell's Gully CP	6131660	289770	16	9	7	10.67	18	6	20
51801	Cleland CP	6129530	288970	9	8	8	8.33	14	4	21
51901	Peter Creek Rd, Kuitpo	6101440	289700	19	10	14	14.33	23	6	21
52001	Rocky Creek, Kuitpo Forest	6108090	293790	13	10	9	10.67	18	7	24
52101	Belair RP North	6123990	285970	7	14	4	8.33	15	9	16
52102	Belair RP South	6121920	287220	13	16	7	12.00	21	6	19

52201	Onkaparinga RP, Site 1	6105170	280430	10	10	11	10.33	19	7	17
52202	Onkaparinga RP, Site 2	6105585	280178	13	10	10	11.00	17	2	18
52301	Manning Reserve	6103050	279180	18	15	15	16.00	31	3	11
52401	Mt Barker Summit	6117410	310170	9	8	15	10.67	18	1	20
52501	Aldinga Scrub CP	6090516	268580	19	5	7	10.33	23	6	16
52601	Douglas Scrub	6103720	281350	13	11	12	12.00	23	5	8
52701	Bulloch Hill CP	6090670	297900	19	11	15	15.00	27	8	22
52801	Polwarth Rd	6070920	271800	15	12	12	13.00	26	1	22
52901	Mosquito Hill Rd	6076820	290110	18	10	11	13.00	22	7	22
53001	Mt Billy CP	6073090	282480	20	19	14	17.67	31	7	14
53101	James Track	6077650	269110	9	4	15	9.33	18	7	22
53301	Onkaparinga Gorge	6109180	280190	13	13	12	12.67	24	2	11
53401	Corkscrew Rd	6138600	294850	5	4	9	6.00	11	5	22
53502	Cromer CP, Site 2	6150126	315126	7	9	14	10.00	17	2	13
53701	Bullaparinga Hill	6061680	248910	15	13	9	12.33	19	3	13
53801	Meadows	6104250	296940	6	8	8	7.33	13	2	16
53901	Springs Rd Sanctuary	6063730	253280	15	13	11	13.00	21	5	15
54001	Mt Hayfield Track	6067076	257802	19	9	15	14.33	25	4	18
54101	Mt Scrub Rd	6057160	267810	15	20	19	18.00	26	11	19
54501	Tugwell Rd	6062190	277530	8	16	18	14.00	21	7	11
54701	Kaiserstuhl Sanctuary	6171840	316060	15	5	13	11.00	21	1	17
54801	Parra Wirra Site 1	6160960	304430	16	10	11	12.33	25	2	18
54802	Parra Wirra Site 2	6160550	304500	15	10	11	12.00	25	3	21
54803	Parra Wirra Site 3	6161110	304120	15	11	13	13.00	25	2	27
54804	Parra Wirra Site 4	6160350	303540	11	8	9	9.33	17	1	14
54805	Parra Wirra Site 5	6160380	303180	10	13	7	10.00	20	2	24
54806	Parra Wirra Site 6	6160810	303260	13	16	10	13.00	23	5	13
54807	Parra Wirra Site 7	6159400	302120	12	15	8	11.67	19	3	23
54808	Parra Wirra Site 8	6159710	302210	14	18	12	14.67	22	8	25
54809	Parra Wirra Site 9	6159410	302420	8	15	2	8.33	17	2	32
54810	Parra Wirra Site 10	6158940	302380	11	14	8	11.00	20	1	27
54811	Parra Wirra Site 11	6159160	302000	13	17	12	14.00	25	5	23
54812	Parra Wirra Site 12	6158920	301940	8	15	9	10.67	19	9	23
54901	Scott Creek, Almanda Mine	6114830	288230	15	12	18	15.00	21	5	30
55001	Mt Gawler Road Site 1	6147991	301608	7	16	1	8.00	18	6	21
55002	Mt Gawler Road Site 2	6149443	300116	9	9	5	7.67	15	3	19
55003	Mt Gawler Road Site 3	6149020	299979	10	10	4	8.00	17	3	13
55004	Mt Gawler Road Site 4	6148709	299991	16	8	1	8.33	17	5	23
55101	Macclesfield Cemetery	6106226	303851	12	6	15	11.00	20	2	9
55201	Old Kersbrook Site 1	6156354	302305	12	7	2	7.00	15	0	11
55202	Old Kersbrook Site 2	6155778	302114	10	10	7	9.00	16	6	14
55203	Old Kersbrook Site 3	6155032	301697	13	15	1	9.67	19	5	17
55204	Old Kersbrook Site 4	6155534	302901	17	10	2	9.67	23	3	14
55205	Old Kersbrook Site 5	6156285	303845	13	8	1	7.33	14	1	21
55301	Pennwood, Site 1	6149000	298078	16	15	13	14.67	21	3	6
55302	Pennwood, Site 2	6149009	298301	13	14	11	12.67	22	5	2

Average Species Count	12.9	11.7	10.4	11.7	20.6	4.5	17.4
SD of Species Count	4.3	4.2	5.2	3.4	5.0	2.3	5.9
90% CI of Species Count	±7.1	±6.9	±8.6	±5.6	±8.3	±3.8	±9.8
90% CI of Average Species Count	±0.79	±0.77	±0.95	±0.37	±0.93	±0.43	±1.1