

Aerial Survey of Waterbirds on Coongie Lakes wetlands including Malkumba-Coongie National Park - October 2024 and 2025

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Lake Toontoowaranie 29/10/2025

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Background

Heavy rainfall in early and mid-2024 fell across the Cooper Creek catchment in Queensland. This was subsequently followed by multiple tropical low-pressure systems in January-February 2025, delivering rainfall totals of up to 300mm. These created high runoff throughout the Thomson River-Barcoo River headwaters, causing flows and downstream flooding of Cooper Creek and its associated wetlands.

Coongie Lakes are only fully inundated after major Cooper Creek system floods; such basin-wide events occur only a few times per century (Kingsford et al. 1999; Puckridge et al. 2010). The 2024–2025 sequence represents a large recent filling event. These flow events moved into Coongie Lakes wetlands (SA) in 2024–2025, culminating in a multi-year sequence of flows across the Cooper Creek system. Innamincka received its highest flood levels since records began.

To capitalise on this flooding event, waterbird surveys of the Coongie Lakes wetlands were commissioned in two stages: by the Department for Environment and Water in October 2024 as part of the Lake Eyre Basin Project, and by the SA Arid Lands Landscape Board in 2025 as part of the Wetland Wonders project. The surveys were conducted by the UNSW Centre for Ecosystem Science (CES) to provide up-to-date information on waterbird breeding, distribution and abundance. In addition to the Malkumba-Coongie National Park, the surveys also covered other portions of this extensive wetland system that extends across a large part of the Cooper Creek catchment (Kingsford et al. 2021) including Coongie Lakes Ramsar site and Coongie Lakes Important Bird Area site.

Aims

The Coongie Lakes Aerial Waterbird Survey covered up to 49 important riverine and floodplain wetlands and waterbodies across the Coongie Lakes Ramsar system, surveying nationally and internationally significant wetland sites.

Specifically, the surveys aimed to quantify waterbird species, abundance, breeding and wetland inundation extent in the Coongie Lakes wetland system and Ramsar sites.

It provided data on the current ecosystem health of wetlands and rivers, useful for the State of the Basin Report for the Lake Eyre Basin, as well as Ramsar reporting. These data can be used to assess long-term changes to wetlands and rivers. It also provided data on the relative importance of these wetlands to waterbird populations in Australia. Changes in waterbird numbers provide a tangible way of indicating and measuring changes in the ecological health of aquatic ecosystems (rivers and wetlands) of international significance.

The project complemented the long running Eastern Australian Waterbird Survey program which has been running annually since 1983 by including areas not covered by this program (Kingsford et al. 2020).

Methods

Aerial survey methods were described in detail in Braithwaite et al. (1985) and Kingsford et al. (2020), with a short description here. All waterbirds (including nests and broods) were counted from high-winged aircraft (e.g. Cessna 208) at 167–204 km hr⁻¹ and a height of 30–46 m. A front-right observer (navigator) and a back-left observer independently recorded counts on digital audio recorders, with their combined counts making up a completed count. Counts were attributed on the recorder to different parts of the wetland so they could be collated and spatially explicit. All timing was synchronised to GPS time, enabling audio counts to be linked to location via a GPS tracklog of the flight path. Navigation and tracklog records were completed with a Garmin Map 296 GPS using a 1 second tracking interval. The inundated area (percent fullness) of each wetland was also estimated, relative to the mapped high-water (nominal 100% full) mark by using Sentinel-2 LA satellite imagery and GIS mapping software (Google Earth 2025; QGIS 2025).

All waterbirds were identified to species and individuals, nests and broods counted, except those few that could not be consistently identified to species level from the air and were assigned to taxon groups: small grebes (Australasian Grebe, Hoary-headed Grebe; see Appendix 1 for scientific names), small egrets (Eastern Cattle Egret, Little Egret and Medium Egret), terns and small and large migratory wading birds (Charadriiformes). Waterbirds were counted singly and in groups, progressively increasing up to 1,000 individuals. Waterbird nomenclature and classification followed the International Ornithological Congress (IOC) World Bird List v15.1 (Gill et al. 2025).

Waterbird species were assigned to a functional group or guild, reflecting foraging, dietary preference and habitat usage. The five functional groups were: Du- ducks; He-herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird (see Appendix 1).

Three counting techniques were used: total counts, proportion counts and transect counts. For total counts, all birds were counted during a circumnavigation of the wetland, the preferred method for open water wetlands and waterbodies with large concentrations of waterbirds. For proportion counts, a proportion (>50%) of a large wetland was surveyed, with counts extrapolated to give total counts. For the transect method, waterbirds were counted within 200 m-wide transects (100 m on each side of the aircraft, delineated by tape markers on each aircraft wing strut). Only total and proportion counts were employed for the 2024 and 2025 Coongie Lakes surveys.

Surveys were conducted in October of 2024 and 2025 (Fig.1); we used waterbody features (from 1:250,000 topographic mapping) and natural water inundation patterns from satellite imagery to help determine waterbody names (if available), flight paths and define discreet wetland areas and boundaries. Un-named wetlands were given an arbitrary label with a number ('Ad-hoc 1' or 'Unnamed 1') as required. Mapped wetland area (nominal 100% full) is a fixed reference value and does not change over time; inundated area is the areal extent of surface water and changes over time as wetlands fill and dry.

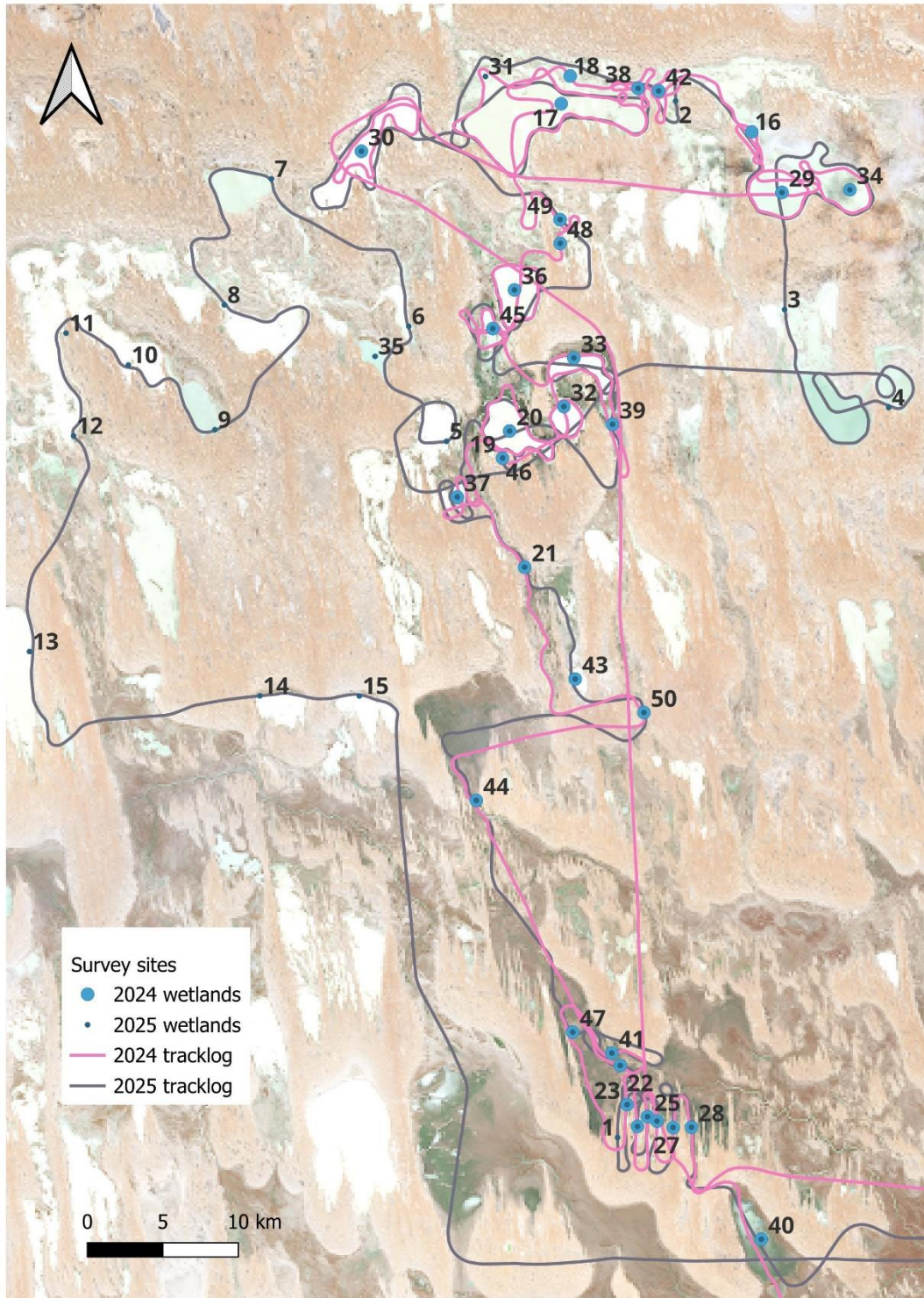


Figure 1. Aerial survey flight paths and surveyed wetlands 2024 and 2025 (diagram shows a true colour Sentinel-2 LA satellite image taken 29/10/2025 for reference; 2024 water inundation not shown). See Appendix 2 for the key to mapping numbers to wetland names.

Results

We surveyed 32 wetlands in 2024 with a total inundated area of 13,867 ha that supported 66,999 waterbirds comprising 44 species. Wetland extent and abundance increased considerably in 2025; we counted 124,200 waterbirds from 39 species across 49 wetlands with a total inundated area of 24,935 ha (Table 1; Fig.2). Fewer species were detected in 2025, probably due to widespread flooding and increased available habitat.

Table 1. Total waterbird abundance, species richness, breeding and wetland inundated area in 2024 and 2025. Breeding index is the sum of nests and broods.

Year	Number of wetlands	Inundated Area (ha)	Total Abundance	Number of species	Breeding index
2024	32	13,867	66,999	44	5
2025	49	24,935	124,200	39	37

Waterbird abundance across wetlands in both years was uneven. In 2024 most of the waterbirds were concentrated in a few wetlands, with one wetland, Montepirie supporting over 15,000 waterbirds (23% of the survey total) which was around double that of the next largest wetland total, Coolangirie (7,762 waterbirds; Table 2). The next highest counts were in Toontoowaranie South (5,497), Lady Blanche (4,643), Coolangirie North (3,611) and Marradibbadibba North (3,542). Collectively these six wetlands supported over 60% of the survey total (Table 2).

Abundance in 2025 was more unevenly spread than the previous year, with one wetland Adhoc 3 containing 73,074 waterbirds (59% of the survey total) – an order of magnitude more waterbirds than the next most abundant site Adhoc 13 with 6,080 waterbirds (Fig.3; Table 2). The next highest counts were Adhoc 6 (6,052), Lake Sir Richard (6,031) and Adhoc 8 (3,456). These 5 wetlands contained over 75% of the survey total.

There was little consistency between years in waterbird abundance across wetlands, probably reflecting complex filling and drying patterns and different levels of wetland productivity as water levels, turbidity and salinity varied in response to filling and drying (Table 3).

In addition to marked changes in wetland total abundance, waterbird species assemblages changed considerably between years (Figs 3 & 4). In 2024 the most abundant species, in order of decreasing magnitude were: Grey Teal, Black-tailed Nativehen, Pink-eared Duck, Maned Duck and Eurasian Coot (Table 4). The top 10 species accounted for 89% of the total abundance (Fig.4). There were three times more Grey Teal than any other species.

In 2025 species abundances were less evenly spread than the preceding year with the top 10 species comprising 95% of total abundance (Fig.4; Table 5). Eurasian Coot was the most abundant species, followed by Grey Teal, Hardhead, Black-tailed Nativehen and Pink-eared Duck. Hardhead were a notable inclusion this group of abundant species in 2025.

Similarly there were very different patterns in species functional groupings between years, with ducks being most abundant in 2024 and followed by a large increase in herbivores in 2025; much of

this increase was driven by a single species, Eurasian Coot which experienced a 10 fold increase with a survey total of 53,587 (Fig.3; Tables 4 & 5). This most likely reflected an increase in aquatic plant abundance.

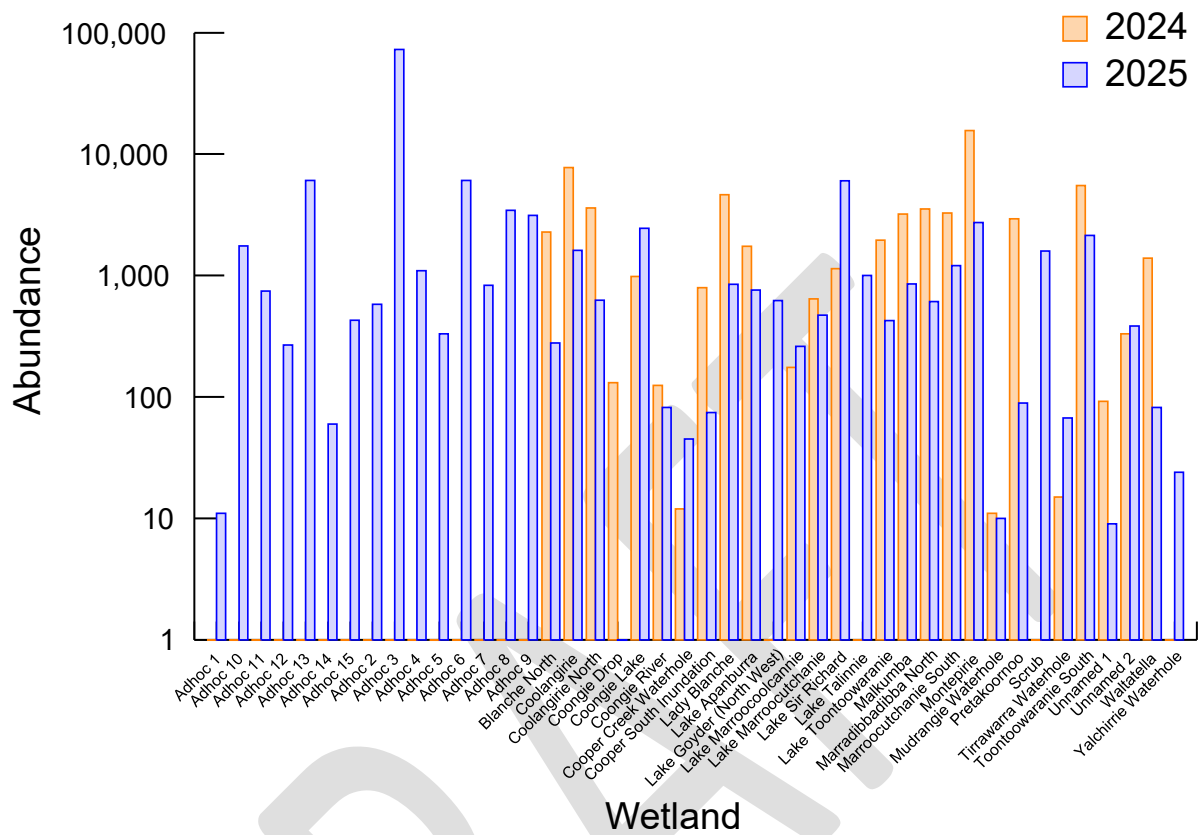


Figure 2. Waterbird abundance on surveyed Coongie Lakes wetlands in 2024 and 2025. Wetlands with no name were labelled as Ad-hoc or Unnamed.

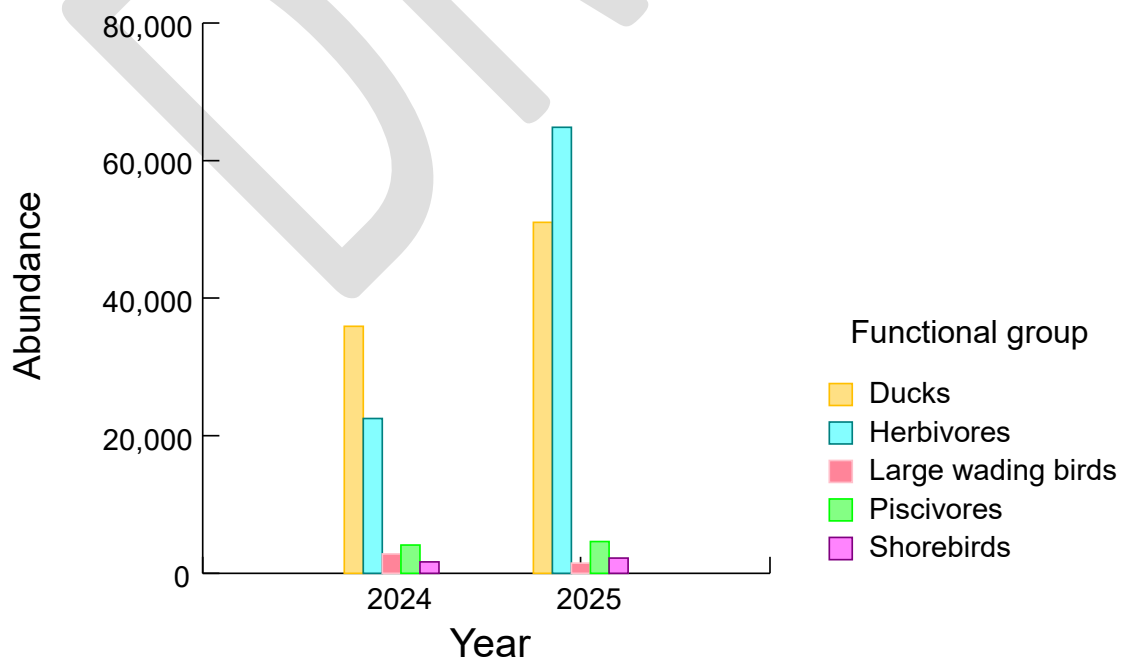


Figure 3. Overall waterbird abundance in 2024 and 2025 showing functional response groupings; functional groups (or guilds) represent ecologically similar species (Du- ducks; He-herbivores; La-large wading birds; Pi-piscivores; Sh-shorebirds; see Appendix 1).

As expected, in both years abundance was positively related to wetland areas – in general larger wetlands supported larger numbers of waterbirds (Tables 2 & 3). Of the 32 wetlands counted in both years, 75% had more waterbirds in 2024 compared to 2025 (Fig.2; Table 3). This probably reflects the drier conditions in 2024 and waterbirds concentrating on available habitat.

Waterbird densities varied considerably among wetlands for each year ranging from 0-57.9 (all densities are birds/ha) in 2024 to 0.1-218.8 in 2025 (Table 3). Overall, mean density (\pm SE) was higher in 2024 with 12.9 (\pm 2.5) compared to 9.6 (\pm 4.8) in 2025. This may have reflected lower habitat availability in 2024, or that wetland productivity was higher as wetlands began to dry.

Table 2. Wetland inundated area, waterbird abundance (ranked), relative (%) abundance and density in 2024 and 2025 (only wetlands with >1,000 waterbirds shown).

Year	Wetland	Inundated area ha	Abundance	Density birds/ha	%total	%cumulative total
2024	Montepirie	674	15,655	23.2	23.37	23.37
2024	Coolangirie	4,634	7,762	1.7	11.59	34.95
2024	Toontoowaranie South	379	5,497	14.5	8.20	43.16
2024	Lady Blanche	1,152	4,643	4.0	6.93	50.09
2024	Coolangirie North	77	3,611	47.0	5.39	55.48
2024	Marradibbadibba North	100	3,542	35.3	5.29	60.76
2024	Marroocutchanie South	306	3,265	10.7	4.87	65.64
2024	Malkumba	155	3,211	20.7	4.79	70.43
2024	Pretakoornoo	306	2,939	9.6	4.39	74.81
2024	Blanche North	121	2,280	18.9	3.40	78.22
2024	Cooper South Inundation 4	119	2,101	17.7	3.14	81.35
2024	Lake Toontoowaranie	1,306	1,961	1.5	2.93	84.28
2024	Lake Apanburra	303	1,740	5.7	2.60	86.88
2024	Waltatella	113	1,395	12.3	2.08	88.96
2024	Cooper South Inundation 3	75	1,143	15.2	1.71	90.67
2024	Lake Sir Richard	946	1,139	1.2	1.70	92.37
2024	Cooper South Inundation 2	66	1,089	16.6	1.63	93.99
2025	Adhoc 3	500	73,074	146.1	58.84	58.84
2025	Adhoc 13	500	6,080	12.2	4.90	63.73
2025	Adhoc 6	500	6,052	12.1	4.87	68.60
2025	Lake Sir Richard	899	6,031	6.7	4.86	73.46
2025	Adhoc 8	600	3,456	5.8	2.78	76.24
2025	Adhoc 9	240	3,129	13.0	2.52	78.76
2025	Montepirie	1,123	2,728	2.4	2.20	80.96
2025	Coongie Lake	1,210	2,454	2.0	1.98	82.93
2025	Toontoowaranie South	681	2,146	3.1	1.73	84.66

2025	Adhoc 10	260	1,759	6.8	1.42	86.08
2025	Coolangirie	5,149	1,610	0.3	1.30	87.37
2025	Scrub	126	1,593	12.7	1.28	88.66
2025	Marroocutchanie South	235	1,206	5.1	0.97	89.63
2025	Adhoc 4	5	1,094	218.8	0.88	90.51
2025	Lake Talinnie	295	1,004	3.4	0.81	91.32

Table 3. Wetland inundated area, waterbird abundance, species richness and density (birds/ha) on Coongie Lakes wetlands in October 2024 and 2025.

Wetland	Inundated area ha		No. species		Abundance		Density	
	2024	2025	2024	2025	2024	2025	2024	2025
Adhoc 1		4		6		11		2.8
Adhoc 2		4		13		581		6.8
Adhoc 3		500		17		73,074		12.4
Adhoc 4		5		15		1,094		0.1
Adhoc 5		350		18		332		12.2
Adhoc 6		500		12		6,052		0.6
Adhoc 7		250		14		834		2.0
Adhoc 8		600		18		3,456		145.3
Adhoc 9		240		16		3,129		146.1
Adhoc 10		260		10		1,759		218.8
Adhoc 11		60		12		744		0.9
Adhoc 12		2,500		4		269		12.1
Adhoc 13		500		13		6,080		3.3
Adhoc 14		100		7		60		5.8
Adhoc 15		210		14		430		13.0
Blanche North	121	271	23	6	2,280	278	18.9	1.0
Coolangirie	4,634	5,149	32	25	7,762	1,610	1.7	0.3
Coolangirie North	77	192	19	16	3,611	628	47.0	3.3
Coongie Drop	21		4		131		6.3	
Coongie Lake	1,282	1,210	17	20	983	2,454	0.8	2.0
Coongie River	369	461	14	12	125	82	0.3	0.2
Cooper Creek Waterhole	0	6	7	9	12	45	30.0	7.0
Cooper South Inundation 1	12	98	12	9	278	22	22.8	0.2
Cooper South Inundation 2	66	175	13	5	1,089	11	16.6	0.1
Cooper South Inundation 3	75	150	19	9	1,143	266	15.2	1.8
Cooper South Inundation 4	119	170	14	16	2,101	180	17.7	1.1
Cooper South Inundation 5	48	241	18	16	774	193	16.1	0.8
Cooper South Inundation 6	58	58	8	13	457	75	7.9	1.3
Lady Blanche	1,152	1,037	18	11	4,643	847	4.0	0.8
Lake Apanburra	303	742	20	19	1,740	759	5.7	1.0

Lake Goyder (North West) Lake Marroocoolcannie			2,700	12		622		0.2
Lake Marroocutchanie	240	240	18	10	175	261	0.7	1.1
Lake Sir Richard	790	360	20	19	641	471	0.8	1.3
	946	899	25	20	1,139	6,031	1.2	6.7

Table 3 Continued. Wetland inundated area, waterbird abundance, species richness and density (birds/ha) on Coongie Lakes wetlands in October 2024 and 2025.

Wetland	Inundated area ha		No. species		Abundance		Density	
	2024	2025	2024	2025	2024	2025	2024	2025
Lake Talinnie Lake			295	9		1,004		3.4
Toontoowaranie	1,306	800	26	17	1,961	427	1.5	0.5
Malkumba	155	206	12	14	3,211	853	20.7	4.1
Marradibbadibba North	100	226	13	8	3,542	610	35.3	2.7
Marroocutchanie South	306	235	17	17	3,265	1,206	10.7	5.1
Montepirie Mudrangie	674	1,123	19	24	15,655	2,728	23.2	2.4
Waterhole	0	0	5	4	11	10	57.9	52.6
Pretakoornoo	306	510	21	8	2,939	89	9.6	0.2
Scrub	0	126	0	18	0	1,593	0.0	12.6
Tirrawarra Waterhole	118	17	5	9	15	67	0.1	4.0
Toontoowaranie South	379	681	25	26	5,497	2,146	14.5	3.1
Unnamed 1	66	133	14	4	92	9	1.4	0.1
Unnamed 2	30	36	8	9	332	383	11.1	10.6
Waltatella	113	283	14	4	1,395	82	12.3	0.3
Yalchirrie Waterhole	3	3	0	5	0	24	0.0	7.4

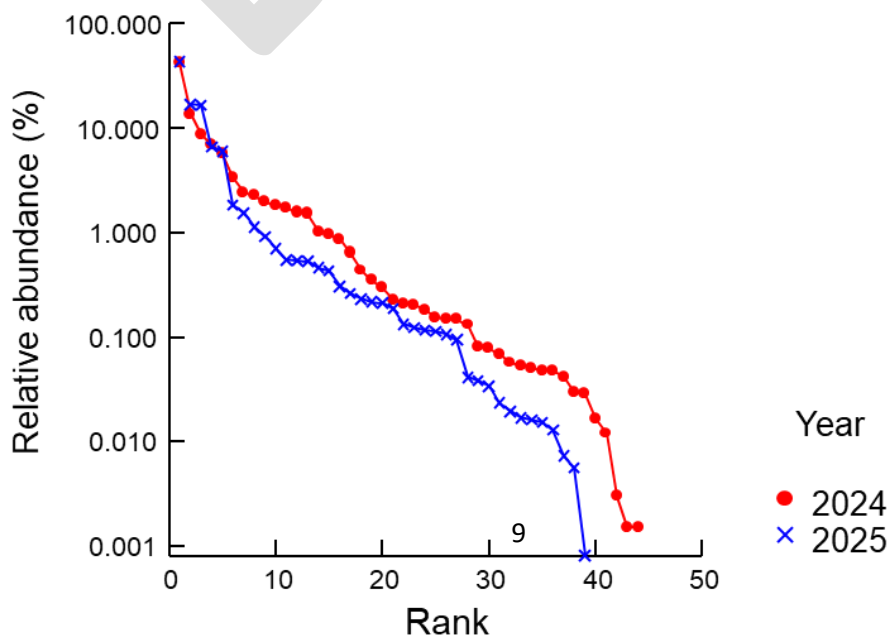


Figure 4. Waterbird species relative abundance in 2024 and 2025 (each point represents a species, ranked from 1 onwards (most to least abundant); abundance is expressed as a percentage of the total).

Table 4. Waterbird species (three letter code – see Appendix 1) and functional response group total ranked abundances in 2024. Waterbird guild or functional groups are: Du- ducks; He-herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird.

Year	Rank	Species	Fx group	Abundance	% total	Cumulative %
2024	1	GTL	Du	28,109	41.95	41.95
2024	2	BTN	He	9,030	13.48	55.43
2024	3	PED	Du	5,812	8.67	64.11
2024	4	WDU	He	4,664	6.96	71.07
2024	5	COT	He	3,797	5.67	76.74
2024	6	SHE	He	2,276	3.40	80.13
2024	7	PEL	Pi	1,631	2.43	82.57
2024	8	BSW	He	1,510	2.25	84.82
2024	9	BDU	Du	1,313	1.96	86.78
2024	10	GWD	He	1,224	1.83	88.61
2024	11	PCO	Pi	1,164	1.74	90.34
2024	12	YSB	La	1,045	1.56	91.90
2024	13	SMW	Sh	1,019	1.52	93.43
2024	14	GLI	La	680	1.01	94.44
2024	15	LBC	Pi	636	0.95	95.39
2024	16	HHD	Du	582	0.87	96.26
2024	17	WHS	Sh	430	0.64	96.90
2024	18	RSB	La	292	0.44	97.34
2024	19	MST	Pi	234	0.35	97.69
2024	20	BRL	La	200	0.30	97.98
2024	21	LGE	La	151	0.23	98.21
2024	22	DAR	Pi	139	0.21	98.42
2024	23	SNI	La	136	0.20	98.62
2024	24	EGR	La	121	0.18	98.80
2024	25	MLW	Sh	103	0.15	98.95
2024	26	WHI	La	100	0.15	99.10
2024	27	AVO	Sh	99	0.15	99.25
2024	28	GBT	Pi	88	0.13	99.38
2024	29	TRN	Pi	54	0.08	99.46
2024	30	GRE	Du	52	0.08	99.54
2024	31	WNH	La	46	0.07	99.61

2024	32	GRC	Pi	38	0.06	99.67
2024	33	LPC	Pi	36	0.05	99.72
2024	34	GCG	Pi	34	0.05	99.77
2024	35	FDU	Du	32	0.05	99.82
2024	36	WFH	La	32	0.05	99.87
2024	37	SGU	Pi	28	0.04	99.91
2024	38	MDU	Du	20	0.03	99.94
2024	39	CST	Pi	19	0.03	99.97
2024	40	NKE	La	11	0.02	99.98
2024	41	BWS	Du	8	0.01	99.99

Table 4. Continued. Waterbird species (three letter code – see Appendix 1) and functional response group total ranked abundances in 2024. Waterbird guild or functional groups are: Du- ducks; He- herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird.

Year	Rank	Species	Fx group	Abundance	% total	Cumulative %
2024	42	BFP	Sh	2	0.00	100.00
2024	43	BBU	Du	1	0.00	100.00
2024	44	BDP	Sh	1	0.00	100.00
2024		Total		66,999		

Table 5. Waterbird species (three letter code – see Appendix 1) and functional response group total ranked abundances in 2025. Waterbird guild or functional groups are: Du- ducks; He-herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird.

Year	Rank	Species	Fx group	Abundance	% total	Cumulative %
2025	1	COT	He	53,587	43.15	43.15
2025	2	GTL	Du	20,854	16.79	59.94
2025	3	HHD	Du	20,442	16.46	76.40
2025	4	BTN	He	8,261	6.65	83.05
2025	5	PED	Du	7,436	5.99	89.03
2025	6	PEL	Pi	2,283	1.84	90.87
2025	7	BDU	Du	1,899	1.53	92.40
2025	8	BSW	He	1,411	1.14	93.54
2025	9	SMW	Sh	1,138	0.92	94.45
2025	10	GWD	He	874	0.70	95.16
2025	11	YSB	La	682	0.55	95.71
2025	12	PCO	Pi	667	0.54	96.24
2025	13	GBT	Pi	662	0.53	96.78
2025	14	WDU	He	572	0.46	97.24
2025	15	WHS	Sh	540	0.43	97.67
2025	16	BWS	Du	377	0.30	97.98
2025	17	CAP	Sh	323	0.26	98.24
2025	18	SGU	Pi	288	0.23	98.47
2025	19	LBC	Pi	270	0.22	98.68
2025	20	LGE	La	263	0.21	98.90
2025	21	MST	Pi	233	0.19	99.08

2025	22	EGR	La	164	0.13	99.22
2025	23	MLW	Sh	154	0.12	99.34
2025	24	WNH	La	145	0.12	99.46
2025	25	SHE	He	140	0.11	99.57
2025	26	GRC	Pi	131	0.11	99.67
2025	27	SNI	La	117	0.09	99.77
2025	28	AVO	Sh	51	0.04	99.81
2025	29	DAR	Pi	48	0.04	99.85
2025	30	RSB	La	42	0.03	99.88
2025	31	BDP	Sh	29	0.02	99.91

Table 5. Continued. Waterbird species (three letter code – see Appendix 1) and functional response group total ranked abundances in 2025. Waterbird guild or functional groups are: Du- ducks; He- herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird.

Year	Rank	Species	Fx group	Abundance	% total	Cumulative %
2025	32	GLI	La	24	0.02	99.93
2025	33	WHI	La	21	0.02	99.94
2025	34	NKE	La	20	0.02	99.96
2025	35	MDU	Du	19	0.02	99.97
2025	36	LPC	Pi	16	0.01	99.99
2025	37	WFH	La	9	0.01	99.99
2025	38	BBU	Du	7	0.01	100.00
2025	39	GRE	Du	1	0.00	100.00
2025		Total		124,200		

Recommendations

The wetlands surveyed supported very high numbers of waterbirds in 2024 and 2025, including threatened species and provide clear evidence of their national and international significance. A system total of more than 124,200 waterbirds in 2025, places it within the top wetland systems recorded by the aerial survey program with over 43 years of counts across eastern Australia.

Shallow gradients and unaltered natural flow regimes of the major rivers and watercourses in the Coongie Lakes system provide an extremely dynamic and complex range of habitats as inundation patterns change rapidly over time. This provides dependant aquatic biota including waterbirds rare opportunities to capitalise on favourable conditions.

The excellent (unregulated) condition of the Coongie Lakes wetlands and reserves make it ideal for measuring and understanding waterbird community dynamics. They provide a rare opportunity to provide a reference point to measure against equivalent regulated or restored wetland systems.

Aerial surveys provide a rapid and cost-effective method for documenting the distribution, breeding and abundance of waterbirds – essential for meeting Ramsar reporting requirements and providing and evidence base to underpin management actions.

A planned program of repeat surveys over time during future flooding and drying cycles would be ideal to fully document the value of these wetlands to waterbirds and be important for reporting on

the Ramsar site as well as the Lake Eyre State of Basin Report r. Complementary ground surveys would add additional detail particularly on breeding rookeries and cryptic species.

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Cover Picture: Lake Toontoowaranie 29/10/2025 – John Porter

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Appendix 1.

Waterbird species, common name, three letter code and functional response group (Du- ducks; He- herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird). Nomenclature and classification follows the International Ornithological Congress (IOC) World Bird List v15.1.

Common Name	Scientific Name	Species Code	Functional Group
Red-necked Avocet	<i>Recurvirostra novaehollandiae</i>	AVO	Sh
Blue-billed Duck	<i>Oxyura australis</i>	BBU	Du
Banded Lapwing	<i>Vanellus tricolor</i>	BDP	Sh
Pacific Black Duck	<i>Anas superciliosa</i>	BDU	Du
Black-fronted Dotterel	<i>Euseyonis melanops</i>	BFP	Sh
Brolga	<i>Antigone rubicunda</i>	BRL	La
Black Swan	<i>Cygnus atratus</i>	BSW	He
Black-tailed Nativehen	<i>Tribonyx ventralis</i>	BTN	He
Australasian Shoveler	<i>Spatula rhynchotis</i>	BWS	Du
Caspian Plover	<i>Charadrius asiaticus</i>	CAP	Sh
Eurasian Coot	<i>Fulica atra</i>	COT	He
Caspian Tern	<i>Hydroprogne caspia</i>	CST	Pi
Australasian Darter	<i>Anhinga novaehollandiae</i>	DAR	Pi
Egrets	<i>Ardea/Egretta sp.</i>	EGR	La
Freckled Duck	<i>Stictonetta naevosa</i>	FDU	Du
Gull-billed Tern	<i>Gelochelidon nilotica</i>	GBT	Pi
Great Crested Grebe	<i>Podiceps cristatus</i>	GCG	Pi
Glossy Ibis	<i>Plegadis falcinellus</i>	GLI	La
Great Cormorant	<i>Phalacrocorax carbo</i>	GRC	Pi
Small Grebes	<i>small grebe sp.</i>	GRE	Du
Grey Teal	<i>Anas gracilis</i>	GTL	Du
Plumed Whistling Duck	<i>Dendrocygna eytoni</i>	GWD	He
Hardhead	<i>Aythya australis</i>	HHD	Du
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	LBC	Pi
Great Egret	<i>Ardea alba</i>	LGE	La
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	LPC	Pi
Musk Duck	<i>Biziura lobata</i>	MDU	Du
Masked Lapwing	<i>Vanellus miles</i>	MLW	Sh
Whiskered Tern	<i>Chlidonias hybrida</i>	MST	Pi
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	NKE	La
Australian Pied Cormorant	<i>Phalacrocorax varius</i>	PCO	Pi
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	PED	Du
Australian Pelican	<i>Pelecanus conspicillatus</i>	PEL	Pi
Royal Spoonbill	<i>Platalea regia</i>	RSB	La
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	SGU	Pi
Australasian Swamphen	<i>Porphyrio melanotus melanotus</i>	SHE	He
Small Waders	<i>small wader sp.</i>	SMW	Sh
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	SNI	La

Unidentified Tern

Tern sp.

TRN

Pi

Appendix 1 continued. Waterbird species, common name, three letter code and functional response group (Du- ducks; He-herbivores; La-large wading bird; Pi-piscivore; Sh-shorebird). Nomenclature and classification follows the International Ornithological Congress (IOC) World Bird List v15.1.

Common Name	Scientific Name	Species Code	Functional Group
Maned Duck	<i>Chenonetta jubata</i>	WDU	He
White-faced Heron	<i>Egretta novaehollandiae</i>	WFH	La
Australian White Ibis	<i>Threskiornis molucca</i>	WHI	La
Pied Stilt	<i>Himantopus leucocephalus</i>	WHS	Sh
White-necked Heron	<i>Ardea pacifica</i>	WNH	La
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	YSB	La

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Appendix 2.

Coongie Lakes wetlands covered by waterbird aerial surveys October 2024 and 2025; many wetlands were dry in 2024. Wetland ID is a unique database code; Wetland locations (decimal degrees latitude and longitude) given are wetland centroids; Wetland area (ha) is the mapped 100% full extent (determined from topographic mapping and satellite imagery).

Map No. ^a	Wetland name	Survey year	Wetland ID	Lat	Lon	Wetland area (ha)
1	Adhoc Wetland 1	2025	39885	-27.6604	140.2457	4
2	Adhoc Wetland 2	2025	39886	-26.9670	140.2846	4
3	Adhoc Wetland 3	2025	39887	-27.1065	140.3575	556
4	Adhoc Wetland 4	2025	39888	-27.1721	140.4272	5
5	Adhoc Wetland 5	2025	39889	-27.1947	140.1311	350
6	Adhoc Wetland 6	2025	39890	-27.1177	140.1059	556
7	Adhoc Wetland 7	2025	39891	-27.0191	140.0139	417
8	Adhoc Wetland 8	2025	39892	-27.1034	139.9823	1,000
9	Adhoc Wetland 9	2025	39893	-27.2931	139.9586	253
10	Adhoc Wetland 10	2025	39894	-27.1436	139.9181	433
11	Adhoc Wetland 11	2025	39895	-27.1223	139.8764	67
12	Adhoc Wetland 12	2025	39896	-27.1910	139.8813	4,167
13	Adhoc Wetland 13	2025	39897	-27.3353	139.8519	556
14	Adhoc Wetland 14	2025	39898	-27.3649	140.0061	100
15	Adhoc Wetland 15	2025	39899	-27.3650	140.0728	221
16	Blanche North	2024/2025	28746	-26.9877	140.3355	301
17	Coolangirie	2024	28753	-26.9688	140.2079	5,149
18	Coolangirie North	2024/2025	38371	-26.9503	140.2139	192
19	Coongie Drop	2024	38368	-27.2059	140.1686	23
20	Coongie Lake	2024/2025	28757	-27.1877	140.1734	1,424
21	Coongie River	2024/2025	28758	-27.2788	140.1834	461
22	Cooper Creek Waterhole	2024/2025	28765	-27.6121	140.2475	8
23	Cooper South Inundation 1	2024/2025	28766	-27.6383	140.2520	122
24	Cooper South Inundation 2	2024/2025	28769	-27.6529	140.2590	219
25	Cooper South Inundation 3	2024/2025	28768	-27.6464	140.2657	188
26	Cooper South Inundation 4	2024/2025	36570	-27.6493	140.2721	170
27	Cooper South Inundation 5	2024/2025	28770	-27.6536	140.2829	241
28	Cooper South Inundation 6	2024/2025	38365	-27.6535	140.2952	289
29	Lady Blanche	2024/2025	28745	-27.0282	140.3558	1,152
30	Lake Apanburra	2024/2025	28754	-27.0006	140.0741	757
31	Lake Goyder (North West)	2025	17417	-26.9506	140.1572	3,000
32	Lake Marroocoolcannie	2024/2025	17420	-27.1714	140.2097	300
33	Lake Marroocutchanie	2024/2025	17421	-27.1389	140.2164	400
34	Lake Sir Richard	2024/2025	28744	-27.0264	140.4012	946

35	Lake Talinnie	2025	39724	-27.1378	140.0833	328
36	Lake Toontoowaranie	2024/2025	17418	-27.0934	140.1766	800
37	Malkumba	2024/2025	28759	-27.2319	140.1383	258

Appendix 2 continued. Coongie Lakes wetlands covered by waterbird aerial surveys October 2024 and 2025; many wetlands were dry in 2024. Wetland ID is a unique database code; Wetland locations (decimal degrees latitude and longitude) given are wetland centroids; Wetland area (ha) is the mapped 100% full extent (determined from topographic mapping and satellite imagery).

Map No. ^a	Wetland name	Survey year	Wetland ID	Latitude	Longitude	Wetland area (ha)
38	Marradibbadibba North	2024/2025	28749	-26.9585	140.2594	251
39	Marroocutchanie South	2024/2025	28756	-27.1833	140.2423	470
40	Montepirie	2024/2025	38372	-27.7284	140.3420	2,245
41	Mudrangie Waterhole	2024/2025	28764	-27.6038	140.2419	4
42	Pretakoornoo	2024/2025	28748	-26.9602	140.2732	510
43	Scrub	2024/2025	28761	-27.3537	140.2173	210
44	Tirrawarra Waterhole	2024/2025	28763	-27.4348	140.1510	168
45	Toontoowaranie South	2024/2025	28755	-27.1192	140.1621	757
46	Unnamed Wetland 1	2024/2025	38367	-27.5899	140.2157	1,327
47	Unnamed Wetland 2	2024/2025	38369	-27.0622	140.2072	36
48	Waltatella	2024/2025	38370	-27.0463	140.2071	283
49	Yalchirrie Waterhole	2024/2025	28762	-27.3760	140.2633	32

^a Wetland number mapped in Figure 1.