To: Minister for Outdoor Recreation

OFFICIAL

Game Management Authority

ARRANGEMENTS FOR THE 2025 STUBBLE QUAIL SEASON

Core message

The Stubble Quail is common, widespread, can respond rapidly to changing environmental conditions and is highly productive when conditions are favourable. These traits make it resilient to harvesting. There are approximately 25,800 hunters licensed to hunt Stubble Quail in Victoria and 3,000 - 7,000 of these actively hunt each year. On average, approximately 178,000 quail are harvested each year. The way that Stubble Quail hunting is conducted provides a number of protections from overharvesting, particularly that they are mostly hunted on private land, which can only be done legally with the permission of the landowner/manager. Stubble Quail immigration from other eastern Australian states dilutes the effect of harvesting in Victoria. Current environmental conditions for Stubble Quail have declined following a dry winter-summer throughout Victoria. This has resulted in a 50% reduction in Stubble Quail abundance from the previous year, which is typical of the boom and bust life-history of the species. Currently, it is estimated there are 2.4 million Stubble Quail in Victoria.

Despite the decline in abundance from the previous 12 months, the Game Management Authority Board considers that, based on the best available evidence, the Victorian Stubble Quail population is at a level that can sustain harvests at the expected level under existing seasonal arrangements. Therefore, variation from the prescribed hunting season arrangements is not considered necessary for ongoing sustainable management of the population. Population and environmental conditions will be monitored and reviewed prior to next year's season to assess whether hunting arrangements require revision to ensure sustainability.

Due	As soon as possible
Explanation	To allow industry, the hunting community and government agencies to make arrangements.

Recommendation

That you:

1. Note the contents of this brief and that the Game Management Authority does not consider there is any substantive basis to vary the Stubble Quail season from the current prescribed arrangements.

Recommendation 1 ☐ Approved ☐ Not approved ☐ Noted ☐ Returned for review

Minister's Comments

Signed **Steve Dimopoulos MP**
Minister for Outdoor Recreation

Date

Approved by Signature removed

Date 11 March 2025

Corrie Goodwin, Acting Chair Game Management Authority ☎ text removed

Endorsed by: Graeme Ford, CEO Game Management Authority ☎ text removed

Prepared by: text removed

From	GAME MANAGEMENT AUTHORITY	**Ref**	
Title	ARRANGEMENTS FOR THE 2025 STUBBLE QUAIL SEASON	**File**	
		Due	As soon as possible

1. Key Information

Biology and ecology

The Stubble Quail is the most common quail species in Australia. Its conservation status is listed as 'Least Concern' by the International Union for the Conservation of Nature. Stubble Quail are widespread and found throughout all states and territories of Australia. It is a nomadic species capable of long-distance movements and can respond rapidly to changing environmental conditions. It is a ground-dwelling bird that can be found in a diverse range of habitats, from very dry parts of Australia to alpine grasslands.

Stubble Quail prefer grassland made up of native or introduced grasses and crops. It has adapted to agriculture and has likely increased its range following European settlement, despite significant reductions in its original habitat of native grasslands. Stubble Quail feed on seeds, other plant material and insects. Population abundance is strongly influenced by rainfall and the resultant impact on food availability. The species is highly productive and can breed at four months of age and lays average clutches of 7-8 eggs. Although its primary period of production is in spring each year, it can breed multiple times in a year if conditions are favourable. These life-history traits make the species resilient to recreational hunting.

Changes in agricultural practices, such as the increased use of pesticides and herbicides, large monocultures of crops and more intensively grazed pastures, has been found to impact ground-dwelling gamebirds internationally. It is currently unknown whether this has impacted Stubble Quail populations in Australia or whether it has offset any benefits to the species from agriculture.

While research into the ecology and biology of the species is limited, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) undertook research into the species' breeding, movements and diet in the 1970s-80s. Harvests have been monitored in Victoria using various methods since 1996. An ongoing abundance monitoring program commenced in Victoria in 2022 under the government's Sustainable Hunting Action Plan. A wing collection program has also commenced to collect demographic data on the species.

Hunting

The Stubble Quail is the only native quail species that can be hunted in Victoria. The Wildlife (Game) Regulations 2024 (the Regulations) prescribe the annual arrangements for the Stubble Quail season, such as season dates, bag limits and hunting methods, including the use of gundogs. The season runs for approximately three months commencing in early-April and concluding at the end of June. The daily bag limit is 20 birds. Seasonal arrangements have remained unchanged for several decades, with the exception of one year in 2023.

Approximately 25,800 people are licensed to hunt Stubble Quail in Victoria. Harvest surveys show the number of hunters who actually hunt each year fluctuates between approximately 3,000 – 7,000. Participation declines during drier periods and increases during wetter periods, reflecting Stubble Quail abundance. Stubble Quail hunters collectively hunt on average for about 22,000 days per season, however, this can be as high as 47,000 days, as was the case in 2011 when environmental conditions were particularly favourable.

Harvest surveys show that approximately 90% of quail hunting occurs on private land, in harvested crop stubble paddocks or on improved or mixed pasture or grasslands. There are 16 State Game Reserves available for Stubble Quail hunting on public land. Approximately 70-80% of hunters use a gundog to assist in hunting.

The average seasonal harvest of Stubble Quail is approximately 178,000 birds per year. However, this can fluctuate in response to bird abundance, with harvest levels in the last decade ranging from a low of approximately 16,000 in 2014 to a high of approximately 678,000 in 2011 (this excludes COVID-affected years).

The average quail harvested per hunter per hunting day over that period is approximately eight birds and the average seasonal harvest per active hunter is 50 birds.

Wounding levels in Stubble Quail hunting are unknown. The extensive use of gundogs by hunters may lower the incidence of a wounding as the use of a well-trained dog is known to reduce wounding by locating birds, allowing hunters to move within effective shotgunning range and assisting in locating downed birds. Under the Sustainable Hunting Action Plan, a quail wounding reduction action plan is currently in preparation and is being developed in consultation with the Wounding Reduction Working Group which is made up of key stakeholders.

The GMA provides education material to hunters on how to minimise wounding and the recently introduced mandatory knowledge test for native game bird hunters includes questions on wounding.

Systemic protections from overharvesting

The majority of hunting occurs on private land. Permission to hunt must be obtained from the landowner/manager before being allowed to hunt with firearms. This prevents large concentrations of hunters in any one area. The number of hunters hunting at any one time and in an area is generally low, and hunters are dispersed widely in low densities. Stubble Quail are dispersed across the landscape in a variety of habitats. The distribution of Stubble Quail throughout eastern Australia, including the Queensland and New South Wales (where they cannot be hunted) and South Australia (where there is low-level hunting), provides a reservoir of birds which can immigrate into Victoria and dilute the effects of hunting. This lowers any risk posed by short-term over-harvesting should that occur.

This combination of dispersed hunting pressure, low hunter numbers and densities, the lack of bird concentration and immigration from other eastern Australian states provides a level of protection from over-harvesting. Stubble Quail are also cryptic (secretive, well-camouflaged and not easy to see) and difficult to locate unless they are flushed while walking or located with the use of a gundog.

Current habitat conditions for Stubble Quail

Stubble Quail predominantly occur in open grasslands (native and improved) and croplands, and these environments benefitted from three years of high rainfall across eastern Australia associated with the 2020-2022 La Niña event. However, habitat conditions for Stubble Quail have declined from the previous year following a period of below average rainfall over most of Victoria in the last 12 months (see Figure 1). Dry conditions since winter 2023 have reduced pasture (grasses and crops) growth (see Figure 2).

Stubble Quail take advantage of cropped areas, where they feed on spilled grain. The Commonwealth Department of Agriculture, Fisheries and Forestry forecast that winter crop production in Victoria is estimated to fall by 31% in 2024– 25. This is 7% below the 10-year average. Lower production follows below to very much below average growing season rainfall in northern and western growing regions, reducing yields.

Figure 1: Australian rainfall March- February, inclusive, for 2023/24 and 2024/25

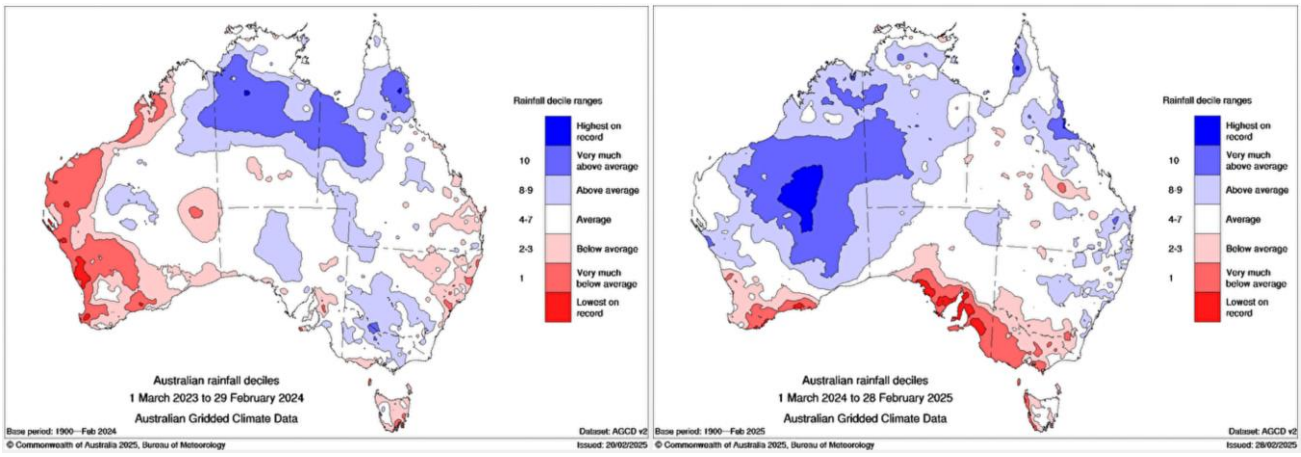
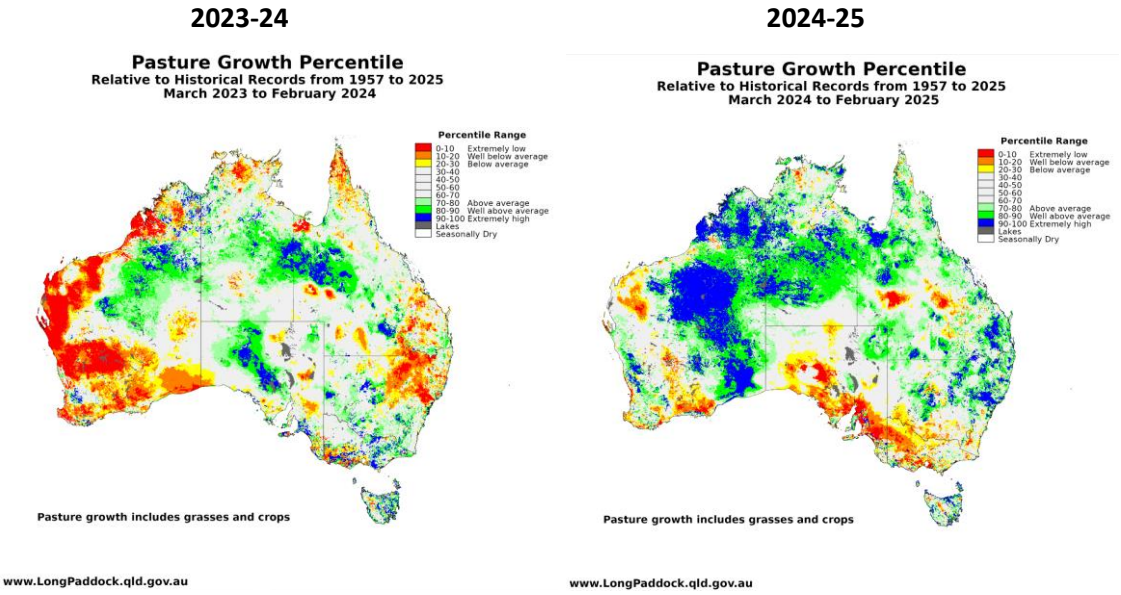
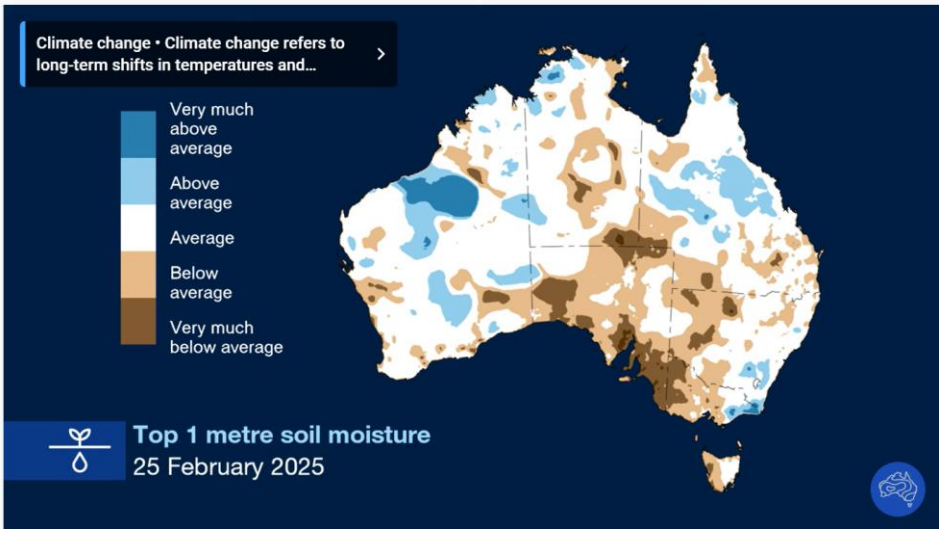


Figure 2: Pasture (grasses and crops) growth 2023-24 compared to 2024-25



Most of western Victoria currently has below average to very much below average soil moisture (see Figure 3) following the wet 2023-24 summer. This is likely to inhibit plant growth and reduce quail habitat quality in the short-term.

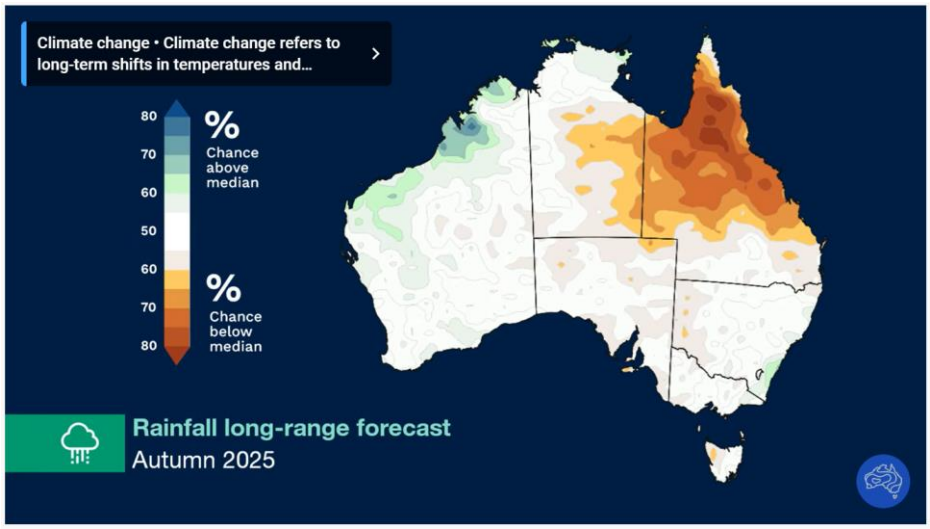
Figure 3: Soil moisture February 2025



Source: Bureau of Meteorology

The Bureau of Meteorology predicts that Victoria will experience neutral rainfall for the autumn period (see Figure 4). March-May maximum temperatures are likely to be warmer than the median for most of Australia. Dry conditions would likely prevent birds from undertaking an opportunistic autumn breed, which can occur when conditions are conducive.

Figure 4: Chance of exceeding median rainfall March-May 2025



Source: Bureau of Meteorology

Stubble Quail abundance

The GMA engages independent wildlife consultants to collect the field data and independent expert biometricians from the Arthur Rylah Institute for Environmental Research, Department of Energy, Environment and Climate Action (DEECA) to analyse the data and prepare a Stubble Quail abundance report. A preliminary report has been prepared to inform this brief. A final technical report will be completed in the coming months. A copy of the preliminary report is included at **Attachment 1**.

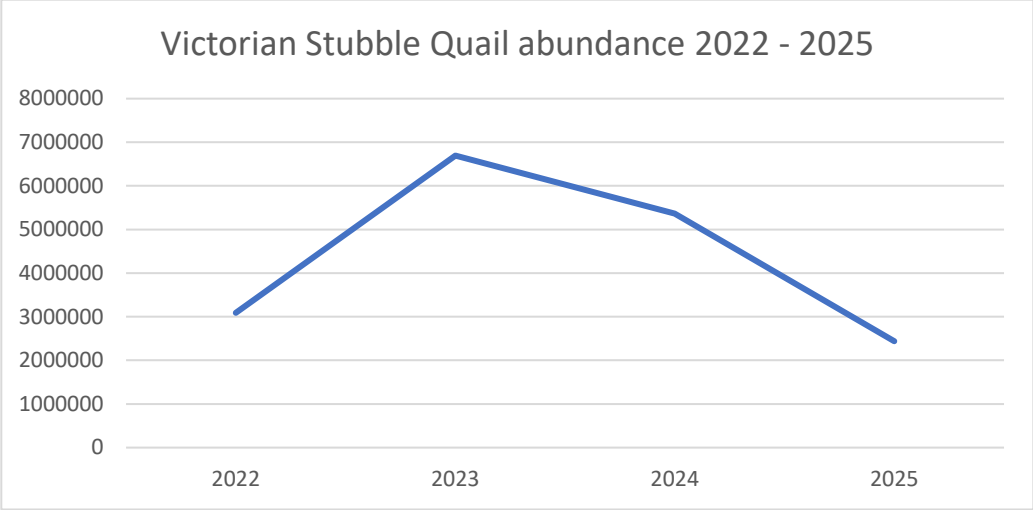
Line transect distance sampling surveys were undertaken for Stubble Quail across Victoria during January of 2025. Surveys were confined to habitat that was mapped as either pasture, dryland crops or native grassland. While Stubble Quail do occur in other habitat types, these three land use categories comprise the majority of their habitat in Victoria.

Model-based distance sampling analysis estimated a total abundance of 2.44 million Stubble Quail in Victoria. This estimate is approximately 50% lower than that recorded at the time of the last survey (2024), when it was estimated that the abundance of the Victorian Stubble Quail population was approximately 5.3 million. 2025 abundance was the lowest since surveys began in 2022 (see Figure 5). Despite the decline in numbers, current abundance is the important metric to consider when determining the possible impact of harvesting.

The observed decline in abundance has coincided with a prolonged period of lower than average rainfall across Victoria which may have impacted Stubble Quail survival and reproduction. This is typical of Stubble Quail ecology as they are known to be a 'boom and bust' species. This means they experience dramatic fluctuation in population size, going through periods of rapid growth ('boom') followed by sharp declines ('bust') predominantly driven by rainfall and its influence on food availability. The increase in abundance in 2023 coincides with greater than average rainfall during the spring breeding period in spring 2022[1] Abundance has declined since 2023 following a period of below average rainfall.

[1] 2022 abundance was considered an underestimate due to the initial approach to surveying. This has since been refined to improve precision.

Figure 5: Victorian Stubble Quail abundance 2022 - 2025



Harvesting

As recorded in previous years, the harvest level is expected to decline during the forthcoming season as harvests generally track with abundance. Research shows that harvest per active hunter is greater under La Niña (wetter) conditions when abundance increases.

When comparing the annual reported harvest with annual abundance between 2022-2024, under current seasonal arrangements, harvest as a percentage of abundance has ranged from 3.4% to 8.5% (average 5.5%) of the total population (see Table below)[2].

In the USA, simulation harvest modelling determined that the most commonly harvested quail species (the Northern Bobwhite Quail) could be sustainably harvested at a rate of 20-25%. Thirty percent harvests resulted in a high probability of quasi-extinction (inability to sustain a stable or growing population) and 40% harvesting was not sustainable.

Sustainable harvest rates for Stubble Quail have not been determined for Victoria. However, those identified for Bobwhite Quail provide a guide for Victoria given the similarities between the species. Current harvest rates under the existing regulatory regime are considered to fall within sustainable limits, even with wounding losses of up to 30%[3] factored in (see Table below). Harvesting at those levels in 2025 given the current total population abundance of 2.4 million birds is not considered to pose a risk to the long-term conservation status of the species.

Table: Victorian Stubble Quail abundance and harvest rates 2022 - 2024

Year	Abundance	Reported harvest	Reported harvest as a percentage of abundance	Total hunting losses (reported harvest + 30% wounding)	Total losses as a percentage of abundance
2022	3.1 million*	105,968	3.4	137,758	4.4
2023**	6.7 million	302,824	4.5	393,671	5.9
2024	5.4 million	457,399	8.5	594,619	11
			5.5	**Average**	**7.1**
2025	2.4 million	N/A	N/A		

* Abundance in 2022 was considered an underestimate. Survey methodology was later refined to achieve greater precision.
** 2023 season length was reduced to 35 days.

[2] It should be noted that the 2023 season length was reduced to 35 days.
[3] The level of wounding in Stubble Quail hunting is not known. This level of wounding has been reported in Bobwhite Quail hunting in the USA.

Recommendation
The GMA Board considers that the Victorian Stubble Quail population is at a level that can sustain harvests at the expected level under the current prescribed seasonal arrangements. Therefore, the GMA Board considers that variation from the prescribed hunting season arrangements for the 2025 season is not considered necessary for ongoing sustainable management of the population. Population and environmental conditions will be monitored and reviewed prior to next year's season to assess whether hunting arrangements require revision to ensure sustainability.

Social and economic impact
Given GMA's recommendation is to maintain the current prescribed seasonal arrangements, it has no social or economic impact on the government's current policy position on Stubble Quail hunting.

2. Context

Stubble Quail season
The Wildlife (Game) Regulations 2024 prescribe the arrangements for the annual Stubble Quail season. The prescribed bag limit is 20 birds per day and gundogs may be used to locate, flush and retrieve Stubble Quail. The prescribed season runs from the first Saturday in April to 30 June, each year. In 2025, the quail season would commence on 5 April and avoids a clash with the start of the 2025 duck season (19 March), allowing the GMA to focus compliance efforts over the opening weekend of the quail season.

The use of lead shot and electronic quail callers for hunting Stubble Quail are now prohibited following the making of the Wildlife (Game) Regulations 2024

Role of the Game Management Authority in providing advice on game management
Under section 5(a) of the *Game Management Authority Act 2014* (GMA Act), an objective of the Game Management Authority (GMA) is to 'promote sustainability and responsibility in game hunting in Victoria.'

Under section 6(h), the GMA is to 'monitor, conduct research and analyse the environmental, social and economic impacts of game hunting and game management' and under section 6(i), the GMA may make recommendations to relevant Ministers in relation to:

(i) game hunting and game management, and
(iii) open and closed seasons and bag limits.

Section 8A 'Guiding principles' also requires the GMA to have regard to the following relevant principles when exercising its powers or performing its functions:

(b) the principle of triple bottom-line assessment, which means an assessment of all the economic, social and environmental costs and benefits, taking into account externalities;
(d) the principle of an evidence-based approach, which means considering the best available information when making decisions.

3. Consultation

The Arthur Rylah Institute for Environmental Research, DEECA, prepared the abundance report at Attachment 1.

4. Attachments

Attachment 1: Preliminary results from the 2025 survey of Stubble Quail in Victoria.

Preliminary results from the 2025 survey of Stubble Quail in Victoria.

Arthur Rylah Institute for Environmental Research, DEECA, Victoria.

Preamble

To ensure the ecological sustainability of the arrangements for Stubble Quail *(Coturnix pectoralis)* hunting in Victoria it is desirable to obtain periodic estimates of the abundance of this species in Victoria at both the entire state and regional (in this case Catchment Management Authority area, CMA) scales. This document contains brief, headline results of some analyses of the January 2025 survey for Stubble Quail in Victoria that can be used to inform decision-making for the forthcoming hunting season. Full results will be presented in a pending ARI technical report (Scroggie and Ramsey, in prep)

Methods

Surveys

Line transect distance sampling surveys were undertaken for Stubble Quail across Victoria during January of 2025. Surveys were confined to habitat that was mapped as either pasture, dryland crops or native grassland. While Stubble Quail do occur in other habitat types, these three land use categories comprise the majority of their habitat in Victoria. The survey methodology followed that described in Scroggie and Ramsey (2023, 2024). In brief, line transects were walked with three observers line-abreast with the two outer observers walking 10 m either side of the central observer. A rope of 20 m total length was carried stretched between the three observers both to maintain constant spacing and to aid in flushing of birds from the 20 m wide survey strip. Stubble Quail that were flushed were counted (including birds beyond the two outer observers out to a maximum of 20m from the transect line), and the distance from the centre line to the point of first detection was measured.

Abundance estimation

Abundance estimation was conducted using standard line-transect distance sampling methods (Buckland *et al.* 1993), with model-based approaches (Buckland *et al.* 2016; Miller *et al.* 2020) being preferred for final inference as they allow predictions of abundance at small spatial scales and the identification of relationships between local population density and selected habitat variables.

The fitted spatial model of abundance was used to produce predictions of Stubble Quail density at a 1 km^2 scale across Victoria. The predicted abundances at this scale were aggregated at both statewide and CMA scales along with associated estimates of uncertainty (confidence intervals and coefficients of variation).

Results

Stubble quail abundance in Victoria

The model-based distance sampling analysis led to an abundance estimate of approximately 2.4 million stubble quail in Victoria (95% CI 1.6 – 3.8 million, Table 1). This estimate is lower than the estimate from the previous (2024) survey (5.3 million; 95% confidence interval 4.1 – 6.9 million) (Scroggie and Ramsey 2024). Based on the point estimates, this represents a decline of over 50 % in the total abundance of Stubble Quail across Victoria (Figure 1). The largest populations of Stubble

Quail were found in the North Central, Glenelg-Hopkins, Mallee, Wimmera and Corangamite CMAs (Table 1). At both the state and regional (CMA) level, the population estimates were generally of adequate precision (all but two coefficients of variation <0.3).

Table 1. Model-based estimates of the abundance of Stubble Quail in each Victorian CMA region and for the entire state. Estimates are given with 95% confidence intervals and coefficients of variation (a measure of precision).

CMA	Area of habitat (km^2)	Abundance (N)	Lower 95% bound	Upper 95% bound	CV
Corangamite	8,375	192,000	123,000	300,000	0.23
East Gippsland	1,980	36,000	20,000	65,000	0.31
Glenelg Hopkins	16,825	348,000	220,000	552,000	0.24
Goulburn Broken	12,895	257,000	159,000	415,000	0.25
Mallee	25,976	458,000	274,000	767,000	0.27
North Central	22,476	446,000	280,000	710,000	0.24
North East	5,468	98,000	57,000	171,000	0.29
Port Philip and Westernport	5,781	134,000	82,000	219,000	0.26
West Gippsland	6,142	153,000	82,000	285,000	0.33
Wimmera	17,740	317,000	191,000	525,000	0.26
TOTAL	**123,658**	**2,439,000**	**1,576,000**	**3,774,000**	**0.23**

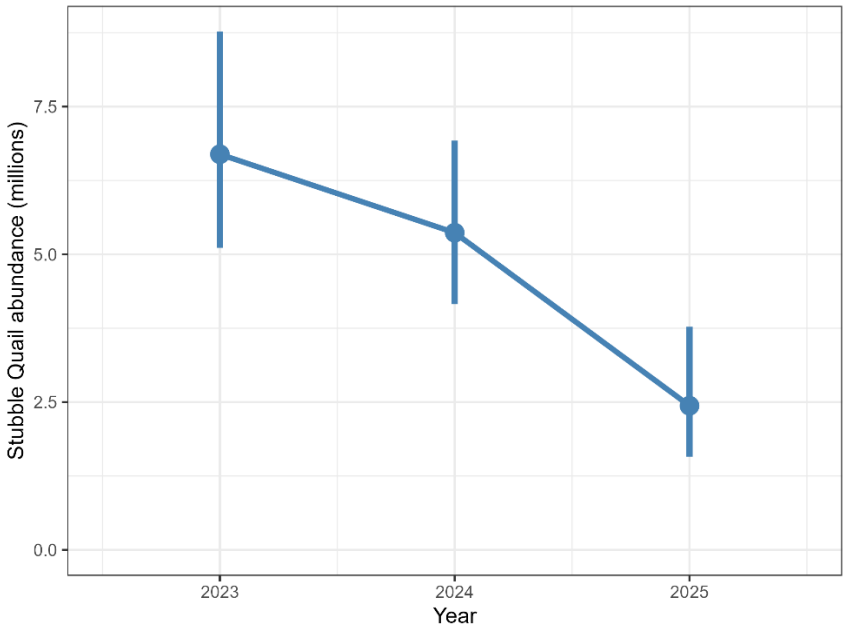


Figure 1. Trends in model-based estimates of the total abundance of Stubble Quail in Victoria 2023 - 2025. Error bars denote the 95 % confidence intervals of the estimates.

Comparisons were also made between successive model-based abundance estimates for each CMA for the period 2023-2025 (Figure 2). Between the 2024 and 2025 surveys, most CMAs recorded declines in abundance of between 30 and 70 %. The exceptions were the East Gippsland and North East CMAs, where only insignificant changes in abundance (a 2% increase and 8% decrease) were noted.

The observed state and regional declines in abundance has coincided with a prolonged period of lower-than-average rainfall in Victoria, which may have impacted survival and reproduction of Stubble Quail. A fuller exploration of the possible drivers of population abundance will be found in the forthcoming technical report (Scroggie and Ramsey in prep).

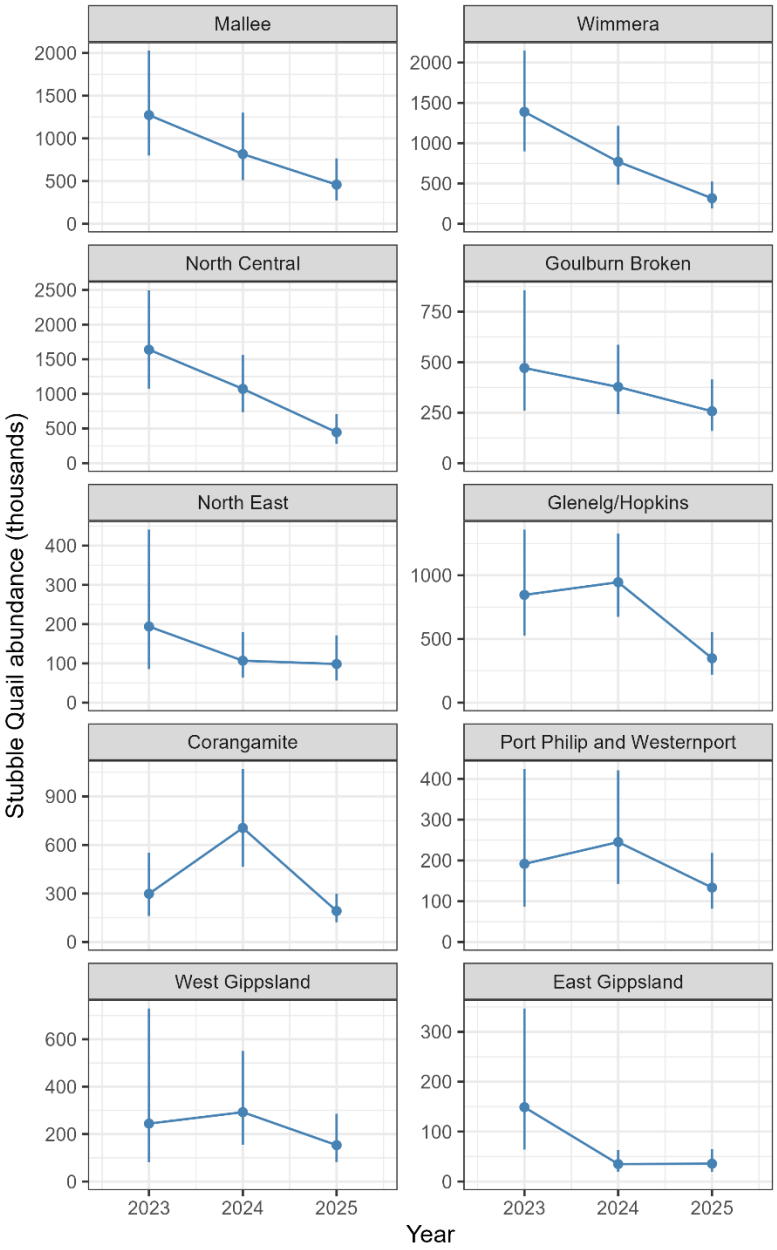


Figure 2. Trends in model-based estimates of abundance of Stubble Quail for each Victorian Catchment Management Authority region 2023 - 2024. Error bars denote the 95 % confidence intervals on the population estimates. Note that the magnitudes of the y-axis scales differ between plots to accommodate the wide variation in abundances between CMAs.

Conclusions

A model-based distance sampling analysis of recent survey data has yielded a population estimate of approximately 2.4 million Stubble Quail with a 95% confidence interval of 1.6-3.8 million, which represents a decline of over 50% in abundance since the previous (2024) survey. It should be noted that the estimates contained with this report are preliminary and may be subject to revision in the final report. The full technical report will contain additional information of relevance to decision-makers, including predictive maps of Stubble Quail density across the state and further commentary and interpretation of the population estimates.

References

Buckland ST, Anderson DR, Burnham KP, Laake JL (1993). 'Distance sampling: estimating abundance of biological populations'. (Springer: New York)

Buckland ST, Oedekoven CS, Borchers DL (2016). Model-based distance sampling. *Journal of Agricultural, Biological, and Environmental Statistics* **21**, 58–75. doi:10.1007/s13253-015-0220-7

Miller DL, Rexstad E, Burt L, Bravington MV, Hedley S (2020). 'dsm: Density Surface Modelling of Distance Sampling Data' Available at: https://CRAN.R-project.org/package=dsm

Scroggie MP, Ramsey DSL (2024). Abundance estimates for Stubble Quail in Victoria: results from the 2024 survey. Arthur Rylah Institute for Environment Research Technical Report Series No. 379. Arthur Rylah Institute for Environmental Research, Heidelberg. Available at: https://www.gma.vic.gov.au/__data/assets/pdf_file/0007/1029571/Abundance-estimates-for-Stubble-Quail-in-Victoria-2024.pdf

Scroggie MP, Ramsey DSL (2023). Stubble Quail abundance in Victoria: improved survey methods and updated population estimates. Arthur Rylah Institute for Environment Research Technical Report Series No. 360. Arthur Rylah Institute for Environmental Research, Department of Energy, Environment and Climate Action, Heidelberg.