Victorian Duck Season Priority Waterbird Count, 2025

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Context:

The Victorian Duck Season Priority Waterbird Count is a state-wide survey of game ducks and other selected waterbird species on popular duck hunting wetlands. It is conducted each year in the lead up to the Victorian duck hunting season.

The information gathered is used to inform management decisions about the management of and, where necessary, the further regulation of hunting on specific wetlands during the forthcoming duck hunting season.

The start date of the hunting season sets the timetable for conducting the priority waterbird count. The count occurs as close as possible to the opening week of duck hunting season to provide more accurate counts of game and non-game threatened waterbirds present at important duck hunting sites while still allowing adequate time for management decisions to be made and authorised prior to the season opening.

In 2025, the Victorian duck hunting season took place between 19 March and 9 June, which meant that this year's Duck Season Priority Waterbird Count was done between 7 and 22 February 2025.

Aims:

The Duck Season Priority Waterbird Count (DSPWC) gathers count, location, and breeding data about game ducks and threatened waterbird species to inform management decisions regarding the forthcoming duck hunting season. Specifically, the aims are to:

1. Identify wetlands that are open to hunting and are holding large numbers of threatened or rare waterbirds.
2. Identify cases of local breeding by waterbirds, particularly colony-breeding species.
3. Provide details on the distribution and numbers of game and priority non-game species of waterbirds on wetlands open to hunting.

Methods:

A total of 136 priority wetlands were identified across Victoria for assessment in 2025. Of these, standardised surveys of targeted waterbird species were made at 121 priority wetlands between 7 and 22 February 2025. Thirteen priority wetlands were determined by satellite imagery to be dry and so were not visited and two priority wetlands (Lake Corringle and Morleys Swamp, both in the Gippsland region) could not be accessed for survey. A further three non-priority wetlands (Lake Gilmour, Lake Marmal and Sandhill Lake, all in Loddon Mallee region) were also surveyed by GMA and DEECA staff during the 2025 DSPWC survey period to check if they were supporting large numbers of significant threatened or rare waterbirds.

Results:

In 2025 the total count of ducks belonging to the eight game species[1] was 76% of the long-term mean and 91% of the mean since the DSPWC began in 2015 (excluding pandemic-affected counts in 2020 and 2021), a similar result to 2024.

There were more dry wetlands (i.e. those holding less than 5% water) than last year with 49% of wetlands categorised as dry compared to 25% in 2024 and 6% in 2023.

Most closures were the result of Australasian Shoveler (a game species, currently prohibited from being hunted) and Blue-billed Duck counts meeting or exceeding trigger levels for closure consideration (as specified in Menkhorst and Thompson 2022).

Listed threatened and Migratory shorebirds, including Curlew Sandpiper, were recorded aggregating in large numbers at Lake Tutchewop (Loddon Mallee).

Conclusions and Implications:

The 2025 Duck Season Priority Waterbird Count was efficiently conducted within the time frames stipulated by the season opening date.

Based on data collected during the count, 18 wetlands were identified as warranting extra management attention during the 2025 duck hunting season.

1 There are eight Australian native waterfowl species that are declared to be 'game' under the Wildlife Act 1975. However, the Australasian Shoveler has a prescribed year-round close season under the Wildlife (Game) Regulations 2024 and may not be hunted.

1 Introduction

Annual counts of waterbirds in the lead-up to the opening of duck hunting season have been conducted at wetlands across Victoria since 1987. The counts were initiated following a recommendation from a review of the management of duck hunting within the state (Loyn 1989, 1991). Between 1987 and 2014, the purpose of the counts (then referred to as the Summer Waterbird Count) was to count waterbirds at as many wetlands as possible across Victoria, regardless of hunting status, but with an emphasis on eight duck species designated as game species under the *Wildlife Act 1975*. This information was used to inform management decisions about further regulation of hunting on specific wetlands during the forthcoming duck hunting season.

In 2015, a new approach was introduced that directed limited survey capacity to wetlands that have been: 1) historically important duck hunting sites; 2) are on public land or are open to hunting; and 3) have a history of supporting threatened waterbird species. There has also been an increasing emphasis on broadening the focus of the surveys to include all threatened waterbirds, including species not often recorded during earlier counts. This change reflects a concern that duck hunting could have more nuanced impacts on waterbirds than simply direct mortality (Menkhorst 2019, Menkhorst and Thompson 2022). This changed approach is reflected in the list of target species, as well as the change of name of the count to Duck Season Priority Waterbird Count (DSPWC) and adjusting the layout of the field data sheet accordingly.

Data collected during the pre-duck season counts have also proven to be valuable for other purposes, including informing the development of management plans for Ramsar sites and other individual wetlands, providing critical data for the Interim Harvest Model (e.g., Klaassen & Kingsford 2021) which was used by the GMA to inform daily bag limits for game ducks prior to the adoption of an Adaptive Harvest Management approach to setting season arrangements, and monitoring population trends of individual species (e.g. Pacioni et al. 2017).

All count data obtained during these surveys are stored in departmental databases held at the Arthur Rylah Institute for Environmental Research (ARI) and submitted to the Victorian Biodiversity Atlas. The results of these annual counts have been published in various reports (Martindale 1988; Hewish 1988; Peter 1989–1992; Purdey and Loyn 2008–2011, 2013; Purdey and Menkhorst 2014–2015), or are available as unpublished reports (Price 1993; O'Brien 1994; Pert 1995; Norman 1996–2006; Norman and Purdey 2007; Menkhorst and Purdey 2016; Menkhorst et al. 2017–2023; Menkhorst and Stamation 2021–2022) and since 2014 have been made available on the website of the Game Management Authority, Victoria (https://www.gma.vic.gov.au/research/duck-research).

The overarching objective of the surveys are to inform decisions on the regulation of duck hunting in Victoria, including possible closure of individual wetlands to hunting during duck hunting season. Specific objectives of the 2025 DSPWC are:

1. Identify wetlands that are open to hunting and currently support large numbers of threatened or rare waterbirds.
2. Identify cases of local breeding by waterbirds, particularly colony-breeding species.
3. Provide details on the distribution and numbers of game and non-game species of waterbirds on wetlands open to hunting.

2 Methods

2.1 Count organisation

In 2025, the field component of the counts was shared equally by the Department of Energy, Environment and Climate Action (DEECA) and the Game Management Authority (GMA). Within DEECA, three regional coordinators arranged on-ground logistics and ensured data sheets were submitted within the timelines. The GMA nominated four regional coordinators to undertake surveys and one staff member responsible for timely data sheet submission.

Each regional coordinator was responsible for liaising locally with DEECA and GMA officers in their region, distributing instructions and count forms, and ensuring adequate coverage of regional wetlands without duplication. The coordinators acted as a conduit for problems encountered during surveys and were expected to review completed forms before forwarding them to the authors at ARI by a specified date.

Regional coordinators were also required to report if any of the priority species or significant breeding events were detected, for example, colony-breeding waterbirds, were found during counts. Completed forms, once processed locally, were scanned and emailed to the authors as soon as possible. This allowed preliminary data to be examined for records of rare or threatened non-game species, or any evidence of breeding birds that might require special protection. At ARI, the authors checked all data sheets for accuracy and completeness, queried coordinators or individual observers on unusual or deficient records and entered data into a Microsoft Access© database.

2.2 Timing of the count relative to season opening

Dates for the counts are set so that enough time is available to recommend further regulation of duck hunting and for management action to be legally enacted prior to the opening of the hunting season. The period of the count has been reduced to 14 days, with the end date being as close as possible to opening day of the duck season while also allowing sufficient time for a review of the data. The timing of the counts also considers the need for consultation with stakeholders and implementation any necessary legal mechanisms to allow management actions to be implemented before the season opens. This timing helps to minimise error due to waterbird movements between the count and opening day of the hunting season. Even so, the period between the count and opening day, which is necessitated by requirements to implement legal mechanisms under the Victorian *Wildlife Act 1975*, is roughly three weeks in any given year, an ample period for flocks of waterbirds to change location. This time lag remains a shortcoming in the decision-making process as it is currently structured. To minimise the chance of errors due to waterbird movements, wetlands at which significant values (numbers of a threatened species exceeding the threshold, or significant breeding activity) are identified during the count are monitored by GMA or DEECA staff prior to management decisions being finalised to ensure that the issue still exists at the site. Further targeted monitoring by GMA or DEECA staff may take place throughout the duck hunting season to assess the need for further management intervention, such as further closures or re-openings.

2.3 Wetlands surveyed

The schedule of priority wetlands for surveying is reviewed each year to account for any foreseeable accessibility challenges (e.g. through private land), and to match staffing capacity. Prior to scheduling the surveys satellite imagery is reviewed for wetlands that are suspected to be dry. Attempts are made to still visit wetlands that are deemed to be dry by satellite imagery, however if resources are limited some wetlands may not be visited. The full list of 136 priority wetlands is provided in Appendix 1, with water levels for the 134 wetlands that could be assessed during the 2025 DSPWC.

2.4 Field methods

All targeted waterbird species were counted (see below) on a wetland (or a defined part of a large wetland), using binoculars or tripod-mounted spotting scopes. Observers were asked to record the wetland name, location (using Australian Map Grid reference or nearest town as a guide), date, time, priority species present and number of individuals of each priority species. At each wetland, an estimate of water level was taken (as a percentage of its full supply level) and, if the entire wetland could not be surveyed, an estimate was sought of the proportion of the wetland that was surveyed. Observations of breeding by any waterbird species were also recorded, including numbers of broods or nests, and nest contents where appropriate.

Wetlands that were found to be dry, or almost so, with no birds visible, were generally not formally surveyed but were simply noted to be not supporting waterbirds.

2.5 Species counted and analysed

Species targeted for counting include the eight game duck species (i.e. native duck species that are declared 'game' under the *Wildlife Act 1975* and may be hunted in Victoria in a normal year[2]). Twelve rare or threatened non-game species were also included in the count (Table 1). These species were identified as being at risk of being mistakenly hunted due to their resemblance or association with game species (e.g., Freckled Duck) or are particularly susceptible to the sorts of disturbance associated with duck hunting (Menkhorst 2019, Menkhorst and Thompson 2022) (Table 1). Other waterbird species were also counted as time permitted. This is a significant change from the previous Summer Waterbird Count (1987–2014) which targeted the eight game species plus eight specified non-game species, including some abundant species such as Black Swan and Hoary-headed Grebe.

Particular attention was also given to identifying active waterbird breeding colonies where adverse impacts of disturbance by hunters may be amplified by the numbers of birds present in a relatively small area. Waterbird species that may breed colonially at Victorian wetlands open to hunting are listed in Table 2.

Table 1. The priority species for the 2025 Duck Season Priority Waterbird Count

*Note that hunting of one game species, the Australasian Shoveler, was prohibited during the 2025 season.

	English name	Scientific name
Game species	Australian Shelduck	*Tadorna tadornoides*
	Australian Wood Duck	*Chenonetta jubata*
	Australasian Shoveler*	*Spatula rhynchotis*
	Chestnut Teal	*Anas castanea*
	Grey Teal	*Anas gracilis*
	Hardhead	*Aythya australis*
	Pacific Black Duck	*Anas superciliosa*
	Pink-eared Duck	*Malacorhynchus membranaceus*
Non-game priority species	Australian Painted-snipe	*Rostratula australis*
	Australasian Bittern	*Botaurus poiciloptilus*
	Blue-billed Duck	*Oxyura australis*
	Brolga	*Antigone rubicunda*
	Curlew Sandpiper	*Calidris ferruginea*
	Freckled Duck	*Stictonetta naevosa*
	Great Egret	*Ardea alba*
	Plumed (Intermediate) Egret	*Ardea (intermedia) plumifera*
	Latham's Snipe	*Gallinago hardwickii*
	Little Egret	*Egretta garzetta*
	Magpie Goose	*Anseranas semipalmata*
	Musk Duck	*Biziura lobata*

2 Note, Australasian Shoveler are declared game but cannot be hunted under the Wildlife (Game) Regulations 2024. They are still counted as part of the DSPWC.

Table 2. Waterbird species that may breed colonially at wetlands open to hunting in Victoria.

English name	Scientific name
Australasian Darter	*Anhinga novaehollandiae*
Australian Painted-snipe	*Rostratula australis*
Australian Pelican	*Pelecanus conspicillatus*
Australian White Ibis	*Threskiornis moluccus*
Caspian Tern	*Hydroprogne caspia*
Eastern Cattle Egret	*Bubulcus coromandus*
Fairy Tern	*Sternula nereis*
Glossy Ibis	*Plegadis falcinellus*
Great Cormorant	*Phalacrocorax carbo*
Great Egret	*Ardea alba*
Gull-billed Tern	*Gelochelidon nilotica*
Plumed (Intermediate) Egret	*Ardea (intermedia) plumifera*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Little Egret	*Egretta garzetta*
Little Pied Cormorant	*Microcarbo melanoleucos*
Little Tern	*Sternula albifrons*
Magpie Goose	*Anseranas semipalmata*
Nankeen Night-Heron	*Nycticorax caledonicus*
Pied Cormorant	*Phalacrocorax varius*
Pied Stilt	*Himantopus leucocephalus*
Red-necked Avocet	*Recurvirostra novaehollandiae*
Royal Spoonbill	*Platalea regia*
Silver Gull	*Chroicocephalus novaehollandiae*
Straw-necked Ibis	*Threskiornis spinicollis*
Whiskered Tern	*Chlidonias hybrida*
Yellow-billed Spoonbill	*Platalea flavipes*

3 Results

3.1 Number of wetlands counted

The 2025 DSPWC contributes to a dataset now spanning the 38 years from 1987. In 2025, counts were made at 121 priority wetlands, 54 of these were dry (i.e. those holding less than 5% water). A further 13 priority wetlands were determined dry by satellite and were not visited (see Appendix 1) giving a total of 134 priority wetlands assessed (99%). Waterbirds at a further three non-priority wetlands were also counted (Appendix 2).

The numbers of priority wetlands in each DEECA region and the number that were surveyed or not surveyed in 2025 are shown in Table 3. Table 4 shows the annual effort since counts began in 1987, and the numbers of game and non-game birds counted.

Table 3. Coverage of priority wetlands in the 2025 Duck Season Priority Waterbird Count by DEECA region.

The 13 wetlands that were determined dry by satellite and not surveyed are considered to have been 'assessed'.

DEECA region	Number of priority wetlands	Number of priority wetlands holding water and surveyed	Number of priority wetlands that were dry	Number of priority wetlands not assessed
Barwon South West	32	16	16	0
Gippsland	15	11	2	2
Grampians	34	12	22	0
Hume	15	4	11	0
Loddon Mallee	40	24	16	0
All	**136**	**67 (49%)**	**67 (49%)**	**2 (1%)**

Table 4. Summary of Summer Waterbird Counts and Duck Season Priority Waterbird Counts conducted in Victoria from 1987 to 2025.

SWC = Summer Waterfowl Count; DSPWC = Duck Season Priority Waterbird Count.

Program	Year	Count Period	Number of wetlands surveyed	Total Count of game species
SWC	1987	17 – 25 January	332	205,000
	1988	6 – 14 February	472	294,108
	1989	4 – 12 February	626	292,598
	1990	18 – 26 February	668	385,148
	1991	16 – 24 February	786	414,417
	1992	22 February – 1 March	659	408,004
	1993	20 – 28 February	534	218,562
	1994	26 February – 6 March	284	292,899
	1995	25 February – 5 March	367	196,955
	1996	24 February – 3 March	234	200,861
	1997	22 February – 2 March	223	124,914

Program	Year	Count Period	Number of wetlands surveyed	Total Count of game species
	1998	21 February – 1 March	309	216,476
	1999	27 February – 7 March	312	206,839
	2000	26 February – 5 March	298	128,021
	2001	24 February – 4 March	336	240,671
	2002	23 February – 3 March	225	231,235
	2003	22 February – 2 March	175	155,623
	2004	21 – 29 February	249	187,139
	2005	19–27 February	272	155,069
	2006	25 February – 5 March	268	182,487
	2007	24 February – 4 March	176	91,210
	2008	23 February – 2 March	191	58,628
	2009	21 February – 1 March	161	78,723
	2010	20–28 February	153	77,649
	2011	19 February – 6 March	201	104,903
	2012	11 February – 4 March	136	212,865
	2013	9 February – 2 March	133	185,507
	2014	10 – 23 February	166	267,055
DSPWC	2015	16 – 28 February	126	159,666
	2016	15 – 26 February	131	92,168
	2017	13 – 24 February	127	283,430
	2018	12 – 23 February	144	262,397
	2019	11 – 22 February	135	225,733
	2020*	30 March – 12 April & 22 – 30 April	62	3,250
	2021*	19 April – 4 May	84	45,730
	2022	7 – 20 February	139	40,202
	2023	7 – 20 February & 16 - 28 March	127	52,129
	2024	27 February – 14 March	133	132,246
	2025	7 – 22 February	**134**	**141,142**
	Mean		**264**	**185,940**

*Count severely affected by COVID-19 pandemic travel restrictions.

3.2 Game species

In 2025, the total count of ducks belonging to the eight game species was 141,142, 76% of the long-term mean and 91% of the mean since the DSPWC began in 2015 (excluding pandemic-affected counts in 2020 and 2021 (Table 4). The count total was similar to that in 2024, and considerably higher than in 2022 and 2023 when high rainfall events caused flooding across inland Victoria and southern NSW (October 2022), and in north-eastern New South Wales and south-eastern Queensland (early 2023). Such rainfall events likely attract many waterbirds from larger Victorian wetlands (Loyn et al. 2014, Clarke et al. 2015, Bino et al. 2020, Papas et al. 2021, Menkhorst et al. 2023).

One species, the Grey Teal, made up 53% of the total game duck count, with the Chestnut Teal contributing a further 18% and Pink-eared Duck 10%. Thus, these three species made up 81% of all game ducks counted. Australian Shelduck and Pacific Black Duck accounted for 7% and 6% of all game ducks counted respectively, and the remaining game species (Australian Wood Duck, Australasian Shoveler and Hardhead) made only a 6% contribution.

3.3 Threatened waterbirds considered sensitive to disturbance

Sightings were made of 10 of the 12 threatened, non-game waterbird species targeted for attention during the 2025 DSPWC (see Table 1). These sightings are briefly summarised below.

3.3.1 Blue-billed Duck

The Blue-billed Duck is a non-game species that is of particular concern because it is listed as Vulnerable under the *Flora and Fauna Guarantee Act 1988.* During the 2025 DSPWC, the Blue-billed Duck was recorded at 13 wetlands with the largest group being 187 at Tower Hill Lake (Barwon South West) on 18 February 2025. The total number of Blue-billed Ducks observed during the 2025 DSPWC was 504, less than half that were observed during the 2024 count.

3.3.2 Freckled Duck

The Freckled Duck is a non-game species that is of particular concern because it is listed as Endangered under the *Flora and Fauna Guarantee Act 1988*. Freckled Ducks are at risk of being shot during duck hunting season because they can be difficult to distinguish from Pacific Black Duck and sometimes Hardhead when flying or fly in mixed flocks with game ducks. During the 2025 DSPWC, the Freckled Duck was recorded at eight wetlands. The largest aggregation was 76 at Lake Lonsdale (Grampians) on 17 February 2025. The total number of Freckled Duck observed during the 2025 DSPWC was 119, similar to last year's count of 101 but below the 2023 count of 246 and well below the highest total of 1,626 observed in 2018.

3.3.3 Musk Duck

The Musk Duck is a non-game species that is of particular concern because it is listed as Vulnerable under the *Flora and Fauna Guarantee Act 1988.* It was recorded at 16 wetlands during the 2025 count, but there were only eight wetlands where numbers exceeded 10. There was one large aggregation of 167 at Lake Elingamite (Barwon South West) on 13 February 2025.

3.3.4 Magpie Goose

The Magpie Goose is a non-game species that is of particular concern because it is listed as Vulnerable under the *Flora and Fauna Guarantee Act 1988.* A single Magpie Goose was recorded during the 2025 count, at Tower Hill (Barwon South West) on 18 February 2025.

3.3.5 Brolga

The Brolga is a non-game species that is of particular concern because it is listed as Endangered under the *Flora and Fauna Guarantee Act 1988.* The number of Brolga observed during the 2024 DSPWC was 26, considerably lower than the previous season when 245 Brolga were observed across 15 wetlands, including an aggregation of 149 at Lake Muirhead (Grampians). In 2025 Brolga were only observed at six wetlands with the largest aggregation of five observed at Green Lake (Loddon Mallee) on 17 February 2025. There were however third-party reports of Brolga in large numbers at Greens Swamp (90) and Lake Muirhead (244) during the DSPWC period, but outside of the days these sites were surveyed. In 2025 the Annual Brolga

Count (a monitoring program co-ordinated by DEECA) coincided with the DSPWC survey period and so numbers of Brolga observed during this annual count (https://www.swifft.net.au/cb_pages/sp_brolga.php#2025) were considered when assessing wetlands for further regulation. On 15 February, during the Annual Broga Count, significant numbers of Brolga (44 and 32) were observed at Lake Muirhead (Grampians) and Lake Weering (Barwon South West) respectively. In addition, 20 Brolga were reported by ARI staff at Lake Stewart (a private wetland in Loddon Mallee) on 12 February whilst conducting fieldwork for another research program**.**

3.3.6 Great Egret

The Great Egret is listed as Vulnerable under the *Flora and Fauna Guarantee Act 1988.* This species was present at 27 of the monitored wetlands with the largest aggregation at Lake Cullen (Loddon Mallee), where four individuals were present on 21 February 2025.

3.3.7 Plumed Egret

The Plumed Egret is listed as Critically Endangered under the *Flora and Fauna Guarantee Act 1988.* In total 111 Plumed Egret were reported across four wetlands and numbers were greater than 10 at all four wetlands. The largest group reported was 36, at Lake Cullen on 21 February 2025; followed by 33 at Reedy Lake, Nagambie on 10 February 2025; and 30 at Lake Leaghur on 19 February 2025. However, there remains some doubt over these records; they may have been misidentified Great Egret. Plumed Egret at these sites and in these numbers would be considered exceptional. Counts at Reedy Lake and Lake Leaghur in the week preceding (by ARI staff) did not identify any Plumed Egret nor did subsequent third-party reports that were received following the DSPWC period.

3.3.8 Little Egret

The Little Egret is listed as Endangered under the *Flora and Fauna Guarantee Act 1988*. Breeding in Victoria appears to be confined to several tiny colonies near Geelong, Queenscliff and at Mud Islands. Former breeding colonies at Gunbower Island on the Murray River have been inactive for several decades. A single Little Egret was reported during the 2025 DSPWC, at Lake Marmal (a non-priority wetland in Loddon Mallee). In 2024 Little Egrets were reported at six wetlands during the DSPWC, however in numbers that were low overall with a total of 28 reported for that year.

3.3.9 Latham's Snipe

Although not formally listed as threatened in Victoria, there is concern that Latham's Snipe is declining. It has recently been listed as Vulnerable under the *EPBC Act 1999*. Two Latham's Snipe were recorded at Lake Colac and another two at Hospital Swamp (Barwon South West) during the 2025 DSPWC.

3.3.10 Curlew Sandpiper

The Curlew Sandpiper is listed as Critically Endangered under the *Flora and Fauna Guarantee Act 1988*. Curlew Sandpiper were observed during the 2025 DSPWC across five wetlands. It was originally reported that ~1000 Curlew Sandpiper were present at Lake Tutchewop (Loddon Mallee) on 20 February. However, review of images taken on the day suggested a mix of Sharp-tailed Sandpiper, Red-necked Stint and Curlew Sandpiper. Nevertheless, this represents a significant aggregation of migratory shorebirds at an inland wetland.

3.4 Breeding and moulting

The Victorian duck hunting season is timed to occur after the main waterbird breeding period (July–January in Victoria) and after game species have completed their post-breeding moult. The survey results indicate that breeding by waterfowl was largely finished statewide at the time of the 2025 DSPWC, with no broods of ducklings reported during the count period.

There was one instance of colonial nesting observed in the south-central portion of Dowds Morass State Game Reserve (Gippsland) on 10 February 2025, with an estimate of 100 individual Pied Cormorants, including ~70 immatures on nests.

3.5 Further regulation of hunting activity

In 2025, information collected during the DSPWC contributed to decisions to further regulate hunting activity. This included the closure of 20 wetlands due to the count of at least one threatened waterbird species meeting trigger levels (see Menkhorst and Thompson, 2022) or the presence of colonial breeding, ahead of the commencement of the 2025 duck season; five of these wetlands were reopened during the season as the trigger was no longer met (see Table 5). A further five wetlands were closed prior to the 2025 duck season for reasons outside of the DSPWC and two wetlands (Green Lake and the adjoining Fresh Lake in Loddon Mallee) were closed during the season following agency verification of third-party reports of significant numbers of threatened species (Table 6).

Table 5. Wetlands that received further regulation of hunting based on the information collected during the 2025 Duck Season Priority Waterbird Count.

Wetland name	Action trigger	Management action
*Hospital Swamp	Australasian Shoveler	Closed to hunting
Lake Elingamite	Australasian Shoveler, Blue-billed Duck, Musk Duck,	Closed to hunting
Lake Lonsdale	Australasian Shoveler, Freckled Duck	Closed to hunting
Lake Straun	Blue-billed Duck	Closed to hunting
Tower Hill SGR	Australasian Shoveler, Blue-billed Duck	Closed to hunting
Lake Weering	Brolga	Closed to hunting
Lake Muirhead	Brolga	Closed to hunting
Lake Wongan	Australasian Shoveler, Brolga	Closed to hunting
First Marsh	White-bellied Sea Eagle	Closed to hunting
Lake Bael Bael	Australasian Shoveler	Closed to hunting
*Lake Cullen	Australasian Shoveler	Closed to hunting
Little Lake Meran	Australasian Shoveler, Blue-billed Duck	Closed to hunting
Round Lake (nth of L Meran)	Australasian Shoveler, Blue-billed Duck	Closed to hunting
Little Spectacle Lake	Australasian Shoveler, Blue-billed Duck	Closed to hunting
Great Spectacle Lake	Australasian Shoveler, Blue-billed Duck	Closed to hunting
Lake Cope Cope	Freckled Duck	Closed to hunting
Lake Tooliorook	Blue-billed Duck, Australasian Shoveler	Closed to hunting
*Lake Tutchewop	Significant Shorebird aggregation	Closed to hunting
*Lake Stewart	Brolga	Closed to hunting
**Dowds Morass SGR	Colonial nesting birds	Partial closure

*reopened during the season as birds were no longer present at threshold levels at the site

**reopened during the season when breeding had ceased.

Table 6. Wetlands that were closed ahead of the 2025 duck hunting season for other reasons including surveys outside of the DSPWC period.

Wetland name	Action trigger	Management action
Kow Swamp	Reaffirm Wildlife Sanctuary status	Closed to hunting
Reedy Lakes (near Kerang)	Reaffirm Wildlife Sanctuary status	Closed to hunting
Richardson River (near Lake Buloke)	Reaffirm Wildlife Sanctuary status	Closed to hunting
Anderson Inlet	Known habitat for Orange-bellied Parrots	Closed to hunting
Lake Connewarre	Significant number of Orange-bellied Parrot	Closed to hunting
*Green Lake	Brolga	Closed to hunting
*The Fresh Lake (adjoining Green Lake)	Brolga	Closed to hunting

*closed during the season following agency verification of third-party reports of significant numbers of threatened species.

4 Discussion

The total count of game ducks in the 2025 DSPWC was 91% of the mean for the past eleven years (excluding pandemic-affected counts in 2020 and 2021) up from 85% in 2024 and just 28% in 2023. This suggests a considerable increase in game duck species in Victorian priority wetlands in the last couple of years, following the drop that occurred during the La Nina event years of 2020–2023. The increase in duck numbers in these wetlands occurred despite more of them being dry (i.e. holding less than 5% water) with 49% of wetlands categorised as dry in 2025 compared to 6% in 2023 and 25% in 2024. It is likely that in 2024/25, some ducks relocated from drying wetlands to those priority wetlands that still held water. In contrast to increased duck numbers in the priority wetlands monitored in the 2025 DSPWC, the total statewide abundance of game ducks in November-December 2024 decreased by around 32% from the equivalent adaptive harvest model based in the previous year (Ramsey and Fanson 2025). It is likely that these differences reflect different survey designs between the two surveys. The priority waterbird counts are restricted to wetlands of traditional importance to duck hunting, or of traditional importance to threatened bird species. It is probable that such wetlands are disproportionately likely to be used as a refuge by waterbirds in dry conditions. In contrast, the estimates of statewide abundance of game ducks are based on models that correct for the extent of surface water in Victoria each year (using data on water cover from satellite imagery). The years of 2024 and 2025 have been generally drier than the preceding three years in Victora (Porter et al. 2024, http://www.bom.gov.au/climate/current/annual/vic/summary.shtml); the extent of surface water in Victoria has decreased markedly. In addition to probably being responsible for overall declines in the number of ducks in Victoria (Porter et al. 2024, Ramsay and Fanson 2025), the declining availability of surface water has presumably forced some of the game ducks that remain in Victoria to relocate to refuge wetlands such as those monitored in the DSPWC.

4.1 Limitations and constraints

The limitations and constraints of the DSPWC need to be appreciated when considering the results. While it is the only long-term, land-based survey of Victoria's waterbirds, with annual counts since 1987, the number of wetlands surveyed has declined from a peak of 786 wetlands in 1991, to 121–150 in recent years. Regional organisers are now encouraged to focus survey effort on those wetlands that are on public land, are open to hunting and which consistently hold large numbers of game species. This biases the data towards waterbird species that prefer large and more permanent wetlands (such as Hardhead, Blue-billed Duck, Eurasian Coot and Hoary-headed Grebe), and against those species that prefer shallower, ephemeral and more highly vegetated wetlands (such as teal, Australasian Shoveler, Pink-eared Duck and bitterns). Australasian Bittern is a target species that can be easily overlooked and so additional effort (e.g. wading through vegetation) may be required at wetlands that have supported bitterns in the past and/or are identified as having suitable habitat. Furthermore, as survey coverage decreases, the chances of the survey failing to record aggregations of significant species increases, which compromises the value of the counts as a tool for minimising the impact of duck hunting on wetland values.

4.2 Next steps and recommendations

The original Summer Waterfowl Count was designed to achieve two main objectives (Loyn 1989, 1991):

1. to locate flocks of threatened waterfowl or breeding aggregations of waterbirds that may warrant additional management during the coming duck hunting season.
2. to obtain data on numbers of waterbirds in Victoria for long-term monitoring.

Management of game species requires long-term tracking of changes in species abundance across the state and the continent. The inherent variability of the Australian climate has profound effects on the availability of habitat for waterbirds, and breeding opportunities are typically provided by flood events in disparate parts of the continent (e.g., Frith 1982; Kingsford and Norman 2002).

Long-term datasets are essential to tease out the relative importance of these climatic influences, compared to immediate human impacts, such as hunting and the provision of environmental water. Such datasets are rare in Australia, and many have been discontinued. In Victoria, only Western Port has been monitored long-term for waterbirds, since 1973 (Loyn et al. 1994; Hansen et al. 2015), and the Western Treatment Plant has been intensively monitored since 2000 (Loyn et al. 2014). On a much broader scale, the Eastern Australian

Aerial Waterbird Survey (EAAWS), which began in 1983, has provided annual abundance indices of waterbirds and wetland habitats across a standard series of aerial transect lines from Queensland to Victoria and into South Australia (see https://www.ecosystem.unsw.edu.au/content/rivers-and-wetlands/waterbirds/eastern-australian-waterbird-survey). However, the aerial transect lines used in the EAAWS are widely spaced (2 degrees of latitude or approximately 168 km in Victoria) and thus many important Victorian wetlands are not covered.

The DSPWC adds a broad perspective to our understanding of waterbird numbers and distribution within Victoria, with data having been collected from many wetlands (121+ annually, and approximately 1,500 altogether) since 1987. The data summarised here add to the series that is used to assist decision making about duck hunting and wetland management in the state, as envisaged by Loyn (1991). Only a sample of the State's wetlands are surveyed each year, and it should be stressed that most of these counts do not provide data on absolute numbers of waterbirds or total species diversity. While the primary aim is to identify wetlands that warrant consideration for further regulation of hunting (objective 1) and that emphasis has been exaggerated as survey resources have decreased, it still has value as an index of abundance for comparisons between years (objective 2), with appropriate recognition of the data limitations as described above. Examples of appropriate use of the DSPWC data include Murray et al. (2012) and Klaassen and Kingsford (2021). DSPWC data have also proved helpful in other projects including assessing species population trends (e.g., Pacioni et al. 2017), BirdLife Australia's Australian Waterbird Index project (Clemens et al, 2019) and assessing the success of management to maintain Ramsar values.

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Appendix 1: List of priority wetlands and assessment status

DEECA Region	Wetland Name	Latitude	Longitude	Dry	Assessed
Barwon South West	Brown Swamp	-38.27	144.13	Y	✓
Barwon South West	Bryans Swamp	-37.56	142.27	Y	✓
Barwon South West	Bullrush Swamp	-37.77	142.23	N	✓
Barwon South West	Carter Swamp	-38.24	143.30	Y	✓
Barwon South West	Cundare Pool	-38.09	143.59	Y	✓
Barwon South West	Deep Lake (Derrinallum)	-37.93	143.17	N	✓
Barwon South West	Deep Lake (Nerrin Nerrin)	-37.79	143.04	N	✓
Barwon South West	Eurack Swamp	-38.13	143.70	Y	✓
Barwon South West	Hospital Swamp	-38.23	144.41	N	✓
Barwon South West	Lake Balkil Narra	-38.12	143.37	Y	✓
Barwon South West	Lake Bookar	-38.13	143.12	N	✓
Barwon South West	Lake Colac	-38.30	143.59	N	✓
Barwon South West	Lake Colongulac	-38.17	143.16	N	✓
Barwon South West	Lake Connewarre	-38.23	144.45	N	✓
Barwon South West	Lake Coradgill	-38.11	143.36	Y	✓
Barwon South West	Lake Elingamite	-38.35	143.01	N	✓
Barwon South West	Lake Fyans	-37.14	142.63	N	✓
Barwon South West	Lake Gherang	-38.25	144.06	Y	✓
Barwon South West	Lake Kariah	-38.17	143.21	Y	✓
Barwon South West	Lake Kennedy	-37.77	142.18	Y	✓
Barwon South West	Lake Koreetnung	-38.18	143.24	Y	✓
Barwon South West	Lake Lonsdale	-37.03	142.63	N	✓
Barwon South West	Lake Martin	-38.07	143.58	Y	✓
Barwon South West	Lake Murdeduke	-38.17	143.89	N	✓
Barwon South West	Lake Punpundal	-38.13	143.37	Y	✓
Barwon South West	Lake Round	-38.13	143.21	N	✓
Barwon South West	Lake Struan	-38.01	143.42	N	✓
Barwon South West	Lake Terang Goodwich	-38.12	143.37	Y	✓
Barwon South West	Lake Weering	-38.08	143.68	Y	✓
Barwon South West	Lough Calvert	-38.18	143.69	Y	✓
Barwon South West	Reedy Lake (Geelong)	-38.21	144.42	N	✓
Barwon South West	Tower Hill	-38.32	142.35	N	✓
Gippsland	Blond Bay SGR	-38.01	147.52	N	✓
Gippsland	Clydebank Morass	-38.04	147.22	N	✓
Gippsland	Dowds Morass SGR	-38.14	147.23	N	✓
Gippsland	Freshwater Swamp SGR	-38.56	146.96	Y	✓
Gippsland	Heart Morass	-38.12	147.20	N	✓
Gippsland	Hollands Landing (Lagoon)	-38.06	147.45	N	✓
Gippsland	Jack Smith SGR	-38.50	147.00	Y	✓
Gippsland	Lake Coleman	-38.16	147.33	N	✓
Gippsland	Lake Corringle	-37.78	148.49	N	☒
Gippsland	Lake Curlip	-37.75	148.57	N	✓
Gippsland	Lake Kakydra	-38.07	147.20	N	✓

DEECA Region	Wetland Name	Latitude	Longitude	Dry	Assessed
Gippsland	Lake Wat Wat	-37.76	148.52	N	✓
Gippsland	Macleods Morass	-37.84	147.63	N	✓
Gippsland	Morleys Swamp	-38.09	147.44	N	☒
Gippsland	Victoria Lagoon	-38.04	147.45	N	✓
Grampians	Black Swamp (Balmoral)	-37.50	143.60	Y	✓
Grampians	Booroopki Swamp	-36.73	141.22	Y	✓
Grampians	Bradys Swamp	-37.59	142.45	Y	✓
Grampians	Dock Lake	-36.77	142.30	N	✓
Grampians	Greens Swamp Wildlife Reserve	-37.00	141.78	Y	✓
Grampians	Jacka Lake	-36.80	141.81	Y	✓
Grampians	Lake Albacutya	-35.75	141.97	Y	✓
Grampians	Lake Batyo Catyo	-36.52	142.94	Y	✓
Grampians	Lake Bolac	-37.72	142.88	N	✓
Grampians	Lake Buninjon	-37.48	142.78	Y	✓
Grampians	Lake Burrumbeet	-37.50	143.64	N	✓
Grampians	Lake Carpolac	-36.85	141.32	N	✓
Grampians	Lake Clarke	-36.87	141.86	Y	✓
Grampians	Lake Coorong	-35.73	142.40	Y	✓
Grampians	Lake Goldsmith	-37.54	143.36	N	✓
Grampians	Lake Hancock	-36.55	142.92	Y	✓
Grampians	Lake Hindmarsh	-36.04	141.91	Y	✓
Grampians	Lake Karnak	-36.83	141.51	Y	✓
Grampians	Lake Koynock	-36.82	141.51	Y	✓
Grampians	Lake Linlithgow	-37.75	142.22	N	✓
Grampians	Lake Muirhead	-37.49	142.61	Y	✓
Grampians	Lake Natimuk	-36.70	141.94	Y	✓
Grampians	Lake Turangmoroke	-37.73	142.89	N	✓
Grampians	Lake Wongan	-37.61	143.15	N	✓
Grampians	McGlashins Swamp	-37.09	141.76	Y	✓
Grampians	Merin Merin Swamp	-37.23	143.80	Y	✓
Grampians	Pine Lake	-36.79	142.35	N	✓
Grampians	Toolondo Reservoir	-37.02	141.95	N	✓
Grampians	Walkers Swamp	-37.57	142.48	Y	✓
Grampians	Wally Allans Swamp	-36.77	141.48	Y	✓
Grampians	Winter Lake	-36.88	141.27	Y	✓
Grampians	Yarrackigarra Swamp	-36.72	141.24	Y	✓
Hume	Big Reedy Lagoon	-35.98	145.92	Y	✓
Hume	Black Swamp (Nine Mile Creek)	-36.14	145.45	Y	✓
Hume	Buffalo Dam	-36.71	146.66	N	✓
Hume	Doctors Swamp	-36.62	145.18	Y	✓
Hume	Dowdle Swamp	-36.10	146.03	Y	✓
Hume	Green Lake (north of Lake Cooper)	-36.44	144.84	N	✓
Hume	Jubilee Swamp	-36.57	145.76	Y	✓
Hume	Lake Cooper	-36.50	144.81	N	✓
Hume	Lake Moodemere	-36.05	146.39	N	✓
Hume	Lehmann Swamp	-36.56	145.61	Y	✓
Hume	Loch Garry	-36.23	145.31	N	✓

DEECA Region	Wetland Name	Latitude	Longitude	Dry	Assessed
Hume	McBurney Swamp	-36.58	145.56	Y	✓
Hume	Moodie Swamp	-36.23	145.79	Y	✓
Hume	Morphett Swamp	-36.54	145.78	Y	✓
Hume	Reedy Lake (Nagambie)	-36.72	145.10	N	✓
Hume	Rowan Swamp	-36.29	145.98	Y	✓
Hume	Tungamah Swamp	-36.15	145.92	Y	✓
Loddon Mallee	First Marsh	-35.67	143.74	N	✓
Loddon Mallee	Heywoods Lake	-34.79	143.21	N	✓
Loddon Mallee	Hird Swamp	-35.86	144.09	Y	✓
Loddon Mallee	Horseshoe Bend Billabong	-34.14	142.06	N	✓
Loddon Mallee	Johnson's Swamp	-35.82	144.07	Y	✓
Loddon Mallee	Lake Bael Bael	-35.69	143.74	N	✓
Loddon Mallee	Lake Boort	-36.13	143.74	N	✓
Loddon Mallee	Lake Buloke	-36.27	142.96	Y	✓
Loddon Mallee	Lake Cope Cope (Brown's Lake)	-36.46	143.03	N	✓
Loddon Mallee	Lake Cullen	-35.64	143.77	N	✓
Loddon Mallee	Lake Elizabeth	-35.70	143.82	N	✓
Loddon Mallee	Gaynors Swamp	-36.52	144.83	Y	✓
Loddon Mallee	Lake Gil Gil	-36.33	143.04	Y	✓
Loddon Mallee	Lake Grassy (NW corner -public land component)	-36.46	143.06	Y	✓
Loddon Mallee	Lake Leaghur	-35.98	143.80	N	✓
Loddon Mallee	Lake Lyndger	-36.11	143.75	N	✓
Loddon Mallee	Lake Meran	-35.88	143.81	N	✓
Loddon Mallee	Lake Murphy	-35.81	143.87	Y	✓
Loddon Mallee	Lake Nurrumbeet	-36.47	143.06	N	✓
Loddon Mallee	Lake Tutchewop	-35.51	143.75	N	✓
Loddon Mallee	Lake Wallenjoe	-36.48	144.88	Y	✓
Loddon Mallee	Lake Wandella	-35.74	143.88	N	✓
Loddon Mallee	Lake Yando	-36.04	143.78	Y	✓
Loddon Mallee	Little Lake Buloke	-36.32	142.95	Y	✓
Loddon Mallee	Little Lake Meran	-35.85	143.81	N	✓
Loddon Mallee	Mansfield Swamp	-36.44	144.88	Y	✓
Loddon Mallee	McDonalds Swamp	-35.70	144.07	Y	✓
Loddon Mallee	Meridian Basin	-34.26	141.98	Y	✓
Loddon Mallee	Racecourse Lake	-35.61	143.79	N	✓
Loddon Mallee	Richardsons Lagoon	-36.03	144.57	N	✓
Loddon Mallee	Round Lake 1 (west of Lake Boga)	-35.47	143.61	N	✓
Loddon Mallee	Round Lake 2 (n. of Lake Meran)	-36.45	143.07	N	✓
Loddon Mallee	Second Marsh	-35.62	143.74	Y	✓
Loddon Mallee	Third Marsh	-35.60	143.73	Y	✓
Loddon Mallee	Tobacco Lake	-35.86	143.80	N	✓
Loddon Mallee	Woolshed Swamp	-36.17	143.72	N	✓
Loddon Mallee	Wooroonook Lake (Church)	-36.27	143.21	N	✓
Loddon Mallee	Wooroonook Lake (Middle)	-36.27	143.20	Y	✓

Appendix 2: Other wetlands surveyed

DEECA Region	Wetland Name
Loddon Mallee	Lake Gilmour
	Lake Marmal
	Sandhill Lake

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