

Preliminary results from the 2024 survey of Stubble Quail in Victoria.

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Preamble

To ensure the ecological sustainability of the arrangements for Stubble Quail 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 most recent survey data 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 2024. 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). 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. Design-based estimates of abundance were also calculated as a point of comparison that is simpler and relies on fewer assumptions. The two sets of estimates were broadly congruent, so only the model-based estimates are included in this preliminary report. A comparison and commentary on the two methods will be included in the full report.

The fitted spatial model of abundance was used to produce predictions of Stubble Quail density at a 1 km² scale across Victoria. The predicted abundances at this scale were aggregated at both statewide and CMA scales along with associated estimates of uncertainty.

Results

Stubble quail abundance in Victoria

The model-based distance sampling analysis led to an abundance estimate of approximately 5.3 million stubble quail in Victoria (95% CI 4.1 – 6.9 million, Table 1). This estimate is somewhat lower than that recorded at the time of the last survey (2023), when it was estimated that the abundance of the Victorian Stubble Quail population was approximately 6.7 million (95% confidence interval 5.1

– 8.8 million) (Scroggie and Ramsey 2023). Based on the point estimates, this represents a decline of approximately 20 % in total abundance, however the relatively wide confidence intervals around the successive estimates of abundance means that the results are also consistent with population changes of larger or smaller magnitude (Figure 1).

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	706,000	465,000	1,070,000	0.21
East Gippsland	1,980	35,000	19,000	63,000	0.31
Glenelg Hopkins	16,825	946,000	674,000	1,328,000	0.17
Goulburn Broken	12,895	377,000	243,000	586,000	0.23
Mallee	25,976	816,000	511,000	1,302,000	0.24
North Central	22,476	1,073,000	735,000	1,565,000	0.19
North East	5,468	107,000	64,000	179,000	0.27
Port Philip and Westernport	5,781	245,000	143,000	421,000	0.28
West Gippsland	6,142	292,000	155,000	550,000	0.33
Wimmera	17,740	769,000	487,000	1,215,000	0.24
TOTAL	123,658	5,366,000	4,159,000	6,925,000	0.13

At a regional (CMA) level, the population estimates were generally of good precision (most coefficients of variation <0.3), with the largest populations being found in the North Central, Glenelg-Hopkins, Mallee, Wimmera and Corangamite CMAs (Table 1).

Comparisons were also made between successive model-based abundance estimates for each CMA (Figure 2). Both declines and increases in abundance were noted when considering only the point estimates, however as confidence intervals for successive years were mostly overlapping it is not reasonable to conclude with certainty that these apparent increases or decreases are statistically meaningful. A fuller exploration of these issues will be found in the forthcoming report.

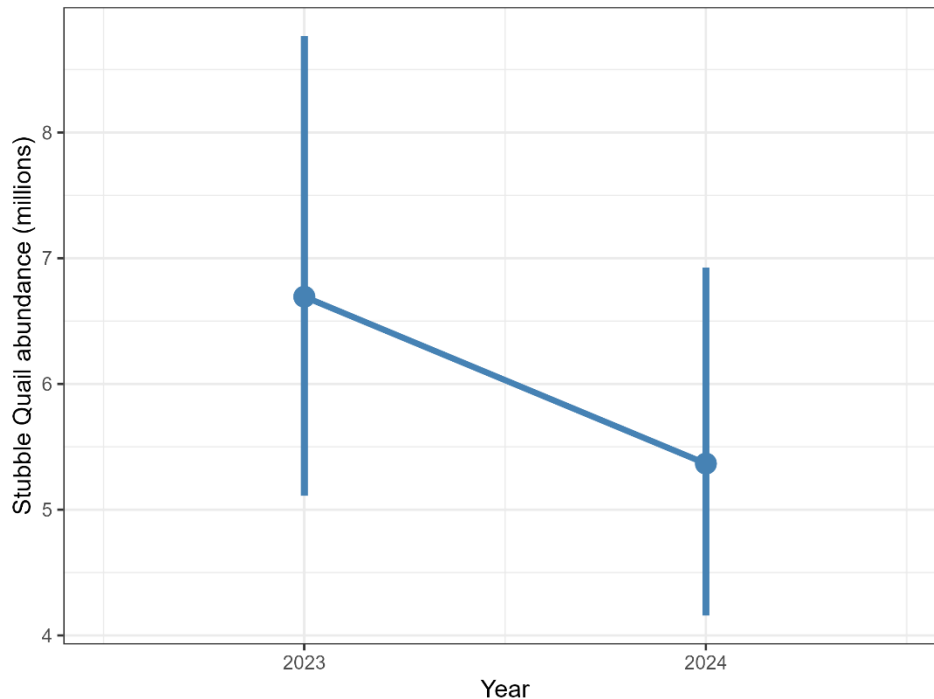


Figure 1. Comparison of model-based estimates of the total abundance of Stubble Quail in Victoria for 2023 and 2024. Error bars denote the 95 % confidence intervals on the estimates.

Conclusions

A model-based distance sampling analysis of recent survey data has yielded a population estimate of approximately 5.3 million Stubble Quail with a 95% confidence interval of 4.1-6.9 million. 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, a comparison of model- and design-based population estimates, and further commentary and interpretation of the population estimates with regard to the ecological sustainability of the legal hunting program.

References

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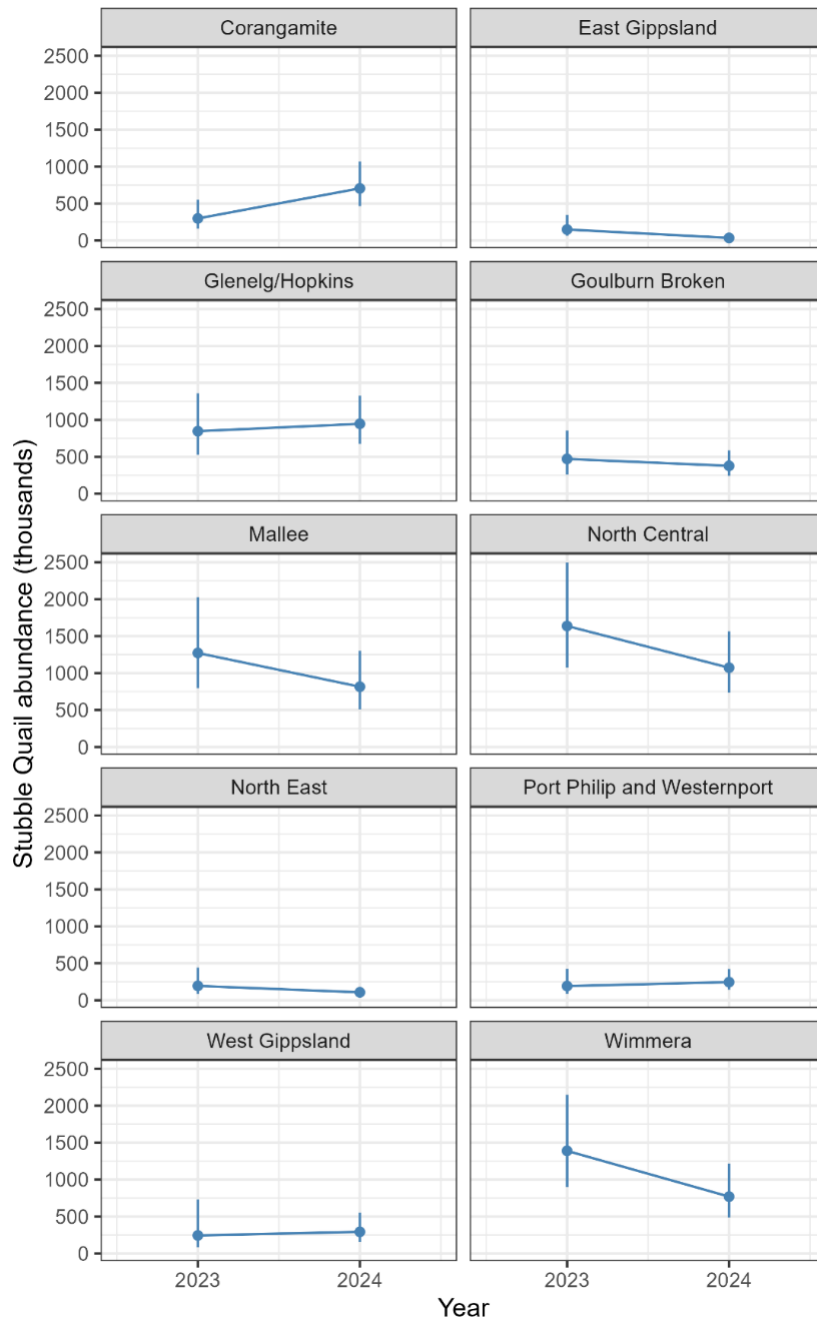


Figure 2. Comparison of model-based estimates of abundance of Stubble Quail in each Victorian Catchment Management Authority region for 2023 and 2024. Error bars denote the 95 % confidence intervals on the estimates.