Nature Knowledge Channel

NATURE KNOWLEDGE CHANNEL

The Kangaroo Report

Volume 6

Victoria's Kangaroos and their commercial exploitation: plans, surveys, quotas and the kill

IN THIS VOLUME

1 Victoria: The Paper Trail
2 Counting Kangaroos
3 Quotas and the Kill
4 Synthesis

Peter and Andrea Hylands

November 2026

The Kangaroo Report · Volume 6

Victoria's Kangaroo harvest: plans, surveys, quotas and the kill.

PUBLISHED BY Nature Knowledge Channel, November 2026.

AUTHOR Peter Hylands.

ABOUT THIS VOLUME Volume 6 was prepared in four parts in November 2026. Part 1 examines the plans, politics and governance behind Victoria's commercial Kangaroo ‘harvest’; Part 2 the aerial surveys; Part 3 the quotas and the kill; and Part 4 draws the three together and sets them beside the ATCW analysis in Volume 2. The parts are reproduced here in full.

NUMBERING Sections, tables and figures are numbered by part. Table 2.3, for example, is the third table in Part 2, and Section 3.4.1 is in Part 3. Cross-references in the text follow the same scheme. References to chapters, sections, tables and figures in earlier volumes or in source documents keep their original numbers.

SUGGESTED CITATION Hylands, P. (2026). The Kangaroo Report, Volume 6. Nature Knowledge Channel.

© Nature Knowledge Channel 2026.

Contents

Victoria: The Paper Trail **1**
Executive summary 1
1.1 Scope, sources and method 2
1.2 From 'not supported' to an export trade 4
1.3 What Parliament warned in 2000 5
1.4 The trial that failed its own evaluation 6
1.5 The closed loop 6
1.6 Four plans, eroding safeguards 8
1.7 Quotas, take and the 10 per cent ceiling 9
1.8 The population numbers 12
1.9 The ATCW loophole and the drought subsidy 13
1.10 Joeys: the uncounted dead 14
1.11 Self-policing, at public expense 16
1.12 A system that will not be reviewed 17
1.13 Register of contradictions 18
1.14 No lessons learnt 19
1.15 Conclusions and recommendations 19
Sources 20

Counting Kangaroos **22**
Executive summary 22
2.1 Documents reviewed 23
2.2 How the numbers are made 24
2.3 The survey's purpose, rewritten 25
2.4 Changes in method and reporting 26
2.5 Where the transects are 27
2.6 How accurate are the estimates? 30
2.7 The decline that disappeared 32
2.8 Reporting quality 34
2.9 Fire, drought and the harvest model 34
2.10 How the surveys and the plans fit together 35
2.11 Register of survey contradictions 36
2.12 Corrections to earlier volumes 36
2.13 Conclusions and recommendations 37
Sources 37

Quotas and the Kill **39**
Executive summary 39
3.1 Documents reviewed 41
3.2 How a quota is made 42
3.3 Where the 10 per cent came from 44
3.4 Quotas year by year 46
3.5 The total take 48
3.6 ATCW: the uncapped majority 49
3.7 Zones over the limit 50
3.8 Population inputs that do not compute 52

3.9 Who is killed 53
3.10 Quota management in practice 55
3.11 Compliance and oversight 56
3.12 How this links to Parts 1 and 2 56
3.13 Register of contradictions and anomalies 57
3.14 Likely outcomes for Kangaroos and for biodiversity management 58
3.15 Recommendations and FOI requests 59
Sources 60

Synthesis 62
Summary 62
4.1 How Volume 6 was built 63
4.2 Part 1: The Paper Trail 64
4.3 Part 2: Counting Kangaroos 65
4.4 Part 3: Quotas and the Kill 65
4.5 How the three Parts fit together 66
4.6 The ATCW intersection: Volume 2 and Volume 6 68
4.7 What Volume 6 means 70
4.8 Consolidated recommendations 70
4.9 The record in numbers 71
Sources 72

List of Tables

Table 1.1. The document set reviewed 3
Table 1.2. The Committee's five warnings, and the record since 5
Table 1.3. What the trial evaluation found, and what the Government did 6
Table 1.4. How the plans changed, 2019 to 2024-2028 8
Table 1.5. Text removed or added between the draft and the approved WTMP version 9
Table 1.6. Victoria's Kangaroo Harvesting Program, 2019 to 2025 10
Table 1.7. ATCW approvals: forecast against actual 13
Table 1.8. Females and joeys in the commercial kill 15
Table 1.9. Compliance record, 2020 to 2025 16
Table 1.10. Wildlife Act Review: recommendations rejected that bear on Kangaroo killing 17
Table 1.11. Claims and the record 18
Table 2.1. Survey document set 23
Table 2.2. The stated purpose, June and August 2017 25
Table 2.3. The five surveys 27
Table 2.4. Single transects that dominated a zone's count 28
Table 2.5. Zone-level precision (CV, %), design-based, Eastern or all Grey Kangaroos 30
Table 2.6. Where the killing was concentrated, and what happened 33
Table 2.7. Errors and irregularities in the published survey record 34
Table 2.8. ARI's spatial harvest model (TR315, 2020) against practice 35
Table 2.9. What the plans say about the surveys, and what the surveys say 35
Table 2.10. Claims and the record 36
Table 3.1. Documents reviewed in this Part 41
Table 3.2. ARI's 2019-2020 safety assumptions against the record 44
Table 3.3. Commitments in the 2019 plan against the record 45
Table 3.4. From recommendation to kill, 2019-2026 46
Table 3.5. Total take by year as reported 48
Table 3.6. Compliance as reported 56
Table 4.1. The evidence base for Volume 6 63
Table 4.2. The ATCW thread through Volume 6 69
Table 4.3. Figures to reconcile 70
Table 4.4. Key figures from Volume 6 71

List of Figures

Figure 1.1. Key documents and decisions, 2000 to 2025. 4
Figure 1.2. Roles under the KHMP 2024-2028 7
Figure 1.3. Commercial quota as first announced against commercial take, 2020 to 2025. 10
Figure 1.4. Composition of the claimed total take. ATCW figures are the maximum numbers authorised; the Government confirms permit holders do not report actual kills. 11
Figure 1.5. 2025 total take (commercial plus ATCW maximum) as a share of each zone's estimated population. 12
Figure 1.6. Grey Kangaroos counted on aerial transects against the official estimate. 12
Figure 1.7. Dependent young killed, as reported by commercial harvesters. ATCW kills of joeys are not reported at all. 15
Figure 1.8. Victorian Government funding for the KHP and the 2025 drought rebates. 17
Figure 2.1. From aerial count to commercial quota. 25
Figure 2.2. Method and reporting changes, 2017 to 2026. 26
Figure 2.3. Transects flown in September 2024 (red), with the new harvest zones and exclusion zone. 28
Figure 2.4. Central zone share of area, flying effort and the Eastern Grey estimate. Central zone density: 48.5 (2017), 22.7 (2018), 54.2 (2020) and 67.5 (2022) Kangaroos per km2, against 1.7 to 17.8 elsewhere. 29
Figure 2.5. Grey Kangaroos recorded per km on ground transects in the overlap zone. In 2017 only 29 Kangaroos in 8 groups were seen across Buloke, Gannawarra, Hindmarsh and Yarriambiack, and a single Kangaroo in Gannawarra. 29
Figure 2.6. Kangaroos counted per km of transect and the official estimate, indexed to 2017. Estimates are for the whole survey area; 2024 is the model-based figure including the ten exclusion-zone municipalities. 31
Figure 2.7. Estimates of the 2022 population from the same survey data under four analyses. 31
Figure 2.8. Western Grey and Red Kangaroo estimates, 2017 to 2024. 32
Figure 2.9. Change in Eastern Grey estimates by old harvest zone, 2022 to 2024, model-based (bars) and design-based (diamonds). 33
Figure 3.1. The quota pipeline. Each step carries an assumption that the documents show to be weak. Derived from the documents reviewed 43
Figure 3.2. ARI's base recommendation, the quota the department set, the final quota and the commercial kill. 2024 from ARI TR371, obtained online. 47
Figure 3.3. Commercial and ATCW take against the total quota, 2020-2025. 48
Figure 3.4. ARI's ATCW forecasts against the ATCW numbers actually issued. 49
Figure 3.5. Total take as a share of each zone's population figure, 2020-2024 (annual report figures). 50
Figure 3.6. Total take by zone and species in 2025, the first year of species-specific quotas. 51
Figure 3.7. Implied annual growth in zone estimates against the growth limits in ARI's own models. 52
Figure 3.8. Females and dependent young killed by commercial shooters. 53
Figure 3.9. Females as a share of the commercial kill. 54
Figure 4.1. The 67 unique files by type. 64
Figure 4.2. Commercial and ATCW take against the total quota, 2020-2025 (from Part 3). 66
Figure 4.3. The chain from plan to report, and where each Part found it broken. 67
Figure 4.4. Non-commercial killing authorised and reported, 2025 (from Volume 2). 68

PART 1

Victoria: The Paper Trail

How government and consultant documents enabled the commercial killing of Kangaroos in Victoria, and what those documents contradict

Author	Peter Hylands
Prepared	November 2026
Scope	A critical review of the Kangaroo Harvest Management Plans 2019 to 2024-2028, the quota and survey reports behind them, the Kangaroo Pet Food Trial evaluation, the Commonwealth export approvals, and the parliamentary, regulatory and budget record, 2000 to 2026.

Executive summary

Victoria's commercial Kangaroo trade was not forced on the State by evidence. It was assembled, document by document, over a parliamentary finding that a Kangaroo industry should not be supported, over an evaluation that called the pilot's risk to Kangaroo populations "unacceptable", and over a regulator's warning that the State's two killing systems were not coherent. This volume reads those documents against each other and against the Government's own results.

Earlier volumes of this Report counted the dead: Chapter 1 (Victoria) and its Parks Victoria addendum documented quotas, survey counts and kills to the first quarter of 2026, and the national plausibility analysis showed that Victoria is the only mainland state whose official estimate rose sharply (+67 per cent, 2020 to 2026). Volume 6 asks a different question: **what did the documents that authorised this trade promise, and did any of it hold to be correct?**

Principal findings

1. **The trade was built against Parliament's own advice.** In June 2000 the Environment and Natural Resources Committee declined to support a Kangaroo industry based on Victoria's wild populations. It warned of low densities, erratic supply, community resistance and "excessive pressure to increase the cull" in line with industry need. Each warning has since come true (section 1.3).
2. **The pilot failed its own evaluation and was made permanent anyway.** The 2018 evaluation of the Kangaroo Pet Food Trial found approvals at 260 per cent of the long-term average, 62 possible illegal-take offences in an audit of just five record books, a sustainability risk it called "unacceptable", and costs of at least $2.5 million against benefits of about $1.6 million. Within a year the trial became the permanent Kangaroo Harvesting Program (section 1.4).
3. **Safeguards were promised, then quietly removed.** The 2019 plan promised population thresholds that would suspend harvesting "by June 2020". The 2021-2023 plan moved the deadline to "during the plan's lifespan". The 2024-2028 plan contains no thresholds at all. Public land went

from "sanctuary zones" (2019) to a place where commercial harvesting "may be authorised" (2024) (section 1.6).

4. **The approved export plan was edited to remove claims that had become false.** Between the late-2023 version and the version the Commonwealth approved in September 2024, DEECA deleted its claims that quotas take "less than the scientifically determined allocation", that the ATCW share was falling, and that neither species was over-harvested. It added an admission that total take "could exceed the total quota" (section 1.6).
5. **The 10 per cent ceiling is a ceiling in name only.** In 2025 the claimed total take reached 12.4 per cent of Eastern Greys, above 10 per cent in every zone, 15.3 per cent in the fire-affected Grampians and 17.1 per cent of Western Greys in Loddon Mallee. The plan itself concedes "no legal mechanism" exists to cap ATCW permits (sections 1.7 and 1.9).
6. **The counted part of the kill is now the minority.** ATCW permits, which report only the maximum authorised, made up 70 per cent of the 2025 total. In 2025 the Government added $1.8 million in rebates to pay for professional shooters, their travel and ammunition under ATCWs, with no tags required. That recombines commercial shooting and damage-mitigation permits, the arrangement the 2018 evaluation said must be separated (section 1.9).
7. **The population numbers come from one in-house team and cannot detect decline.** The same Arthur Rylah Institute scientists designed the survey, analyse it, built the quota model and recommend the quota. Their 2025 quota report calls the movement from 2.36 million to 2.30 million "well within the margin of error": a survey that cannot detect a 12 per cent fall in the harvest zones cannot protect a population harvested at 10 per cent a year (section 1.8).
8. **At least 118,221 dependent young were killed by commercial shooters from October 2019 to December 2025.** They are excluded from quotas and totals. The authorisation condition that "Kangaroos with obvious dependent young must not be shot" sits beside a kill in which roughly 83 to 91 joeys are recorded for every 100 females (section 1.10).
9. **Self-policing and public subsidy.** In 2024 there were 1,152 audits of self-reported returns, 18 investigations and no substantiated offences. The program costs Victorian taxpayers $1.2 to $1.8 million a year, plus $1.8 million in drought rebates, though cost recovery was recommended in 2000 and 2018 (section 1.11).
10. **The governing system refuses independent scrutiny.** In 2025 the Government rejected the Wildlife Act Review's recommendations for an independent regulator, a statutory Chief Conservation Regulator and third-party merits review (section 1.12).

> **BOTTOM LINE**
>
> Every safeguard in the Victorian system depends on the same thing: a population estimate produced inside the department that sets the quota, checked by no one outside it, and too imprecise to detect the declines it is meant to prevent. Meanwhile the uncounted share of the kill keeps growing. On the Government's own documents, the claim that this trade is ecologically sustainable and humane cannot be sustained.

1.1 Scope, sources and method

This volume examines the documents that created, justified and approved commercial Kangaroo killing in Victoria. Where a document makes a claim, we test it against the Government's later reports and against the other documents in the set. Figures marked *derived* are our calculations from the cited sources.

Table 1.1. The document set reviewed

Document	Author and date	What it is	Why it matters here
Inquiry into the Utilisation of Victorian Native Flora and Fauna	Parliament of Victoria, ENRC, June 2000	Parliamentary inquiry report	Did not support a Kangaroo industry; set out the risks (Rec. 27)
Commercial and Sustainable Use of Wildlife	R. Cooney for RIRDC, Dec 2008	Policy report; terms of reference set with George Wilson	The sustainable-use case that later plans draw on
Improving the humaneness of commercial kangaroo harvesting	S. McLeod and T. Sharp for RIRDC, June 2014	Field and enclosure studies of joey killing	Methods used on pouch young; fate of orphaned young-at-foot
Guide to preparing a kangaroo management plan for Melbourne's growth corridors	DELWP, draft March 2015	Guidance for developers	Admits development traps and starves Kangaroos
Wildlife Shelter and Foster Carer Authorisation Guide	DELWP, 2017	Carer licensing rules	Standards required of carers, by contrast with shooters
Firearms Amendment (Silencers) Bill 2018	Jeff Bourman MLC, June 2018	Private member's bill (defeated 36 to 4)	Political context: the shooting lobby in Parliament
Control and monitoring of kangaroo populations in the Mallee Parks	Morris, Duncan and Vesk (Univ. of Melbourne) for Parks Victoria, March 2019	Independent review of cull modelling	Found earlier models overstated their performance
Victorian Kangaroo Harvest Management Plan 2019 and 2020	DELWP, 2019	First two plans; pet food only	Original promises: thresholds, sanctuary zones
Chief Conservation Regulator comments (document 52)	Kate Gavens, 23 Dec 2020	Internal advice on 2021 quotas	ATCW and KHP "do not form a coherent policy and regulatory approach"
Victorian KHMP 2021-2023 (document 42)	DELWP, 2020	Plan; human consumption enabled by amendment	Thresholds deferred; public-land "special quota"
Regulating the protection of wildlife: Statement of Regulatory Intent	Conservation Regulator, Nov 2021	Regulator's policy statement	Promises ATCW reform
Victorian KHMP 2024-2028 (Dec 2023 draft and June 2024 WTMP version)	DEECA	Current plan in two versions	Text changed between versions (section 1.6)
WTMP Declaration 2024-2028	Minister Plibersek, 8 Sep 2024	Commonwealth export approval	Only conditions are DEECA's own reports
Guidance Note for managing kangaroos in Victoria's growth areas	DEECA, Sep 2024	Guidance for developers and councils	Contradicts the KHMP on habitat
Government response to the Wildlife Act Review	Victorian Government, Sep 2025	Response to 2021 expert panel	Rejects an independent regulator and merits review
Kangaroo Harvesting Program: Budgeted funding and activities	Parliamentary Budget Office, Nov 2025	Costing requested by Georgie Purcell MP	Public cost; ATCW cap breached; zero offences

We add the published KHP annual reports (2019 to 2025), the Arthur Rylah Institute (ARI) quota and survey reports, the 2018 Kangaroo Pet Food Trial evaluation, Commonwealth declarations, and Agriculture Victoria's 2025 rebate guidelines. All are listed in the Sources at the end.

Relationship to earlier volumes

- **Chapter 1, Commercial Exploitation of Kangaroos in Victoria**, holds the detailed counts, quarterly results to Q1 2026, female share and the history of Victoria's macropods. Its numbers are not repeated here.
- **Chapter 1 Addendum, Parks Victoria and ATCWs on public land**, covers the Mallee parks. Section 1.6 here shows how the plans redefined public land.
- **Population Plausibility Analysis** (national, 1980 to 2026) flagged three of Victoria's six recent years as biologically implausible. Section 1.8 here explains how the method makes that possible.
- **The state chapters** (NSW, South Australia, Queensland, Western Australia, Tasmania, ACT and Northern Territory) show the same pattern of rising quotas over unfilled take. The welfare research reviewed in section 1.10 was largely carried out in NSW.

1.2 From 'not supported' to an export trade

In 25 years Victoria moved from a parliamentary refusal to an export-approved commercial trade. Each step was taken by the executive, mostly through plans the department writes and approves itself; Parliament never legislated for it.



Figure 1.1. Key documents and decisions, 2000 to 2025.

Sources: ENRC (2000); DELWP KPFT evaluation (2018); KHMPs 2019 to 2024-2028; Chief Conservation Regulator (2020); Commonwealth declarations F2017N00063, F2020N00152, F2024N00820; Agriculture Victoria (2025); Government response to the Wildlife Act Review (2025).

Three features of the sequence stand out. First, the commercial program grew out of a damage-mitigation permit system. The trial attached a cash value to animals already being shot under ATCWs, and approvals rose. Second, Commonwealth approval came in stages, from a skin-export approval (2017) to a "developmental" trade operation (December 2020) to a full five-year Wildlife Trade Management Plan (September 2024). Each stage relied on the State's own reports. Third, the 2024-2028 plan was in force for eight months before it was approved for export, so the Commonwealth assessed a program already running.

1.3 What Parliament warned in 2000

The Environment and Natural Resources Committee's 2000 report is the only parliamentary inquiry into whether Victoria should trade in its wild Kangaroos. Its answer was no. Recommendation 27 reads, in part:

> *That while the Committee does not support the development of a kangaroo industry based on the harvest of the Victorian wild populations of kangaroos, it recommends that an assessment be made to determine whether the costs of the necessary management and monitoring systems ... can be undertaken on a cost-recovery basis. Such an assessment to be undertaken in conjunction with and at the cost of industry.* ENRC (2000), Recommendation 27

The Committee also noted that Kangaroo densities in Victoria are low compared with neighbouring states, that much rangeland research "can only be related to Victoria with considerable caution", and that the cost of regular surveys was "a particularly significant issue for Victoria". Table 1.2 sets its five stated difficulties against what followed.

Table 1.2. The Committee's five warnings, and the record since

Warning (ENRC 2000)	What happened
(a) Low densities, so high costs of shooting and transport	Commercial shooters have taken 43 to 80 per cent of quota each year since 2020 (derived; Figure 1.3). Value is about $28 per Kangaroo (Chapter 1). Taxpayers fund $1.2 to $1.8 million a year (PBO 2025).
(b) Small total numbers compared with other States	Commercial take of 46,064 to 81,160 a year (2020 to 2025), a fraction of NSW or Queensland.
(c) Erratic supply	Quotas cut mid-year in 2024 (twice) and 2025; unused tags now cancelled after three months to push quota to active shooters (Chapter 1).
(d) "Potential for excessive pressure to increase the cull and make it more regular in line with industry need rather than population-control prerogatives"	Trial approvals reached 260 per cent of the 2002-2013 average (KPFT evaluation). Claimed total take rose from 116,816 (2020) to 250,385 (2025). The 2025 drought response paid for more shooting.
(e) Strong resistance from sections of the community	716 submissions to the 2023 plan review; the plan's goal, ceiling and method were unchanged.
Recommendation 27: management and monitoring to be assessed "at the cost of industry"	No cost recovery. The 2024-2028 plan only commits to "investigate the feasibility" of it (Action 8.4).

The Committee also recorded that Field and Game Australia and the Sporting Shooters Council argued for tradeable Kangaroo tags to turn the animals "from being a debit to being an asset". That is the logic later adopted, though not on the Committee's recommendation.

Source: Environment and Natural Resources Committee (2000), Inquiry into the Utilisation of Victorian Native Flora and Fauna, chapters 4, 7 and 11.

1.4 The trial that failed its own evaluation

The Kangaroo Pet Food Trial ran from 31 March 2014 to 30 September 2019. It let shooters operating under ATCW permits in selected local government areas sell carcasses to pet-food processors. Its stated aim was to reduce waste. DELWP's 2018 evaluation, released after a Freedom of Information request, found the opposite of a success.

Table 1.3. What the trial evaluation found, and what the Government did

Evaluation finding (DELWP, 2018)	Government action
Approvals in trial areas averaged **260 per cent** of the 2002-2013 long-term average; commercial gain "has driven at least some" control	Trial extended twice, then made permanent as the KHP from 1 October 2019
Audit of **five** record books found 403 record-keeping infringements, 283 incomplete records and **62 possible illegal-take offences**; 37 cases under investigation	Same self-reporting model retained. In 2024 the program reported 0 substantiated offences
Risk to Kangaroo populations described as **"unacceptable"**; males preferentially taken and population effects "not clearly understood"	Ceiling set at 10 per cent of an estimate; male-biased take accepted as "minimal" risk (KHMP 2024-2028)
Recommended licence conditions to **limit carcasses per night** and **manage the male-to-female ratio**	No nightly limit in the plans; female share 32 to 35 per cent every year; no ratio management
Costs of at least **$2.5 million** against benefits of about **$1.6 million** (62 cents per dollar); **cost recovery** recommended	No cost recovery seven years later (PBO 2025)
"ATCW system ... is not an appropriate tool" for commercial processing; **separate commercial harvesting from ATCWs**	Separated in 2019, then recombined in 2025: public rebates pay professional shooters to kill under ATCWs (section 1.9)

The Minister's March 2019 release said the evaluation showed the ATCW system "was not suited to managing the sustainability of kangaroo population levels". That is accurate, but it was used to justify a larger commercial system rather than a smaller kill. The evaluation's warnings about incentives, compliance and sustainability apply as much to the program that replaced the trial.

Sources: DELWP, Kangaroo Pet Food Trial Evaluation Report (2018); Premier of Victoria media releases of 30 March 2018 and 29 March 2019.

1.5 The closed loop

The same small set of bodies estimates the population, sets the quota, writes the plan, approves it, polices it and reports on it. Commonwealth approval depends on reports written by the State agency being approved. No independent party audits any step.

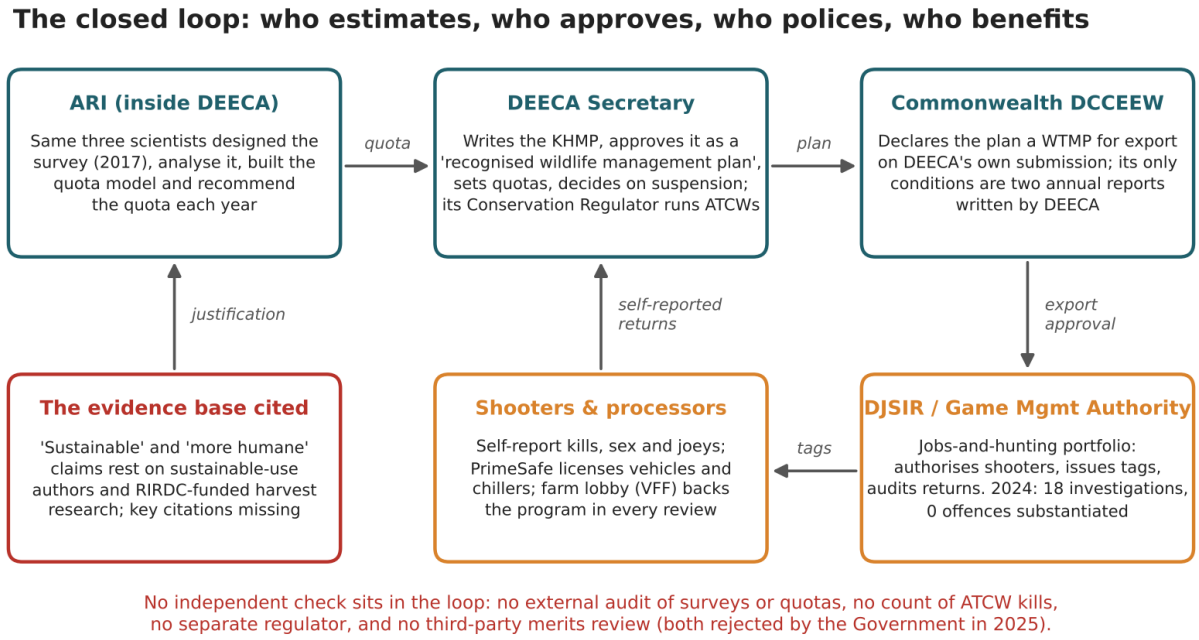


Figure 1.2. Roles under the KHMP 2024-2028.

Sources: KHMP 2024-2028, Administrative arrangements; WTMP Declaration (2024); PBO (2025); KHP Annual Report 2024; Government response to the Wildlife Act Review (2025).

1.5.1 One team, one model, one recommendation

ARI is a DEECA institute. Its scientists M. P. Scroggie, P. D. Moloney and D. S. L. Ramsey designed the aerial survey (Technical Report 280, 2017), produced every statewide abundance report, built the spatial harvest model (Scroggie and Ramsey, 2020), wrote the paper describing the new model-based method, and author the annual quota recommendation. The plan's promise that the model "will be peer reviewed" has been met by that team's own journal article. No external audit of the quota model, of its inputs, or of the decision to change methods in 2024 has been published.

What independent review can find is shown by the one example in our document set. In 2019 University of Melbourne researchers, reviewing Parks Victoria's Mallee cull modelling, rebuilt the models "from scratch". They found problems that "resulted in an overstatement of its performance and potential", and noted there was "no capacity to compare culled kangaroo populations with a control population". No equivalent review of the statewide quota model has been commissioned.

1.5.2 The evidence base the plan cites

The 2024-2028 plan's case that harvesting is sustainable and more humane rests heavily on a familiar circle of sustainable-use authors and industry-oriented research:

- **Cooney et al. (2012)**, with Archer, Baumber, Ampt, Wilson and Webb, a chapter arguing for commercial wildlife use. Cooney's 2008 RIRDC report in our set had its terms of reference "developed in discussion with George Wilson".
- **Wilson and Edwards (2019)**, cited twice as the evidence that "professional harvesting under the KHP would result in improved animal welfare". **The paper is missing from the plan's reference list.** So are Choquenot (1998), Lee et al. (2010), Lee (2006) and Dawson (2012), all cited in the text (derived from the approved WTMP version).

- **Hacker, McLeod and Druhan (2003)** for the claim that 10 to 20 per cent is sustainable; cited in the text as "Hacker et al. 2004". S. McLeod is also co-author of the RIRDC joey study reviewed in section 1.10.
- **Hayward et al. (2019), "Deconstructing compassionate conservation"**, a polemic against the welfare-based ethic held by most of the plan's critics.

None of this literature is Victorian except ARI's own reports. The 2000 Committee warned that rangeland research applies to Victoria only "with considerable caution". The plan cites it as settled.

1.5.3 Who is in the room

The commercial program is delivered through DJSIR, the jobs and industry department, and the Game Management Authority, whose other work is regulating deer, duck and game-bird hunting. The Victorian Farmers Federation has "long been supportive" of the plan in each review. On the political side, the Firearms Amendment (Silencers) Bill 2018, introduced by Shooters, Fishers and Farmers MLC Jeff Bourman, sought wider access to silencers for licensed shooters. It was defeated 36 to 4, but it shows the shooting lobby's legislative agenda at the time the commercial program was being designed. Silencers are now used by commercial kangaroo shooters, a dangerous practice given proximity to human populations.

1.6 Four plans, eroding safeguards

The Kangaroo Harvest Management Plan has been reissued four times. Read in sequence, the safeguards that justified the first plan weaken in each successive version, while the program's reach grows.

Table 1.4. How the plans changed, 2019 to 2024-2028

Safeguard or feature	KHMP 2019 / 2020	KHMP 2021-2023	KHMP 2024-2028
Population thresholds to suspend harvest	To be developed "for all harvest zones by June 2020"	To be developed "during the plan's lifespan"	**None.** No threshold or trigger for low populations
Public land	"Will act as sanctuary zones for the harvested species"	Sanctuary "(unless otherwise specified in future)"; "special quota ... in addition to" the commercial quota	"Refuge", but harvesting "may be authorised"; separate quota "outside of the released commercial quota"
ATCW cap	"No plans to cap ATCW numbers"	"No plans to impose a quota on ATCW numbers"	"No legal mechanism"; total take "could exceed the total quota"
Total take ceiling	10% "for the initial period"; may be adjusted	10%	10%, described as "the low end" of a 10 to 20% range
Products	Pet food only	Human consumption added (from 28 Jan 2021)	Pet food and human consumption; export
Species	Single "grey" quota	Single "grey" quota	Species quotas from 2025, after admitting "difficulty in distinguishing between species"
Commonwealth status	WTMP "will be sought in due course"	Developmental wildlife trade operation (Dec 2020)	Full WTMP to 1 Sep 2029
Plan term	One year	Three years	Five years
Cost recovery	Not addressed	Not addressed	"Investigate the feasibility"

1.6.1 What changed between the draft and the approved plan

Two versions of the 2024-2028 plan are in our set: a late-2023 version, written while the 2021-2023 plan "will continue to remain in force" and whose footer still reads "2024-2026", and the version "submitted June 2024" that the Commonwealth declared a WTMP on 8 September 2024. A sentence-by-sentence comparison shows that statements contradicted by the 2023 and 2024 results were removed before approval.

Table 1.5. Text removed or added between the draft and the approved WTMP version

Late-2023 version	Approved WTMP version (June 2024)	What the record shows
"The quotas allocated each year are conservative (take less than the scientifically determined allocation)."	Parenthesis deleted	Total take exceeded the zone ceiling in the Mallee in 2023 (13%) and in three zones in 2024
"The number of kangaroos approved for control under ATCWs decreased from 78% to 46% and the reported total take ... remained at no more than 10%"	Deleted	ATCW share rose to 59% in 2024 and 70% in 2025
"It is anticipated that the portion of commercial quota within the total quota will increase as the number of ATCW applications decrease"	Deleted	ATCW approvals rose 58% in 2024 and 46% in 2025 (derived)
Data "supports that neither species was exposed to more harvesting pressure than the other"	Deleted; species quotas introduced from 2025	Western Grey total take 17.1% in Loddon Mallee in 2025
Adjusting the commercial quota "helps ensure the total take remains at sustainable levels"	"Is used to aim to keep take within"; total take "could exceed the total quota in some instances"	It did: 12.4% of Eastern Greys in 2025
Not present	"The KHP now accounts for approximately half of kangaroo control in Victoria"	41% in 2024, 30% in 2025 (derived)

CONTRADICTION

The Commonwealth approved a plan from which the claims of conservatism and declining ATCW use had just been removed because they were no longer true. The approval's only conditions are that DEECA send two annual reports. Nothing in the declaration requires the 10 per cent ceiling to be met.

The approved version also contains a sentence that was never finished: "A harvest quota of 10-20% of the population is generally considered ecologically sustainable, and Victoria's quotas are set at the low end of the range. will be set within this range". This sits in Appendix 6, the impact assessment the EPBC Act requires.

1.7 Quotas, take and the 10 per cent ceiling

Every year since 2020 commercial shooters have left a large part of their quota unused, while the uncounted ATCW component has grown. Because commercial kills are tagged and reported, the shortfall is the best evidence available of how many Kangaroos can actually be found.

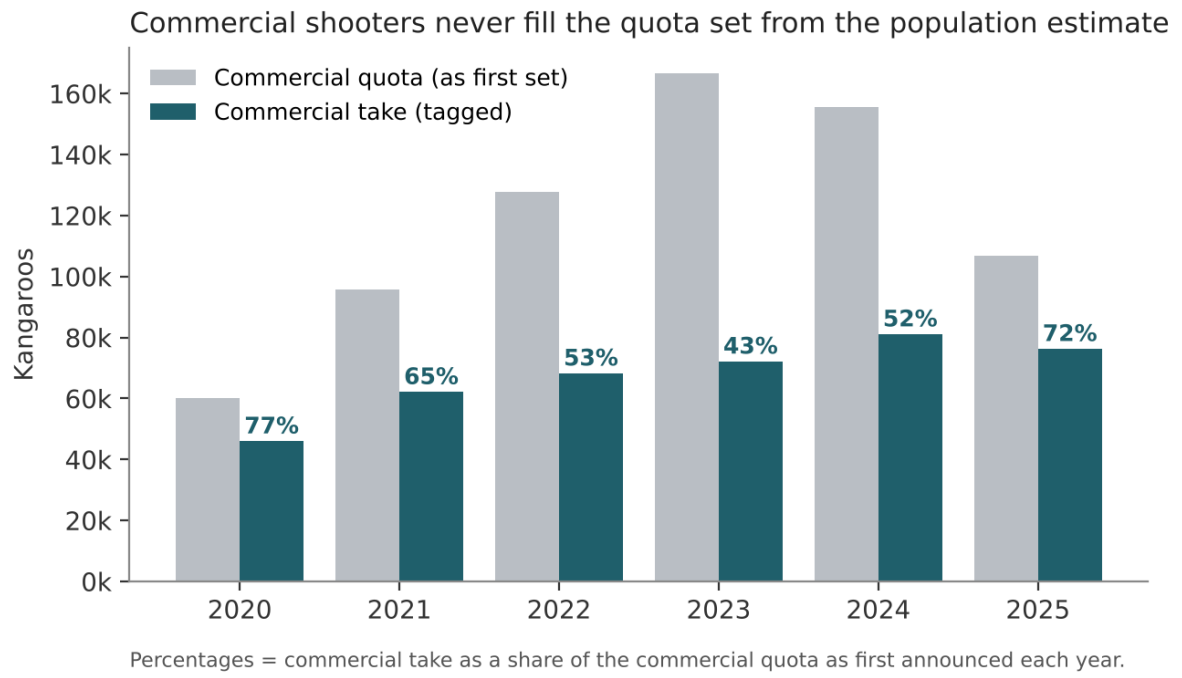


Figure 1.3. Commercial quota as first announced against commercial take, 2020 to 2025.

Sources: KHP annual reports 2020 to 2025.

Table 1.6. Victoria's Kangaroo Harvesting Program, 2019 to 2025

Year	Population estimate used	Recommended total take	Commercial quota (first set / final)	Commercial take	ATCW approved (maximum)	Total take claimed	Total as % of estimate
2019 (Q4)	1,378,605	34,465	14,090	7,835	28,410	36,245*	2.6%*
2020	1,378,605	137,800	60,050 / 57,900	46,064	70,752	116,816	8.5%
2021	1,911,626	191,200	95,680 / 93,640	62,234	56,942	119,176	6%
2022	1,858,150	185,850	127,850 / 118,980	68,346	58,771	127,117	7%
2023	2,363,850	236,350	166,750 / 166,750	72,232	75,375	147,607	6%
2024	2,230,500	223,050	155,650 / 111,575	81,160	118,823	199,983	9.0%
2025	2,078,000	207,800	106,750 / 94,700	76,363	174,022	250,385	12.4% EGK; 9.0% WGK

* Derived by adding commercial take and ATCW approvals; the 2019 report gives 30,499. 2021 recommended total from DEECA quota notices as compiled by Hylands (2024). The 2025 ARI recommendation allocated 117,600 to the commercial quota; DEECA released 106,750.

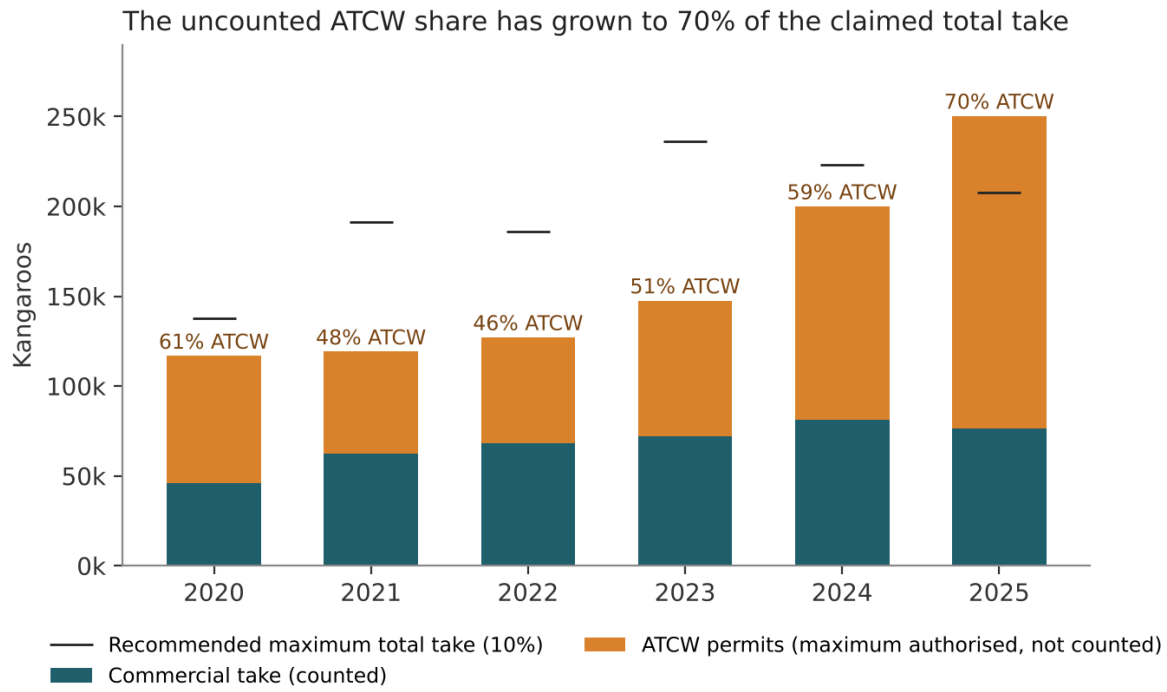


Figure 1.4. Composition of the claimed total take. ATCW figures are the maximum numbers authorised; the Government confirms permit holders do not report actual kills.

Sources: KHP annual reports 2020 to 2025; ARI quota reports.

1.7.1 Three contradictions in the ceiling

- **Which ceiling?** The KHMP sets total take at "no more than 10%". DEECA's own 2024 annual report says "an annual take of 10 to 20 per cent of kangaroo populations is considered sustainable". ARI's 2025 quota report cites "rates of up to 15%" elsewhere. The Government's documents do not agree on the limit they claim to apply.
- **Breached, but not enforced.** Action 1.4.1 requires DEECA to reduce or suspend commercial quota where total take is predicted to exceed the total quota. In 2025 the Eastern Grey total exceeded 10 per cent in every zone. The plan concedes it cannot stop this, because ATCWs cannot be capped.
- **Breached, or not?** Because ATCW numbers are maxima, the Government cannot say whether the 2025 breach was real. A ceiling that cannot be measured cannot function as a safeguard. Either the take exceeded the limit, or the Government's own published take figures are wrong.

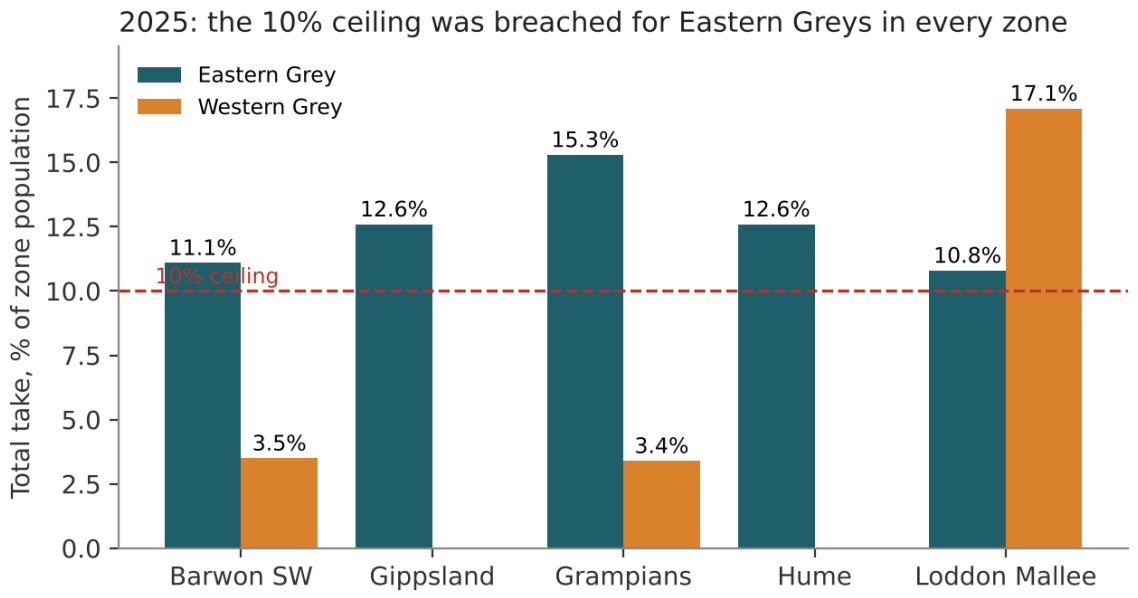


Figure 1.5. 2025 total take (commercial plus ATCW maximum) as a share of each zone's estimated population.

Source: KHP 2025 Annual Report.

1.8 The population numbers

Every quota, every ceiling and every claim of sustainability depends on one number: the population estimate. Victoria began statewide surveys only in 2017, three years after the trial started. The estimates have since moved independently of what the aircraft actually count.

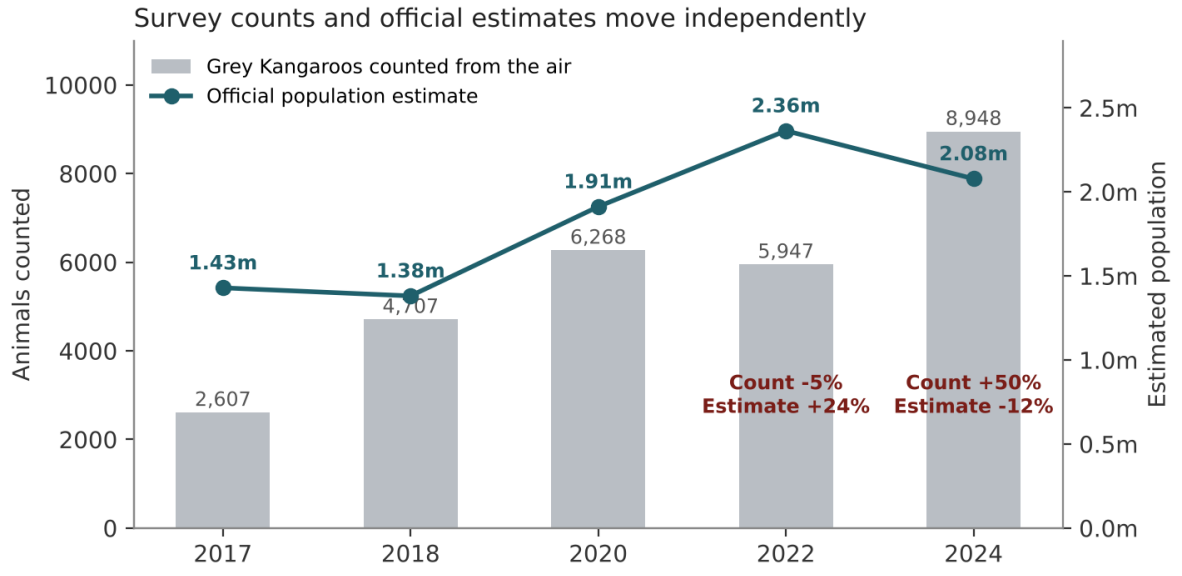


Figure 1.6. Grey Kangaroos counted on aerial transects against the official estimate.

Counts compiled by Hylands from ARI survey reports (see Chapter 1); estimates from KHP annual reports.

1.8.1 What the Government's own reports concede

- **The survey cannot detect the declines it is meant to guard against.** ARI's 2025 quota report describes the change from 2.36 million (2022) to 2.30 million (2024) as "well within the margin of error" and "statistically insignificant". Zone confidence intervals are wide: Hume Eastern Greys

583,000 to 993,000; Grampians Western Greys 75,000 to 164,000. A program removing up to 10 per cent a year cannot be steered by an instrument with that uncertainty.

- **"Stable" depends on where you draw the line.** The same report calls the population "very similar". But that 2.30 million includes 228,000 Eastern Greys in ten local government areas newly moved into the exclusion zone. Within the five harvest zones the estimate fell from 2,363,850 to 2,078,000, or 12 per cent (derived).
- **The "conservative" claim was reversed.** The KHMP lists, as a mitigation, that aerial surveys are "generally believed to underestimate kangaroo abundance". Yet the Government's re-analysis of 2022 under the new method gave about 1.99 million rather than 2.36 million (Chapter 1). The higher figure had already set the 2023 quota of 236,350.
- **Estimates without surveys.** Aerial surveys are flown every second year. In other years the estimate is modelled from rainfall and past take. The 2025 estimate rose by 228,000 without a survey (Chapter 1).
- **Internal inconsistencies.** The 2025 quota report gives 84,550 predicted Eastern Grey ATCWs in its summary and 82,550 in its tables; its figures describe 90 per cent intervals and its table 95 per cent; its summary gives 2.30 million and its results 2.31 million.

CONTRADICTION

The KHMP describes quotas as conservative, and the 2024 annual report describes the population as "broadly stable".

ARI's quota report states the survey cannot distinguish a 2.36 million population from 2.30 million. An estimate that cannot detect a fall in population cannot support a claim of stability, still less one of conservatism.

1.8.2 What DEECA says about habitat elsewhere

The KHMP's threats appendix says "habitat modification has improved conditions for kangaroos". In September 2024 the same department published guidance for growth areas stating that development "reduces both the area and the quality" of habitat, that Kangaroos become "landlocked", and that consequences include "starvation due to reduced food sources and overcrowding". The KHMP also says Kangaroos "recover quickly after drought"; the 2000 Committee recorded drought mortality of around 50 per cent in the rangelands.

1.9 The ATCW loophole and the drought subsidy

Authorities to Control Wildlife were meant to be a last resort for damage mitigation. Under the KHMP they have become the largest and least accountable part of the kill, and in 2025 the Government began paying for them.

Table 1.7. ATCW approvals: forecast against actual

Year	ATCW forecast used to set the commercial quota	ATCW maximum actually approved	Overrun
2024 (all greys)	80,700	118,823	+47%
2025 Eastern Grey	90,750	157,678	+74%
2025 Western Grey	8,400	16,344	+95%

Sources: KHP Annual Reports 2024 and 2025; overruns derived.

1.9.1 The 2025 drought response

In June and July 2025 the Government announced $1.8 million in On-farm Kangaroo Control Rebates. Farmers holding an ATCW may claim up to three rebates of $450 to hire a GMA-accredited professional harvester. Eligible costs include harvester fees, "travel and ammunition". No tag purchase is needed. ATCW processing was fast-tracked to "less than one week".

- **It reverses the 2018 evaluation.** The trial evaluation's central recommendation was to separate commercial harvesting from ATCWs. The rebate pays commercial shooters to kill under ATCWs, outside the tagged quota.
- **It contradicts the ATCW test.** The PBO notes that landholders "must exhaust all non-lethal control options" before applying. A one-week turnaround with a cash incentive leaves little room for that test.
- **It contradicts the plan's drought rule.** KHMP Action 1.6 says that where drought affects populations, "harvesting may be suspended, or quota reduced". The threats appendix says drought "can dramatically reduce kangaroo numbers". Instead, the Government subsidised more killing during drought, and total take reached 12.4 per cent of Eastern Greys.
- **It contradicts the fire rule.** After the 2025 Grampians and Little Desert fires, DEECA teams euthanised about 1,700 Kangaroos, yet made "no changes to the commercial quota". Total take in the Grampians zone reached 15.3 per cent of Eastern Greys.

> *There are risks and inconsistencies inherent in the existing parallel programs of Authority to Control Wildlife and Kangaroo Harvest Program given they each allow the lethal control of kangaroos, but on different policy and decision-making grounds. Chief Conservation Regulator, 23 December 2020*

Five years later the inconsistency remains, and the Government has rejected the independent regulator that the Wildlife Act Review recommended to resolve it (section 1.12).

1.10 Joeys: the uncounted dead

Commercial shooters reported killing 118,221 dependent young between October 2019 and December 2025. These animals are not tagged, are not in the quota and are not in the totals. The 2025 annual report states they "do not feed into quota calculations".

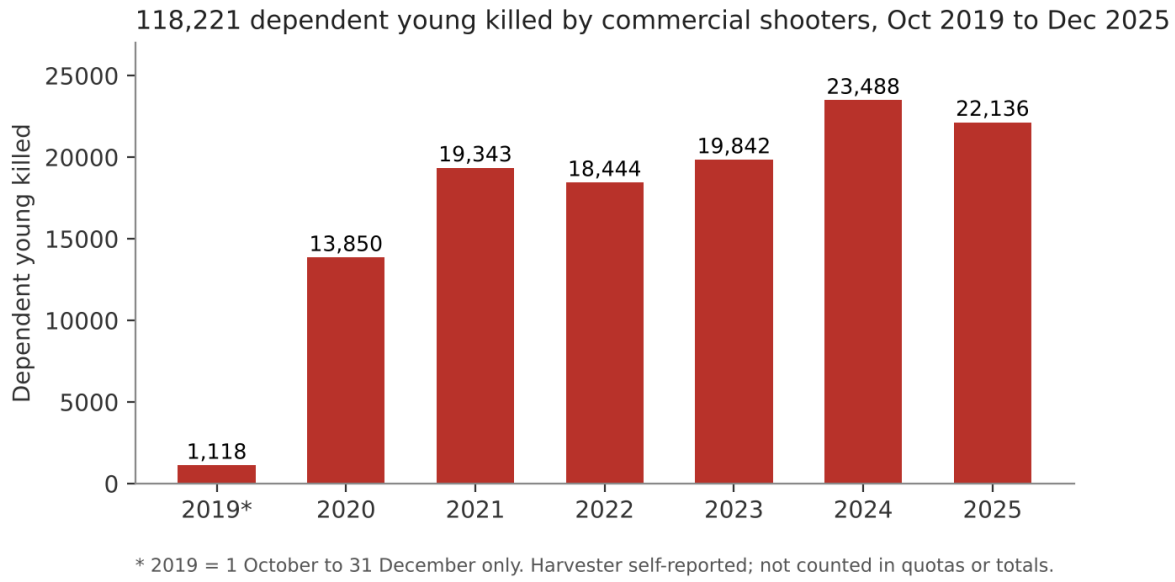


Figure 1.7. Dependent young killed, as reported by commercial harvesters. ATCW kills of joeys are not reported at all.

Sources: KHP annual reports 2019 to 2025 (2023 figure as corrected in April 2025).

Table 1.8. Females and joeys in the commercial kill

Year	Females shot	Female share of commercial take	Dependent young killed	Joeys per 100 females (derived)
2020	15,182	33%	13,850	91
2021	about 21,800	35%	19,343	about 89
2022	22,607	33%	18,444	82
2023	23,321	32%	19,842	85
2024	27,314	33.7%	23,488	86
2025	26,646	35%	22,136	83

The 2021-2023 conditions of authorisation state that "Kangaroos with obvious dependent young must not be shot" (Condition 7). A kill recording more than 80 joeys for every 100 females cannot be reconciled with that condition.

1.10.1 What the RIRDC research found

McLeod and Sharp's 2014 study, funded through the Rural Industries Research and Development Corporation, observed harvesters in the field and kept orphaned young-at-foot in an enclosure. In the field, 86 per cent of females shot had pouch young. The authors recorded the methods used: very small young decapitated "using a finger and thumb" or "firmly stamped on"; larger furred young killed by "a single forceful blow to the head", swung against a hard object such as the vehicle tray. Where the pouch was not checked, small young were "left to die attached to the teat".

- **Young-at-foot.** Separation from the mother caused "a negative welfare impact", with more distress calls and more aggression from other adults. In the NSW harvest, the authors estimated over 600,000 females likely to have had a young-at-foot were shot in 1999 to 2012, and that the share euthanased "was likely to be low".

- **The recommended practice makes it worse.** Targeting females with no large pouch young "is likely to exacerbate the problem since many females without large pouch young will have a young-at-foot".
- **The proposed fix failed.** A spring-loaded captive-bolt device left "an unacceptable proportion" of joeys not stunned by a single shot.

The KHMP addresses none of this beyond requiring compliance with the National Code. Its tagging rule (Action 3.3) states that pouch young and young-at-foot "that are euthanised" need not be tagged. Young-at-foot that escape are not recorded anywhere.

1.11 Self-policing, at public expense

Commercial Kangaroo shooting happens at night, on private land, with no inspector present. Almost every figure about it is self-reported. The compliance record reflects that.

Table 1.9. Compliance record, 2020 to 2025

Year	Authorised / active harvesters	Audits of returns	Investigations	Offences substantiated
2020	87 authorised	In-field audits of 35% of active harvesters (COVID-19 limited)	Not reported (3 information reports)	Not reported
2021	123 authorised	36% programmed in-field audits	Not reported (36 information reports)	Not reported
2022	157 authorised	60% programmed in-field audits	13	Not reported
2023	17 "active"	2,749	4	4 (minor)
2024	29 "active"	1,152	18	**0**
2025	Up to 63 per zone	2,874	5	4

The harvester counts are themselves inconsistent: 157 authorised (2022), 17 "active" (2023), 29 "active" (2024), "about 130" accredited (Agriculture Victoria, July 2025) and 163 authorised (2024-2026 authorisations; Chapter 1). In 2020 "active" meant more than 700 Kangaroos in a year. Different definitions make the compliance rate impossible to compare. Against this, the trial evaluation found 62 possible illegal-take offences in five record books.

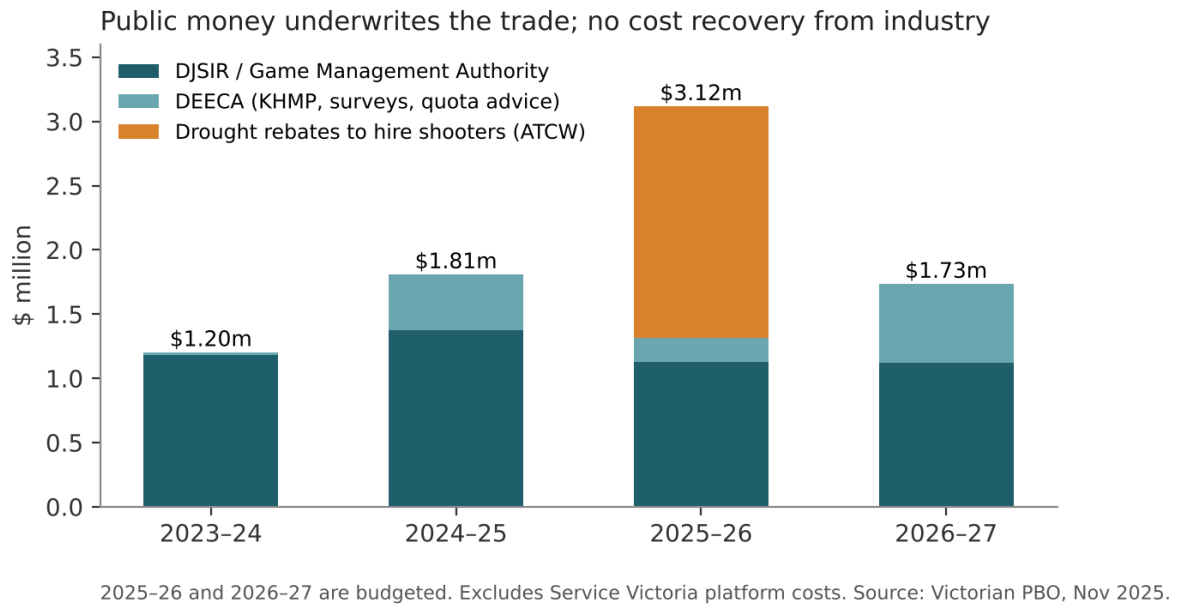


Figure 1.8. Victorian Government funding for the KHP and the 2025 drought rebates.

Source: Parliamentary Budget Office (2025), Figures 6 and 10.

The PBO found that the rebate program alone equals "the entire KHP funding in 2024-25, the largest year of the program". In 2025-26 the Government is budgeted to spend more public money to have Kangaroos shot than it spends administering, surveying and policing the commercial trade.

1.12 A system that will not be reviewed

The independent panel that reviewed the Wildlife Act reported in December 2021. The Government responded in September 2025. Of the 40 recommendations whose responses we could tally, 17 were supported, 13 supported "in principle" and 10 not supported.

Table 1.10. Wildlife Act Review: recommendations rejected that bear on Kangaroo killing

Recommendation	Government response (2025)
7.7 Create a statutory Chief Conservation Regulator with oversight of DEECA	Not supported: the regulator "is functioning well" inside DEECA
11.2 Consider an independent, structurally separate regulator	Not supported: "no clear return on investment"
9.5 Third-party standing to seek merits review of strategic decisions	Not supported: it "would tie up valuable resources"
7.3 Require a Victorian fauna strategy and fauna plans	Not supported
5.8 Remove unprotection orders	Not supported: "valid management tools"
5.2 Decision makers "should apply the precautionary principle"	Supported only "in principle"

The Conservation Regulator therefore remains a division of the department whose plan it is meant to regulate. In December 2020 that regulator's head wrote that ATCW and KHP "do not form a coherent policy and regulatory approach" and that reform "is desirable". The 2021 Statement of Regulatory Intent promised to "ensure the Authority to Control Wildlife system" was fit for purpose. Neither the Wildlife Act nor the ATCW system has since been reformed. The only change is that more permits are now issued faster.

1.13 Register of contradictions

Table 1.11 collects the contradictions identified in this volume. Each pairs a claim in a Government or consultant document with the Government's own evidence against it.

Table 1.11. Claims and the record

#	Claim	Source of claim	Contradicting evidence	Source of evidence
1	Kangaroo industry not supported; any monitoring at industry's cost	ENRC 2000, Rec. 27	Industry created 2014-2019; no cost recovery	KHMPs; PBO 2025
2	Trial's purpose: to reduce waste of carcasses from Kangaroos already controlled under ATCWs	Premier media releases, 2016 and 2018	Approvals 260% of long-term average; risk "unacceptable"	KPFT evaluation 2018
3	Thresholds to suspend harvest by June 2020	KHMP 2019	No thresholds in 2024-2028 plan	KHMP 2024-2028
4	Public land "will act as sanctuary zones"	KHMP 2019, 2020	Harvesting "may be authorised"; 14,838 Western Greys under ATCWs in Loddon Mallee in 2025, almost all on public land	KHMP 2024-2028; KHP 2025 report
5	Quotas "conservative (take less than the scientifically determined allocation)"	KHMP 2024-2028, late-2023 version	Deleted before approval; 2025 take 12.4% of Eastern Greys	WTMP version; KHP 2025 report
6	Total take no more than 10%	KHMP 2024-2028	"10 to 20 per cent ... is considered sustainable"	KHP 2024 Annual Report
7	Commercial quota adjustment keeps total within 10%	KHMP 2024-2028, Action 1.4	Exceeded in every Eastern Grey zone in 2025	KHP 2025 report
8	KHP is "approximately half" of control and rising	KHMP 2024-2028 (WTMP)	41% (2024), 30% (2025)	KHP 2024 and 2025 reports
9	Population "broadly stable"	KHP 2024 report; ARI 2025	Harvest-zone estimate down 12%; change undetectable within margin of error	ARI Tech. Report 384
10	Aerial surveys underestimate abundance	KHMP mitigation list	Re-analysis lowered 2022 estimate to about 1.99m	DEECA via Chapter 1
11	Habitat modification improved conditions for Kangaroos	KHMP Appendix 5	Development causes landlocking and starvation	DEECA Guidance Note, Sep 2024
12	Harvest may be suspended in drought or fire	KHMP Action 1.6	Drought: rebates to kill more; fires: no quota change, 15.3% take in Grampians	Agriculture Victoria 2025; KHP 2025 report
13	Commercial harvesting and ATCWs must be separated	KPFT evaluation 2018	Rebates pay professional shooters under ATCWs, no tags	Agriculture Victoria 2025
14	Kangaroos with obvious dependent young must not be shot	Condition 7, 2021-2023	118,221 dependent young killed; 82 to 91 per 100 females	KHP reports 2019-2025
15	Professional harvesting improves welfare (Wilson and Edwards 2019)	KHMP Appendix 6	Citation absent from reference list; RIRDC study found young-at-foot euthanasia "likely to be low"	KHMP references; McLeod and Sharp 2014
16	Neither species exposed to more harvesting pressure	KHMP 2024-2028, late-2023 version	Deleted; species quotas added; Western Grey take 17.1% in Loddon Mallee	WTMP version; KHP 2025 report

#	Claim	Source of claim	Contradicting evidence	Source of evidence
17	Compliance effectively monitored and enforced (Aim 4)	KHMP 2024-2028	1,152 audits, 18 investigations, 0 offences (2024), all on self-reported data	KHP 2024 report; PBO 2025
18	ATCWs require all non-lethal options to be exhausted	Wildlife Act, per PBO	Approvals fast-tracked to under one week with cash rebates	Agriculture Victoria 2025
19	The Conservation Regulator is "functioning well"	Govt response 2025	Its own head: ATCW and KHP "do not form a coherent" approach	Chief Conservation Regulator, Dec 2020
20	Population model "will be peer reviewed and regularly evaluated"	KHMP Action 8.3	Only review published is the authors' own paper; no independent audit	ARI publications

1.14 No lessons learnt

Victoria has lost seven of the sixteen members of the Kangaroo family present at British settlement, and four more are endangered (Chapter 1). The Brush-tailed Rock-wallaby, now reduced to a few dozen animals in the wild, was traded by the tens of thousands for its skin in the early 1900s. The documents reviewed here repeat the reasoning that preceded those losses: that the animals are abundant, that use gives them value, and that the harvest is too small to matter.

Three patterns link this volume to the national findings of the Report:

- **Estimates that rise regardless of the kill.** Nationally, 24 of 44 year-on-year movements in official estimates exceed what Kangaroo biology allows. Victoria is the only mainland state whose estimate rose sharply between 2020 and 2026, and three of its six years fail the same test (Population Plausibility Analysis).
- **Quotas that are never filled.** Every mainland state takes well under its quota. Victoria's shortfall persists even with the State's own shooters paid by the carcass (Figure 1.3).
- **Safeguards that exist on paper.** In each state the welfare code, the ceiling and the thresholds are written into plans that the same agencies administer and report on. Victoria shows how quickly such safeguards can be edited out.

The 2000 Committee foresaw that once an industry exists, pressure would build to kill "in line with industry need rather than population-control prerogatives". Twenty-five years later, that describes the Victorian program, in the Government's own words and numbers.

1.15 Conclusions and recommendations

On the documents that created it, Victoria's commercial Kangaroo trade cannot be called ecologically sustainable or humane. The plans claim a ceiling they cannot measure and a precaution they have removed. They cite a welfare benefit their own evidence does not support, and rest on a population estimate that cannot detect a decline. The Commonwealth approved the trade on the strength of the State's own reports, and the State has rejected every proposal for independent oversight.

Recommendations

1. End the commercial Kangaroo trade in Victoria, as Parliament advised in 2000.

2. Commission an independent review, outside DEECA and ARI, of the survey design, the 2024 change of method, the quota model and every estimate since 2017, with raw data published.
3. Require all ATCW holders to report actual kills by species, sex and location, and give the Conservation Regulator power to cap ATCW approvals in any zone.
4. End the drought rebate for shooting and fund non-lethal measures instead.
5. Reinstate public land as Kangaroo sanctuary, with no commercial or separate quota.
6. Ask the Commonwealth to revoke or suspend the 2024-2028 WTMP declaration, as total take exceeded the plan's own ceiling in 2025.
7. Establish an independent wildlife regulator outside DEECA, and allow third-party merits review, as the Wildlife Act Review recommended.

Questions for the Victorian Government

- Why were the population thresholds promised for June 2020 never developed, and who decided to omit them from the 2024-2028 plan?
- Who approved the deletions between the late-2023 version and the June 2024 WTMP version, and was the Commonwealth told of them?
- How many Kangaroos were actually killed under the 174,022 ATCW authorisations of 2025, and how many under rebate-funded shoots?
- Why were Wilson and Edwards (2019) and other works cited in the approved plan omitted from its reference list?
- Has any external party reviewed the ARI quota model? If not, why not?
- Why was no quota change made after the 2025 Grampians fires, when the plan provides for suspension?

Sources

1. Environment and Natural Resources Committee, Parliament of Victoria (2000). Inquiry into the Utilisation of Victorian Native Flora and Fauna.
2. DELWP (2018). Kangaroo Pet Food Trial Evaluation Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0034/564685/KPFT-Evaluation-Report.pdf
3. Premier of Victoria (29 March 2019). Kangaroo Management Plan To Be Developed For Victoria. https://www.premier.vic.gov.au/kangaroo-management-plan-be-developed-victoria
4. DELWP (2019). Victorian Kangaroo Harvest Management Plan 2019; and 2020 plan. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0026/436067/VictorianKangarooHarvestManagementPlan2019.pdf
5. DELWP (2020). Victorian Kangaroo Harvest Management Plan 2021-2023.
6. DEECA (2023, 2024). Victorian Kangaroo Harvest Management Plan 2024-2028, consultation and WTMP versions. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0024/692304/Final_Kangaroo-Harvest-Management-Plan-2024-2028.pdf
7. Minister for the Environment (2020). Declaration of an Approved Developmental Wildlife Trade Operation, Victoria 2021-23 (F2020N00152). https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0032/506498/DWTO-signed-by-Minister-Ley.pdf
8. Minister for the Environment and Water (2024). Declaration of a WTMP for the Commercial Harvest of Kangaroos in Victoria 2024-2028 (F2024N00820). https://legislation.gov.au/F2024N00820/asmade/2024-09-11/text/original/pdf
9. DELWP/DEECA. Kangaroo Harvesting Program reports 2019 to 2025. https://wildlife.vic.gov.au/our-wildlife/kangaroo-harvesting-program/kangaroo-harvesting-program-annual-statistics
10. DEECA (2026). Kangaroo Harvesting Program 2025 Annual Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0033/784842/Kangaroo-Harvesting-Program-2025-Annual-Report.pdf
11. DEECA (2025). Kangaroo Harvesting Program Annual Report 2024. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0039/744879/Kangaroo-Harvesting-Program-Annual-Report-2024_FINAL.pdf
12. Scroggie, M.P. and Moloney, P.D. (2024). Kangaroo harvest quotas for Victoria, 2025. ARI Technical Report 384. https://wildlife.vic.gov.au/__data/assets/pdf_file/0032/729455/Kangaroo-harvest-quotas-for-Victoria-2025-ARI-tech-report.pdf

13. Scroggie, M.P. and Moloney, P.D. (2024). State-wide abundance of kangaroos in Victoria, 2024. ARI Technical Report 385. https://www.ari.vic.gov.au/__data/assets/pdf_file/0031/730975/ARI-Technical-Report-385-State-wide-abundance-of-kangaroos-in-Victoria-2024.pdf

14. Scroggie, M.P., Moloney, P.D. and Ramsey, D.S.L. (2017). Design of an aerial survey to estimate the abundance of kangaroos in Victoria. ARI Technical Report 280. https://www.ari.vic.gov.au/__data/assets/pdf_file/0032/80789/ARI-Technical-Report-280-Design-of-an-aerial-survey-for-abundance-of-kangaroos-in-Victoria.pdf

15. Gavens, K., Chief Conservation Regulator (23 December 2020). Attachment 5: Chief Conservation Regulator comments (2021 KHP quotas).

16. Conservation Regulator (2021). Regulating the protection of wildlife: Statement of Regulatory Intent.

17. Victorian Government (September 2025). Government response to the Wildlife Act Review.

18. Victorian Parliamentary Budget Office (November 2025). Kangaroo Harvesting Program: Budgeted funding and activities.

19. Agriculture Victoria (2025). Managing kangaroos on your farm: On-farm Kangaroo Control Rebates. https://agriculture.vic.gov.au/farm-management/drought-support/managing-kangaroos-on-your-farm

20. PrimeSafe (2024). Wild Game Meat Harvesting Guideline (human consumption permitted from 28 January 2021). https://primesafe.vic.gov.au/wp-content/uploads/2024/07/Game-Harvester-Guideline-Amended-July-2024.pdf

21. DEECA (2024). Guidance Note for managing kangaroos in Victoria's growth areas; DELWP (2015) Guide to preparing a kangaroo management plan for Melbourne's growth corridors (draft).

22. McLeod, S.R. and Sharp, T.M. (2014). Improving the humaneness of commercial kangaroo harvesting. RIRDC Publication 13/116.

23. Cooney, R. (2008). Commercial and Sustainable Use of Wildlife. RIRDC Publication 08/199.

24. Morris, W.K., Duncan, D.H. and Vesk, P.A. (2019). Control and monitoring of kangaroo populations in the Mallee Parks of semi-arid Northwest Victoria, Version 2. Parks Victoria.

25. Parliament of Victoria (2018). Firearms Amendment (Silencers) Bill 2018; result reported by SSAA. https://www.ssaa.org.au/?p=7476

26. Hylands, P. Earlier volumes of the Kangaroo Report: Chapter 1 (Victoria) and Addendum; Population Plausibility Analysis; state chapters (2026).

Figures marked derived are calculations by the author from the sources above. ATCW figures are maximum numbers authorised, not kills. Commercial figures are self-reported by harvesters.

PART 2

Counting Kangaroos

Victoria's Kangaroo surveys, 2017 to 2026: how the numbers are made, where the transects are, how the methods and reporting changed, and how the surveys underpin the harvest plans

Author	Peter Hylands
Prepared	November 2026
Scope	A critical review of the Arthur Rylah Institute survey designs and results, the 2018 redesign, the spatial harvest model, the bushfire impact assessment, the contractors' operations plans and ground surveys, and the quota reports that turn survey estimates into kill numbers.

Executive summary

Every Victorian quota, every claim that the harvest is sustainable, and every statement that Kangaroo numbers are "stable" rests on five helicopter surveys flown between 2017 and 2024. Part 1 of this volume showed how the management plans lean on those estimates. Part 2 examines the estimates themselves, using the Government's own design reports, survey results, contractors' plans and internal documents released under Freedom of Information.

The surveys are not fabricated, and the scientists report their uncertainty. The problem is what is done with the numbers: imprecise, method-dependent estimates dominated by a few transects and by the peri-urban fringe of Melbourne are converted, without independent review, into precise kill quotas for farmland where ground crews see few Kangaroos.

Principal findings

1. **The survey was designed to enable trade, then described as something else.** The June 2017 draft design states that "there is an intention to undertake further commercial exploitation" by exporting skins, which requires a Wildlife Trade Management Plan. The August 2017 published version rewrote that purpose as informing ATCW decisions (section 2.3).
2. **The design rests on guesses and has never met its own precision target at zone level.** Densities for the original design came partly from "the authors' own judgements"; the strata were drawn "using an ad hoc approach". Zone coefficients of variation ran from 32 to 67 per cent in 2017 and up to 46 per cent in 2022, against a target of 20 per cent (section 2.6).
3. **One zone on Melbourne's fringe carries the statewide number.** The Central zone is about 7 per cent of the surveyed land and receives about 6 per cent of the flying yet supplied 38 to 43 per cent of the Eastern Grey estimate in four of five surveys. Much of it is now in the commercial exclusion zone (section 2.5).

4. **A handful of transects drive whole zones.** One North East transect (NE09, which ARI locates between Mount Samaria State Park and Mansfield) held 48 per cent of all Kangaroos counted in that zone in 2018 and 38 per cent in 2022. One Otway transect held 33 to 40 per cent. The 150 transects have been re-flown since 2018 (section 2.5).
5. **Where the transects are matters.** Ground crews deliberately concentrated on "ecotones between pasture or crop and patches of wooded habitat" and some routes ended in parks and reserves. They saw only 0.3 to 0.8 Kangaroos per kilometre. Around half the far north-west aerial transects appear to cross Murray-Sunset National Park, which covers about 29 per cent of the Mildura municipality (section 2.5).
6. **The same data give very different answers.** The 2022 survey has produced Eastern Grey estimates from 1.77 million to 2.15 million and Western Grey estimates from 207,000 to 615,000, depending only on the analysis chosen (section 2.6).
7. **The heavily harvested Wimmera fell about 40 per cent in two years, then disappeared from reporting.** On ARI's own figures, Eastern Greys in the old Lower Wimmera zone fell 41 per cent (model) or 44 per cent (design) between 2022 and 2024. From 2025 the zone no longer exists, and the statewide total was described as "very similar" (section 2.7).
8. **Estimates and observations diverge.** From 2020 to 2022 the count per kilometre fell 5 per cent while the estimate rose 24 per cent; from 2022 to 2024 the count rate rose 58 per cent while the estimate fell 2 per cent (section 2.6).
9. **The spatial harvest model's own warnings are being breached.** ARI found harvest rates above 15 per cent carry high risk and that safety depends on a strongly male-biased kill. In 2025 take reached 15.3 to 16.3 per cent of Eastern Greys in the Grampians and 17.1 to 21.4 per cent of Western Greys in Loddon Mallee (DEECA and ARI figures differ), and about a third of the commercial kill is female (section 2.9).
10. **Errors, re-labelling and restricted marking.** Published reports contain estimates outside their own confidence intervals, a 2020 total misprinted by half a million, recycled cover pages and reports marked OFFICIAL-Sensitive. None of it has been independently audited (section 2.8).

> **BOTTOM LINE**
>
> Victoria's survey is a reasonable attempt to estimate a total across a large state, with wide error bars. It cannot do what the harvest plans ask of it: detect local decline in time to stop the killing. The Government's own reports show it missed, or played down, a decline of about 40 per cent in the zone where commercial and ATCW killing began.

2.1 Documents reviewed

We reviewed 19 survey-related documents, most published by the Arthur Rylah Institute (ARI) inside DEECA and some released under Freedom of Information. We added the ARI quota reports for 2024, 2025 and 2026 and the authors' 2025 journal paper.

Table 2.1. Survey document set

Document	Date	What it is	Key point for this review
TR280 draft (file: kangaroo-pet-food-trial-survey)	June 2017	Survey design, draft	Purpose stated as enabling skin exports
TR280 Design of an aerial survey	Aug 2017	Survey design, published	Purpose rewritten; ad hoc strata; assumed densities

Document	Date	What it is	Key point for this review
Helicopter Operations Plans (docs 83a, 82a, 76a2)	2017, 2018, 2020	Contractor flight plans	Flown jointly with Parks Victoria Mallee surveys; transect codes
TR286 A state-wide aerial survey (two copies, and FOI doc 56)	Dec 2017	First survey results	1.44m; zone CVs 32-67%; flushing; one observer per side
Ground surveys 2018 and 2020 (docs 83b3, 78a)	2018, 2020	Macropus Consulting road counts	Targeted habitat edges; 0.3-0.5 Kangaroos per km
Kangaroo Aerial Survey Redesign	2018	Revised design	Effort doubled; ATCW zones prioritised; four observers recommended
Statewide kangaroo report 2018 (TR296)	2019	Second survey	One transect = 48% of a zone's count
TR315 Spatial harvest model	Aug 2020	Population and harvest risk model	Over 15% = high risk; model explained 19% of variance
TR312 Impacts of the 2019/20 bushfires (doc 6)	2020	OFFICIAL-Sensitive fire assessment	Fire impact measured as burnt survey area only
Proteus: Mallee Parks census data 2020 (doc 782)	2020	Parks Victoria density analysis	Possible declines in three parks, 2014-2020
Statewide Kangaroo Report 2020 (TR324)	2021	Third survey, after the fires	+36% estimate; change 'not statistically significant'
State-wide abundance 2022 (TR356)	Feb 2023	Fourth survey	2.42m; Central zone 67.5/km2; no ground survey
State-wide abundance 2024 (TR385)	2024	Fifth survey, model-based	2022 restated; design results moved to appendix
Victorian Response Plan for Wildlife Impacted by Fire	2018	DELWP fire wildlife manual	Orphaned macropod pouch young not rehabilitated

2.2 How the numbers are made

A Kangaroo seen from a helicopter becomes a quota in seven steps. Each relies on assumptions the Government's own reports qualify.

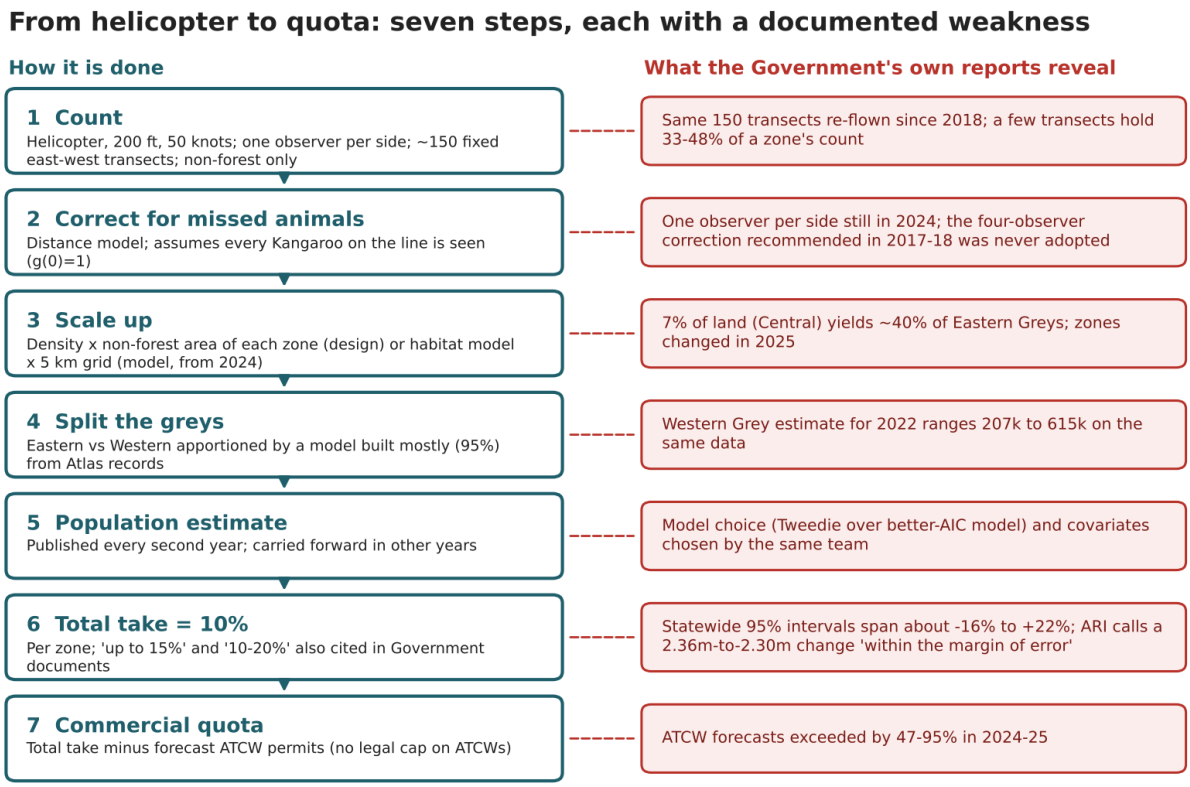


Figure 2.1. From aerial count to commercial quota.

Sources: ARI TR280, TR286, 2018 redesign, TR296, TR324, TR356, TR385; quota reports for 2024 to 2026.

The relationship with the management plans is direct. The KHMP 2024-2028 states that the total quota "will be set each year as recommended by the Arthur Rylah Institute". It cites ARI's population estimates, ARI's spatial harvest model and ARI's view of sex-biased harvesting as its evidence of sustainability. The same three scientists, M. P. Scroggie, P. D. Moloney and D. S. L. Ramsey, designed every survey, analysed every survey, built both models and wrote every quota report (Part 1, section 1.5).

2.3 The survey's purpose, rewritten

Two versions of the survey design report are in the document set. The June 2017 draft, saved under the file name "kangaroo-pet-food-trial-survey", and the August 2017 published version differ almost only in how they describe why the survey was being done.

Table 2.2. The stated purpose, June and August 2017

June 2017 draft	August 2017 published version
"There is an intention to undertake further commercial exploitation of these kangaroo carcasses, by exporting skins."	"To date, there has been a lack of state-wide kangaroo population data to inform ATCW assessment and decision making."
"There is currently a desire to further economically utilise these culled animals, by retaining and exporting skins."	The survey "will assist in the evaluation of the trial" and inform a decision on "future arrangements".
"Victoria will need to undertake a rigorous and defensible assessment ... to support the development and approval of a WTMP."	"Should Victoria move to a future program after the Kangaroo Pet Food Trial, Victoria may need to undertake" such an assessment.

June 2017 draft	August 2017 published version
WTMPs elsewhere "allow commercial exploitation and export"; a model "for development of a WTMP for the commercial utilisation of kangaroo products in Victoria"	WTMPs elsewhere "allow commercial harvesting and export"; "These WTMPs provide a useful model and background."

CONTRADICTION

The scientific method in the two versions is the same. Only the stated reason changed, from preparing Victoria for a commercial export trade to helping manage damage-mitigation permits. Two years later the survey became the basis of exactly the export trade the draft described.

2.4 Changes in method and reporting

In seven years the survey changed its effort, its species-splitting method, its statistical method and its zones. Each change was reasonable on its own terms. Together they mean there is no single comparable time series of Victorian Kangaroo numbers.

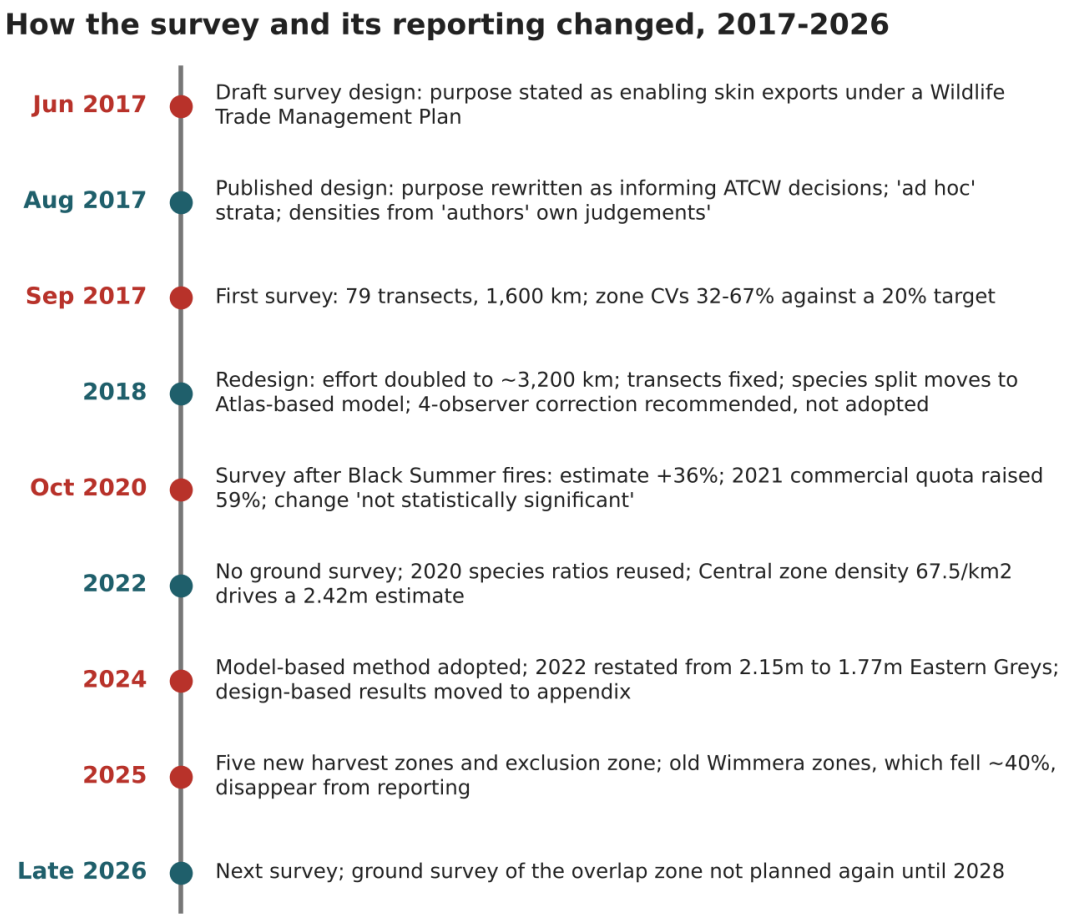


Figure 2.2. Method and reporting changes, 2017 to 2026.

Sources: as Table 2.1; ARI quota reports 2021 and 2024 to 2026.

Table 2.3. The five surveys

Survey	Transects / km	Grey Kangaroos counted	Per km	Estimate, all species	Statewide CV	Method
Sep 2017	79 / 1,600	2,607	1.63	1,442,000	18.8%	Design-based; ground ratio for species
Sep-Oct 2018	150 / 3,182	4,707	1.48	1,425,000	15.7%	Design-based; Atlas-based species model
Oct 2020	150 / 3,234	6,268	1.94	1,942,000	12.5%	As 2018
Sep-Oct 2022	150 / 3,234	5,947	1.84	2,418,000	11.8%	As 2018; no ground survey
Sep 2024	147 / 3,090	8,948	2.90	2,345,000*	about 9%	Model-based (density surface model)

* 2,094,000 Eastern Grey and 212,000 Western Grey (model-based) plus 39,000 Red Kangaroos (design-based). Sources: ARI TR286, TR296, TR324, TR356, TR385.

2.5 Where the transects are

On paper, transects are placed without regard to where Kangaroos are. They were drawn at random from a grid of 25 km east-west lines covering non-forested land, in proportion to each zone's area. In practice four features tilt the counts towards places where Kangaroos concentrate.

2.5.1 What is and is not surveyed

- **Forest is excluded entirely.** Dense forest, most of it public land, is cut out of the survey area because Kangaroos cannot be seen from the air. ARI calls the forest population a "margin of safety" and "harvest refugia" but has never counted it.
- **Mallee parks are included.** Mallee vegetation is surveyed. In the far north-west, ARI's 2024 map shows 14 transects west of 142°E and north of 35.3°S. By our reading of that map, around half cross country dominated by Murray-Sunset National Park, which covers about 6,330 of the Mildura municipality's 22,083 km2. Parks Victoria's own helicopter counts in three Murray-Sunset blocks found 7 to 11 Kangaroos per km2 in 2020, two to three times the 3.1 per km2 (all species) ARI estimated for the whole Mallee zone that year.
- **The city fringe is included.** Peri-urban municipalities such as Hume, Whittlesea, Nillumbik, Melton and the Yarra Ranges are surveyed because they "support significant populations". DEECA's 2024 growth-area guidance describes Kangaroos there as "landlocked" in shrinking habitat.
- **Transects are fixed.** Since 2018 the same 150 transects have been re-flown, with substitutions only for safety. Any transect that happens to run beside a reserve or a landlocked mob does so in every survey.

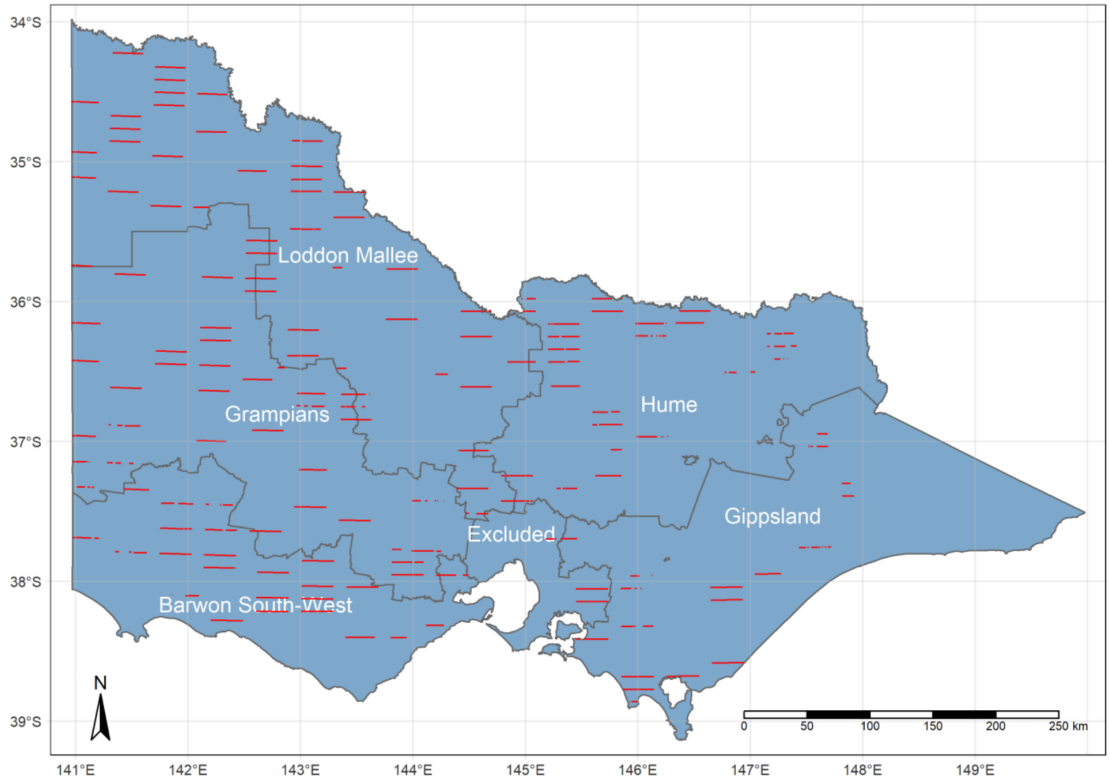


Figure 2.3. Transects flown in September 2024 (red), with the new harvest zones and exclusion zone.

Reproduced from ARI Technical Report 385, Figure 3 (State of Victoria, CC BY 4.0). The transect coordinates (file FlyCoords2018.csv) have not been published.

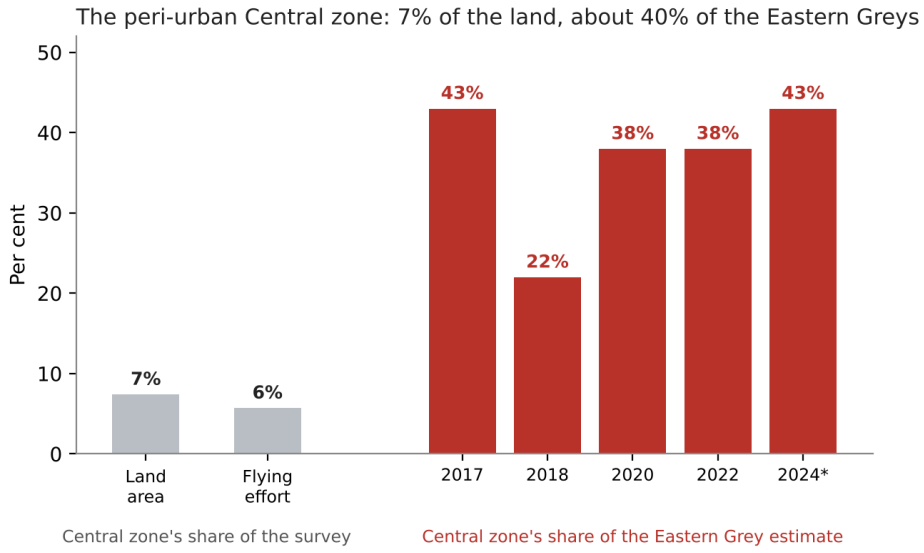
2.5.2 A few transects carry whole zones

Table 2.4. Single transects that dominated a zone's count

Survey	Transect	Location given by ARI	Count	Share of the zone's Kangaroos
2018	NE09	North East (not stated)	528	48%
2018	NE18	North East	105 in one mob (of 109)	not stated
2020	NE09	Between Mount Samaria State Park and Mansfield	one mob of 92	40%
2020	OT12	Between Dunkeld and Mortlake	one mob of 57	40%
2022	NE09	Between Mount Samaria State Park and Mansfield	473	38%
2022	OT12	Between Dunkeld and Mortlake	171	33%

In 2022 no Kangaroos at all were seen on 4 of the 16 Otway transects. A zone estimate built from one heavily populated transect and several empty ones is then spread across every hectare of farmland in the zone.

2.5.3 The Central zone effect



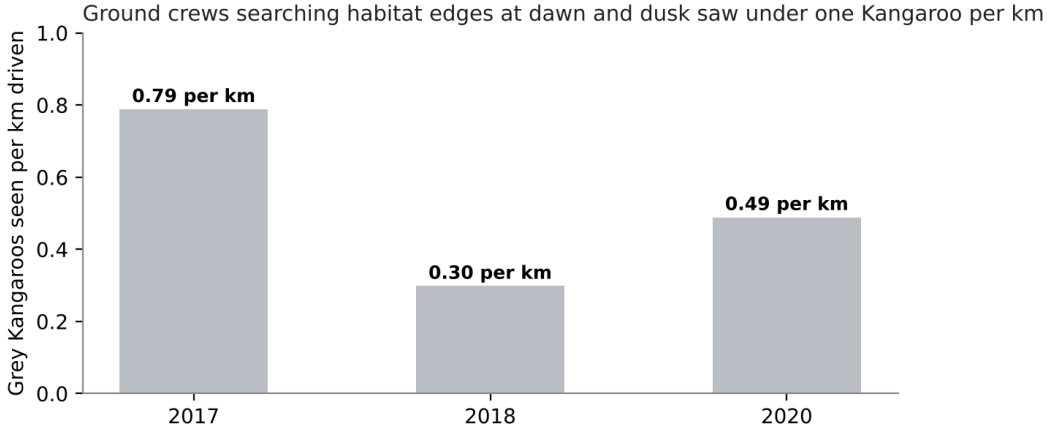
Derived from ARI reports TR280, 2018 redesign, TR286, TR296, TR324, TR356 and TR385. *2024 = model-based estimate for the old Central zone.

Figure 2.4. Central zone share of area, flying effort and the Eastern Grey estimate. Central zone density: 48.5 (2017), 22.7 (2018), 54.2 (2020) and 67.5 (2022) Kangaroos per km2, against 1.7 to 17.8 elsewhere.

The Central zone's density estimate halved between 2017 and 2018 and then trebled by 2022. Because the zone is multiplied across about 12,150 km2, those swings move the state total by hundreds of thousands. In 2024 the model-based estimate for the ten municipalities now in the commercial exclusion zone rose from 91,000 to 228,000. That increase alone exceeds the whole state's commercial quota.

2.5.4 What the ground crews saw

The road-based ground surveys used to split Eastern from Western Greys give an independent view of the farmland. Observers drove at about 33 km per hour at dawn and dusk and, in their own words, "concentrated on the ecotones between pasture or crop and patches of wooded habitat", diverting "to nearby patches of habitat". Several 2018 routes ended at parks and reserves: Pine Plain Lodge, Lake Albacutya Park, Birdcage Nature Reserve and Honeymoon Hut Track.



Macropus Consulting ground surveys of the overlap zone (documents 83b3, 78a; TR286). Includes road-kills. Not a density estimate.

Figure 2.5. Grey Kangaroos recorded per km on ground transects in the overlap zone. In 2017 only 29 Kangaroos in 8 groups were seen across Buloke, Gannawarra, Hindmarsh and Yarriambiack, and a single Kangaroo in Gannawarra.

These are not density estimates, and ground counts miss animals. But even searching the best habitat at the best time of day, crews found well under one Kangaroo per kilometre of road across the Wimmera, where aerial estimates and quotas assume several to many Kangaroos per km2. Near Boort no Kangaroos were recorded in the 2017, 2018 or 2020 ground surveys.

ASSESSMENT

The claim that transects were deliberately placed on public land and in Kangaroo habitat is not supported by the design documents: placement was random within non-forest land. But the documents do show that counts are dominated by a few transects beside habitat and reserves, by the peri-urban fringe and, in the Mallee, by national park country.

Those concentrations are then averaged across farmland where independent ground observers saw few Kangaroos. The precise share of transects on public land cannot be checked until ARI publishes the transect coordinates.

2.6 How accurate are the estimates?

2.6.1 Precision: targets missed and redefined

The survey's design target is a coefficient of variation (CV) of 20 per cent or less in every zone. That has never been achieved by the design-based method on which every quota from 2019 to 2024 was set.

Table 2.5. Zone-level precision (CV, %), design-based, Eastern or all Grey Kangaroos

Zone	2017	2018	2020	2022	Target
North East	40	48.2	43.0	46	20
Otway	54	41.2	46.7	43	20
Upper Wimmera	39	32.8	25.2	32	20
Gippsland	53	30.2	28.8	25	20
Lower Wimmera	32	24.9	22.6	26	20
Central	35	31.4	20.7	14	20
Mallee (Red Kangaroo)	67	25.9	40.9	37	20

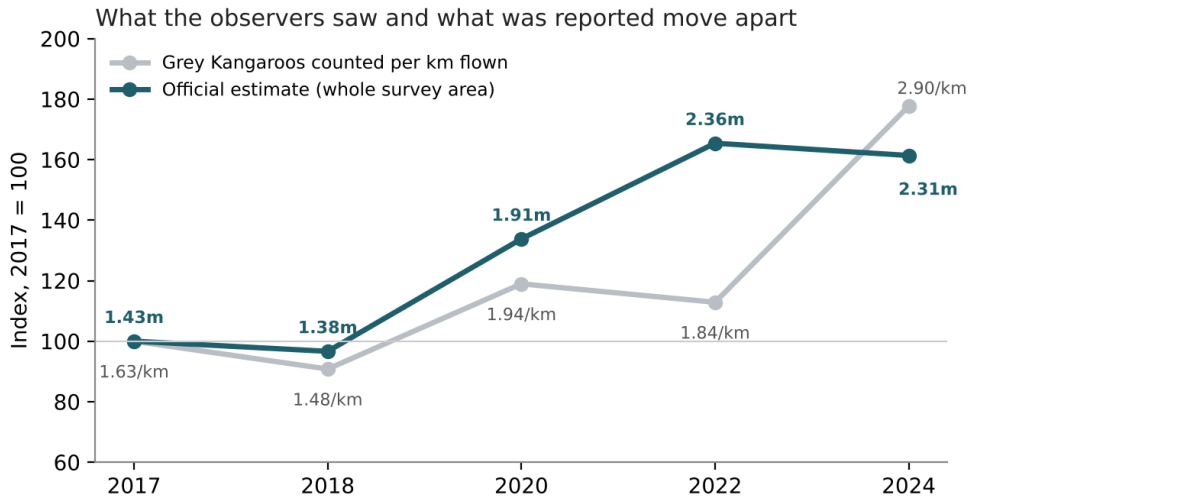
Faced with zone CVs of up to 48 per cent, the reports moved the benchmark. From 2018 they cited Pople (2008) that CVs "over 50% can increase the risk of over-harvesting" and concluded that precision was "suitable" because zones were "marginally below" 50 per cent. The 2022 report then argued that zone precision mattered less because "the overall sustainable offtake of GK is calculated based on the statewide estimate". Yet quotas are set and allocated by zone.

2.6.2 Detection: assumptions not tested

- **Every Kangaroo on the line is assumed to be seen.** In 2017 the contractors reported Kangaroos "flushing" from the helicopter. ARI's answer was to merge the two nearest distance bands. ARI recommended two observers per side and mark-recapture distance sampling in 2017 and 2018 "to overcome potential bias". The 2024 survey still used "a single observer on each side".
- **Large mobs are hard to count.** The contractors reported difficulty assigning distances to groups of "30-100+ kangaroos".

- **One detection curve fits all.** Red Kangaroos are assumed to be detected exactly as Grey Kangaroos are, because too few were seen to fit a separate curve; in 2022 the separate Red curve "fitted the data very poorly".

2.6.3 Counts and estimates diverge

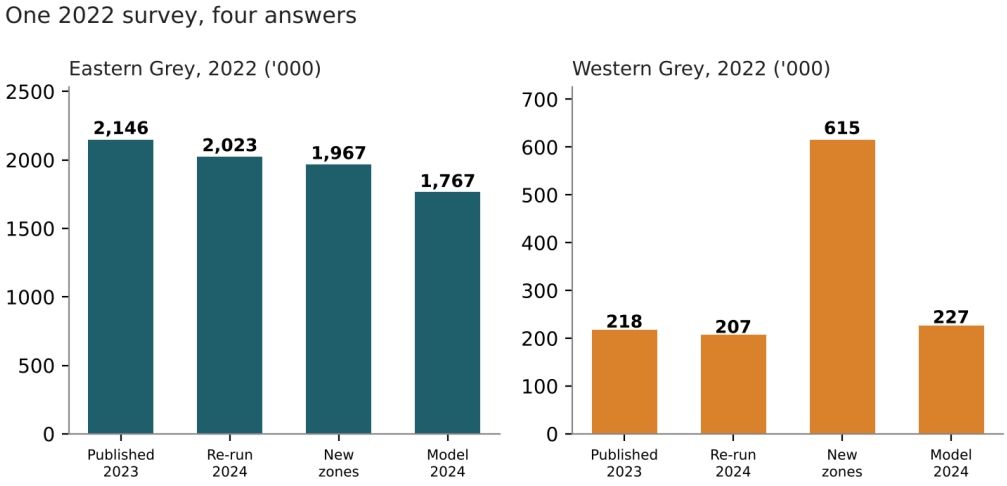


2020 to 2022: count rate -5%, estimate +24%. 2022 to 2024: count rate +58%, estimate -2%. Sources: ARI survey reports 2017-2024.

Figure 2.6. Kangaroos counted per km of transect and the official estimate, indexed to 2017. Estimates are for the whole survey area; 2024 is the model-based figure including the ten exclusion-zone municipalities.

Because each zone's density is multiplied by its area, a mob seen in the Central zone weighs far more in the total than the same mob seen in the Wimmera. That is legitimate statistics, but it means the published estimate can rise while observers see fewer Kangaroos, as in 2020-2022, or fall while they see many more, as in 2022-2024.

2.6.4 The same data, different answers



Published 2023 = design-based, 7 zones (TR356). Re-run 2024 = same method, 7 zones. New zones = design-based, 5 zones. Model 2024 = model-based (TR385). Western Grey estimates range threefold depending on how zones are drawn.

Figure 2.7. Estimates of the 2022 population from the same survey data under four analyses.

The 2023 quota of 236,350 was set on the published 2,363,850. Re-analysed under the method adopted in 2024, the same survey gives about 1,994,000 Grey Kangaroos, 16 per cent fewer. ARI also chose a Tweedie model even though another model "was more parsimonious based on AIC", because the

alternative produced "implausible overestimation". It acknowledged that "more thorough comparisons of alternative models ... was not explored here". Parks Victoria's consultant for the Mallee parks, by contrast, averaged across eight detection models "to honestly account for uncertainty".

2.6.5 Western Greys and Reds

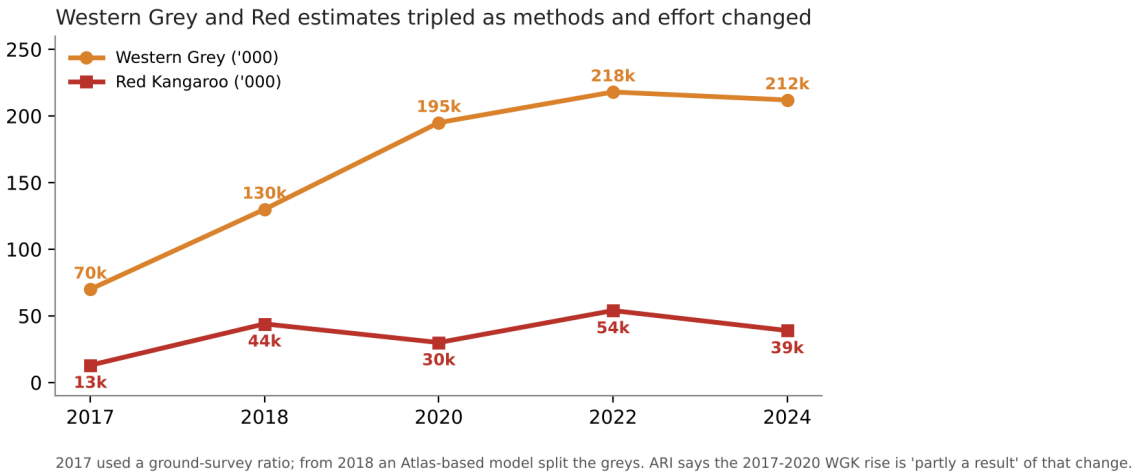


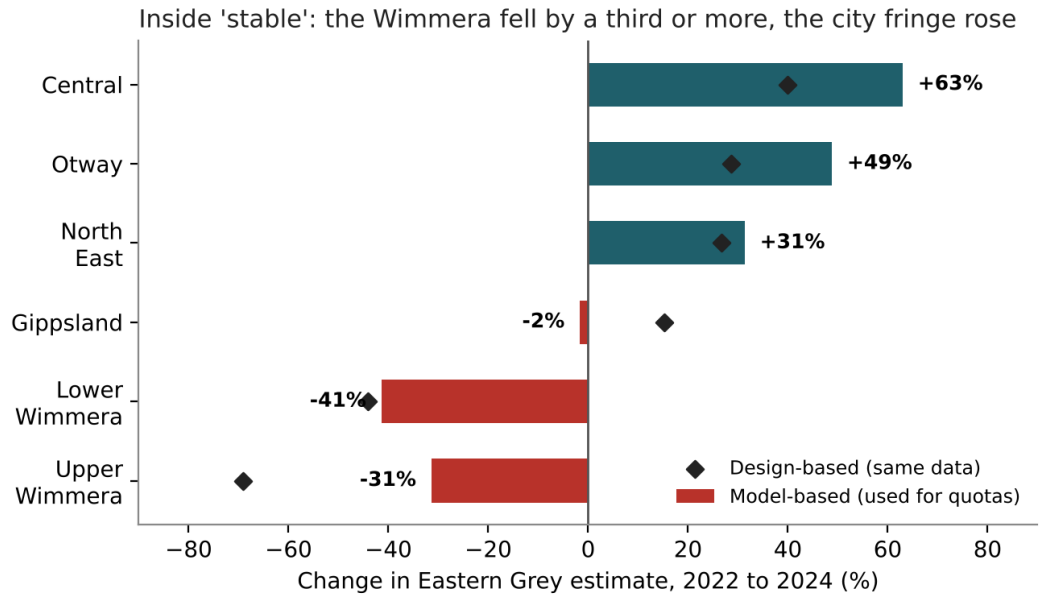
Figure 2.8. Western Grey and Red Kangaroo estimates, 2017 to 2024.

Sources: ARI survey reports.

Grey Kangaroos are not identified to species from the air. Since 2018 the split has been made by a statistical model built overwhelmingly from Atlas of Living Australia records: in 2024, 24,158 thinned Atlas records against 1,264 ground-survey records, or 95 per cent Atlas. The modelled share of Eastern Greys in the Mallee zone went from 12 per cent (2018) to 2.4 per cent (2020). ARI conceded "it is conceivable that this finding is therefore partly a statistical artefact", and that the Western Grey rise was "partly a result of the change" in the modelled boundary.

2.7 The decline that disappeared

Between 2022 and 2024, using either method, ARI's own estimates show steep falls in the western zones where ATCW and pet-food shooting were concentrated, and rises on the city fringe. Averaged together, the result was described as stability.



Old (2017-2024) harvest zones. Mallee omitted (Eastern Greys about 3,000-4,000). Source: ARI TR385, Tables 5, 6, A3, A4.

Figure 2.9. Change in Eastern Grey estimates by old harvest zone, 2022 to 2024, model-based (bars) and design-based (diamonds).

Table 2.6. Where the killing was concentrated, and what happened

Old zone	Share of ATCW authorisations, 2017	Share of pet-food trial authorisations, 2017	Eastern Grey change 2022-2024 (model / design)	Western Grey change (model)
Lower Wimmera	30%	47%	-41% / -44%	-38%
North East	34%	30%	+31% / +27%	n/a
Central	25%	20%	+63% / +40%	n/a
Upper Wimmera	3%	2%	-31% / -69%	+2%

ATCW shares from the 2018 redesign report, Table 4, which also gave a nominal ATCW harvest rate of 21 per cent in the North East in 2017, before the commercial program began. Changes derived from ARI TR385.

ARI's 2024 report noted "apparent large changes in abundance in certain parts of the state" and said they "should prompt careful re-consideration ... at the time of next aerial survey (scheduled for 2026)". Meanwhile the old zones were abolished from January 2025. The Lower Wimmera was divided among the new Grampians, Loddon Mallee and Barwon South West zones, so its decline can no longer be seen in quota or annual reporting. In 2025 total take reached 15.3 per cent (DEECA) or 16.3 per cent (ARI) of Eastern Greys in the Grampians zone.

CONTRADICTION

The KHMP commits DEECA to "ensure sustainability of grey kangaroo populations across Harvest Zones over time by monitoring ... survey data", with quota reduction or suspension as the listed responses. The Government's own survey showed a fall of about 40 per cent in the core harvest zone. The response was a new zone map and a statewide figure described as "very similar".

2.8 Reporting quality

Published reports underpin a Commonwealth export approval and annual kill quotas. They should be error-free and open. These are not.

Table 2.7. Errors and irregularities in the published survey record

Document	Issue
TR286 (2017)	Eastern Grey total printed as "1,3590,000"; PDF metadata title "Estimates of duck and quail harvest in Victoria for 2017"
TR324 (2020 survey)	Discussion gives the 2020 total as "1,440,000"; the report's own estimate is 1,942,000
TR324 (2020 survey)	Summary says the population "has increased since 2018"; discussion says the change is "not statistically significant"
TR356 (2022 survey)	Red Kangaroo lower confidence bound (2.74) is above the estimate (2.47), copied from another row
TR385 (2024 survey)	2022 Hume Eastern Grey estimate of 815,000 sits above its own upper bound of 671,000; standard errors printed as "15.257", "72,6219"
TR385 (2024 survey)	Design-based estimates, which "rely on fewer assumptions", moved to an appendix
Quota report 2024 (TR371)	Marked OFFICIAL-Sensitive; cover dated November 2024 for a 2024 quota; citation says 2023
Quota report 2026 (TR396)	Opening pages carry the 2025 report's number, authors and date; text gives 61% and 63% ATCW shares where its table gives 54.7% and 52.6%
TR312 bushfire report	Marked OFFICIAL-Sensitive; fire impact measured as burnt share of the non-forest survey area only
Survey contractors	Reports name different contractors (EcoKnowledge, Terrestrial Ecosystem Services, Helifarm); contractor reports such as Lethbridge and Stead (2017) are cited but not published

2.8.1 Mixing bases

From 2025 the reports carry two totals: the harvest-zone figure (2,078,000 in 2024) and the whole-survey figure including the exclusion zone (2,306,000). The 2026 quota report expresses the 2025 take of 257,003 as "about 11.1%" of the larger figure. Measured against the harvest zones where the killing occurred, DEECA's own annual report puts the Eastern Grey take at 12.4 per cent. The choice of denominator understates the harvest rate.

2.9 Fire, drought and the harvest model

2.9.1 Black Summer

After the 2019-20 fires, ARI's impact assessment measured the fire's effect as the share of the non-forest survey area that burned: 2.7 per cent in Gippsland and 2.5 per cent in the North East. Because forest is

excluded from the survey, most of the burnt Kangaroo habitat was outside the calculation by definition. The report modelled Kangaroos fleeing burnt forest into unburnt survey areas, affecting up to 19 per cent of the Gippsland survey area, using an "ad hoc" dispersal assumption.

The October 2020 survey then found a 36 per cent higher estimate, and the 2021 commercial quota rose 59 per cent. Kangaroos displaced from burnt forest into open country would be counted from the air and then included in the quota base. ARI's reports do not test this. The fire wildlife plan states that orphaned milk-dependent pouch young of "common species such as macropods" are not rehabilitated.

2.9.2 What ARI's own harvest model says

Table 2.8. ARI's spatial harvest model (TR315, 2020) against practice

TR315 finding or assumption	What has happened
Harvest rates above 15% put the population at "high risk" of falling below half its unharvested level	2025: 15.3-16.3% of Eastern Greys (Grampians), 17.1-21.4% of Western Greys (Loddon Mallee); DEECA and ARI figures differ
Risk is "greatly reduced" only under a "strongly male-biased" harvest	Females are 32-35% of the commercial kill every year; ATCW kills are not sexed
Assumes harvest pressure is the same everywhere	ATCW and commercial killing are concentrated in particular zones (Table 2.6)
The habitat model explained "only 19% of the variance" in counts	Model-based estimation adopted for quotas in 2024
Risk is most sensitive to carrying capacity, for which "we do not have good estimates"	No carrying-capacity data collected since
Surveys at least every three years at 10%; more often if take is higher	Take exceeded 10% in 2025; next survey late 2026
The 2018 model estimate (1,128,500) was 18% below the design estimate (1,381,000)	The higher design-based figures set every quota until 2024

2.10 How the surveys and the plans fit together

The management plans (Part 1) and the surveys (Part 2) describe each other in ways that do not match.

Table 2.9. What the plans say about the surveys, and what the surveys say

KHMP or annual report	Survey and quota reports
Aerial surveys are "generally believed to underestimate" abundance, a safety margin	The 2024 method change lowered the 2022 estimate by 16%; the 2018 model was 18% lower than the design figure
Where data are uncertain "a precautionary approach is taken" (Action 1.5.2)	Zone CVs of 40-48% judged "suitable"; regional declines deferred to the next survey
Quotas "conservative"	ARI: 10% is conservative only because "other states typically use 15%"
"10 to 20 per cent ... is considered sustainable" (2024 annual report)	TR315: above 15% is high risk
Public land "will continue to provide refuge"	Forested public land is not surveyed at all; Mallee park country is surveyed and culled under ATCWs
Surveys every two years "help monitor changes"	Ground surveys of species ratios deferred to every four years (next 2028)

KHMP or annual report	Survey and quota reports
Population "broadly stable" (2024 annual report)	Lower Wimmera -41%, exclusion zone +150% (TR385)

2.11 Register of survey contradictions

Table 2.10. Claims and the record

#	Claim	Source	Contradicting evidence	Source
1	Survey is to inform ATCW decisions	TR280, Aug 2017	Draft: purpose is skin exports under a WTMP	TR280 draft, Jun 2017
2	Design will give zone CVs of 20% or less	TR280; redesign 2018	Zone CVs 32-67% (2017), up to 48% (2018-2022)	TR286-TR356
3	Transects are a representative random sample	TR280	One transect = 38-48% of a zone's count; transects fixed since 2018	TR296, TR324, TR356
4	Unsurveyed forest is a safety margin	TR280	Forest Kangaroos never counted; fire impact on them unassessed	TR315, TR312
5	Four observers and mark-recapture to correct bias	Redesign 2018	One observer per side in 2024	TR385
6	2020 population has increased	TR324 summary	Change "not statistically significant"	TR324 discussion
7	Statewide estimate "very similar" 2022-2024	ARI 2025 quota report	Lower Wimmera -41% to -44%; exclusion zone +150%	TR385
8	2022 estimate 2,363,850 used for 2023 quotas	TR356; 2023 quota	Same data, adopted method: about 1,994,000	TR385
9	Overlap-zone midline "known with a high degree of certainty"	TR324	2022 Western Grey 207k to 615k depending on zoning	TR385 appendix
10	Harvest above 15% is high risk; male bias essential	TR315	15.3-16.3% and 17.1-21.4% zone take; one-third female kill	2026 quota report; KHP reports
11	2025 take about 11.1%	2026 quota report	12.4% of harvest-zone Eastern Greys	KHP 2025 Annual Report
12	Bushfire impact limited (2.5-2.7% of survey area burnt)	TR312	Forest, where most fire burned, excluded by definition	TR312 methods

2.12 Corrections to earlier volumes

Checking the survey record exposed an error carried in earlier volumes. In keeping with the standard we ask of the Government, we correct it here.

- **The 2,306,000 figure was not a modelled, non-survey estimate.** Chapter 1 (Victoria) and Part 1 of this volume described the 2026 population basis of 2,306,000 as modelled rather than surveyed, and as a 228,000 rise made without a survey. In fact it is the September 2024 survey total for Grey Kangaroos across the whole survey area, including about 228,000 Eastern Greys in the ten exclusion-zone municipalities. The 2025 and 2026 quotas were both set on the harvest-zone figure of 2,078,000. The corrected Part 1 accompanies this report.

- **The harvest-zone "12 per cent fall" was not like-for-like.** Part 1 compared the 2022 design-based estimate for all 58 municipalities (2,363,850) with the 2024 model-based estimate for the harvest zones only (2,078,000). On a like-for-like basis the harvest-zone estimate rose about 9 per cent, while the regional falls shown in section 2.7 remain.
- **The national plausibility analysis** uses 2,306,000 as Victoria's 2026 estimate and 1,378,605 for 2020. Both are survey figures, but on different areas and methods. The +67 per cent change should be read with that caveat.

2.13 Conclusions and recommendations

Victoria's Kangaroo survey gives a broad picture of a large, mobile and patchily distributed population, and its authors are candid about uncertainty in their technical text. The failure lies in the chain that converts that uncertain picture into precise, zone-by-zone kill numbers, with no independent check and with every change of method, zone and denominator made by the same small team and department.

Recommendations

1. Publish the transect coordinates (FlyCoords2018.csv), transect-level counts for every survey, and the ground survey spreadsheets, so that land tenure and habitat along each transect can be independently assessed.
2. Commission an independent review, outside DEECA, of the survey design, the 2024 change of method, the species-split model and every estimate since 2017.
3. Re-randomise aerial transects for each survey, stratify by land use, and report farmland and public-land densities separately.
4. Adopt double-observer or thermal-camera methods to test the assumption that every Kangaroo on the line is seen.
5. Report results for the old Lower and Upper Wimmera zones alongside the new zones, and suspend harvesting where the Government's own estimates show declines of 30 per cent or more.
6. Express all take rates against the harvest-zone population where the killing occurs.
7. Survey forested public land before claiming it as a refuge or safety margin.

Freedom of Information requests suggested

- Lethbridge and Stead (2017), Victorian aerial kangaroo population survey: insights and learnings.
- Coulson (2017, 2018, 2020, 2024) ground survey reports and data files.
- Transect-level aerial count data for 2017, 2018, 2020, 2022 and 2024, with transect coordinates.
- Any internal advice on the decision to abolish the seven harvest zones from 2025.

Sources

1. Scroggie, Moloney and Ramsey (2017). Design of an aerial survey to estimate the abundance of kangaroos in Victoria. ARI TR280 (June draft and August published versions).
2. Moloney, Ramsey and Scroggie (2017). A state-wide aerial survey of kangaroos in Victoria. ARI TR286. https://www.ari.vic.gov.au/__data/assets/pdf_file/0007/122011/ARI-Technical-Report-286-A-state-wide-aerial-survey-of-kangaroos-in-Victoria.pdf
3. Moloney, Scroggie and Ramsey (2018). Revisiting the Victorian kangaroo aerial survey design (Kangaroo Aerial Survey Redesign).

4. Moloney, Ramsey and Scroggie (2019). State-wide abundance of kangaroos in Victoria: results from the 2018 aerial survey. ARI TR296. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0030/415596/Statewide_kangaroo_report_2018_FINAL.pdf
5. Scroggie and Ramsey (2020). A spatial harvest model for kangaroo populations in Victoria. ARI TR315. https://www.ari.vic.gov.au/__data/assets/pdf_file/0013/511303/ARI-Technical-Report-315-Spatial-harvest-model-for-kangaroo-populations-Victoria.pdf
6. Ramsey (2020). The impacts of the 2019/20 bushfires on Eastern Grey Kangaroos in the North East and Gippsland harvest zones. ARI TR312 (OFFICIAL-Sensitive; FOI document 6).
7. Moloney, Ramsey and Scroggie (2021). State-wide abundance of kangaroos in Victoria: results from the 2020 aerial survey. ARI TR324.
8. Moloney, Ramsey and Scroggie (2023). State-wide abundance of kangaroos in Victoria, 2022. ARI TR356. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0023/622517/State-wide-abundance-of-kangaroos-in-Victoria-2022.pdf
9. Scroggie and Moloney (2024). State-wide abundance of kangaroos in Victoria, 2024. ARI TR385. https://www.ari.vic.gov.au/__data/assets/pdf_file/0031/730975/ARI-Technical-Report-385-State-wide-abundance-of-kangaroos-in-Victoria-2024.pdf
10. Ramsey (2023/24). Kangaroo harvest quotas for Victoria, 2024. ARI TR371. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0032/692285/Kangaroo-Quota-2024-ARI-Tech-Report_FINAL.pdf
11. Scroggie and Moloney (2024). Kangaroo harvest quotas for Victoria, 2025. ARI TR384. https://wildlife.vic.gov.au/__data/assets/pdf_file/0032/729455/Kangaroo-harvest-quotas-for-Victoria-2025-ARI-tech-report.pdf
12. Ramsey (2025). Kangaroo harvest quotas for Victoria, 2026. ARI TR396. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0039/775659/Kangaroo-harvest-quotas-for-Victoria-2026-FINAL.pdf
13. Scroggie, Moloney and Ramsey (2025). Spatio-temporal trends in the abundance of grey kangaroos in Victoria, Australia. Wildlife Research 52, WR23133. https://doi.org/10.1071/WR23133
14. EcoKnowledge, Kestrel Aviation and Forest Air. Helicopter Operations Plans, 2017, 2018 and 2020 (FOI documents 83a, 82a, 76a2).
15. Macropus Consulting. Grey kangaroo ground surveys 2018 and 2020 (FOI documents 83b3, 78a).
16. Proteus (2020). Distance analysis of Mallee Parks kangaroo census data 2020. Report for Parks Victoria (document 782).
17. DELWP (2018). Victorian Response Plan for Wildlife Impacted by Fire.
18. DEECA (2026). Kangaroo Harvesting Program 2025 Annual Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0033/784842/Kangaroo-Harvesting-Program-2025-Annual-Report.pdf
19. Murray-Sunset National Park, area 6,330 km2; Rural City of Mildura, area 22,083 km2. https://en.wikipedia.org/wiki/Rural_City_of_Mildura
20. Hylands, P. The Kangaroo Report, Volume 6 Part 1: Victoria, The Paper Trail (corrected November 2026); Chapter 1 (Victoria) and Addendum; Population Plausibility Analysis.

Figures marked derived are the author's calculations from the sources above. ARI figures are reproduced under the State of Victoria's CC BY 4.0 licence.

PART 3

Quotas and the Kill

How Victoria sets its Kangaroo quotas, what the harvest and ATCW reports show, and what it means for Kangaroos and for biodiversity management, 2019 to 2026

Author	Peter Hylands
Prepared	November 2026
Scope	A critical review of the 2019 Kangaroo Harvest Management Plan, the Arthur Rylah Institute quota reports for 2019 to 2025, the 2025 quota determination, the Kangaroo Harvesting Program annual reports for 2019 to 2025 and quarterly reports for 2021 to 2026, the 2021 conditions of authorisation, the 2018 Kangaroo Pet Food Trial evaluation and the 2020 bushfire correspondence, several released under Freedom of Information.
Note	This consolidated Part 3 merges the analysis of two batches of documents (previously Part 3A and the second batch) into one report and one register.

Executive summary

Part 1 of this volume examined the management plans and Part 2 the surveys. This part follows the numbers to the point where Kangaroos die: the quota reports that convert a survey estimate into a kill number, and the harvest and permit reports that record what happened. The documents are the Government's own.

The quota system rests on one rule: no more than 10 per cent of each zone's estimated population should be killed in a year, by commercial shooters and Authority to Control Wildlife (ATCW) permit holders combined. The documents show that this rule has never been a limit. It is a calculation that sets the commercial quota, while the larger and faster-growing share of the killing, under ATCW permits, is not capped at all.

Principal findings

1. **The 10 per cent rule was borrowed, not derived.** In 2019 ARI stated that no model of Victorian Kangaroo population dynamics existed and that the rate came from an "informal" risk assessment using other states' figures. The model built since has never been calibrated; ARI says it needs eight to ten surveys. There have been five (section 3.3).
2. **Its safety margins have been eroded one by one.** ARI listed the assumptions that made 10 per cent safe: forest refuges, estimates biased low, male-biased shooting, quota released in stages, regular surveys and accurate harvest records. Each has since been weakened or contradicted by the Government's own reports (section 3.3).
3. **The department twice took the higher of ARI's options.** In 2021 ARI recommended no commercial quota in the Mallee and North East, where ATCW killing already exceeded 10 per cent. The department adopted ARI's "alternative" table instead, assuming 20 per cent of ATCW killing

would move to commercial shooters. That raised the commercial quota by 33 per cent and opened both zones. The shift did not happen (section 3.4).

4. **ATCW killing has more than doubled and is now two-thirds of the theoretical take.** Approved ATCW numbers rose from 56,942 in 2021 to 118,823 in 2024. The 2025 report records 174,022 controlled. ARI's forecasts, which the commercial quota depends on, missed by between minus 52 and plus 93 per cent (sections 3.5 and 3.6).
5. **The total take reached 12 per cent in 2025.** Commercial harvest of 76,363 plus 174,022 ATCW gives 250,385, or 12.0 per cent of the 2.078 million harvest-zone estimate. ARI's 2026 report puts it at 257,003 and "about 11.1 per cent" by dividing by a larger area that includes the exclusion zone, where commercial shooting is banned (section 3.5).
6. **Zone limits were breached 15 times in six years, and the breaches were excused.** In 2025 the Eastern Grey take exceeded 10 per cent in every one of the five harvest zones, reaching 15.3 per cent in the Grampians, and Western Greys in Loddon Mallee reached 17.1 per cent. The Mallee exceeded the limit in four consecutive years, and in the program's first quarter its take was 5.5 times the quarterly limit. In 2020 the department took "no further action" because the statewide total was below 10 per cent. ARI's own modelling showed the statewide average does not protect an over-harvested zone (section 3.7).
7. **The population inputs do not compute.** Between the 2018 and 2020 surveys the Central zone estimate rose 140 per cent, implying 55 per cent growth a year before adding back the harvest. That is near the 65 per cent ARI called the "upper end of biological plausibility", and almost three times the 20 per cent maximum the 2022 quota model assumed. The 2022 quota was set on a projected 3 per cent decline. The survey then reported a 24 per cent rise (section 3.8).
8. **Suspending the quota did not stop the shooting.** The final 2024 quota release was withdrawn in September, yet 22,354 Kangaroos were shot in October to December, 28 per cent of the year's commercial kill, on tags carried over from earlier quarters. In Q4 2025 the Hume release was "fully withheld", but 5,100 unallocated tags from the first quarter were carried forward, and 4,602 Hume Kangaroos were shot on them (section 3.10).
9. **The count of the dead is unreliable.** The 2023 report first published 2,513 dependent young killed and corrected this to 19,842 in April 2025, an error of eight times. Species reports put Western Greys in zones where none live. In 2022, 19 per cent of tagged Kangaroos had no species recorded. ATCW permit holders report nothing: not the number killed, the sex or the young (section 3.9).
10. **The 2019 plan's safeguards were never delivered.** The founding plan promised density thresholds that would trigger suspension "by June 2020", annual population models using harvest, ATCW and climate data, peer review of the survey and harvest model, and public land as "sanctuary zones". None of the quota or harvest reports to 2026 mentions a suspension threshold or a peer review. The same plan stated plainly that "there are no plans to impose a quota on ATCW numbers" (section 3.3).
11. **The male bias that is meant to make the harvest safe is fading.** Females were 19 per cent of the commercial kill in late 2019, about a third from 2020 to 2025, and 39 per cent in the first quarter of 2026 (section 3.9).
12. **The kill is heading the wrong way in drought.** In 2025 drought pushed Kangaroos onto farms. The Government sped up ATCW permits, and ATCW killing reached a record. A proportional quota is meant to ease off when populations are stressed. Victoria's demand-driven permit system does the opposite (sections 3.6 and 3.15).

BOTTOM LINE

From October 2019 to December 2025 the documents record about 1.0 million grey Kangaroos killed or approved for killing in the harvest zones (414,234 commercial and 583,095 ATCW), plus 118,221 dependent young killed by commercial shooters. Joeys killed under ATCW permits are not recorded.

The rate of killing is rising, the share under the uncapped ATCW system is rising, and in 2024 and 2025 the take breached the 10 per cent rule in the very zones ARI warned about, and in 2025 in every zone. In those same zones and years, the surveys behind the quota are least reliable (Part 2). On ARI's own modelling, the program is moving into the range it describes as high risk.

3.1 Documents reviewed

Thirty-seven PDF files were supplied in three batches. Six were exact duplicates (of the 2019 and 2020 annual reports and the Q1 2024, Q2 2024 and Q1 2026 quarterly reports). The 2020 annual report also came as both a scan and a text copy, and the 2023 annual report in two versions, the second carrying an April 2025 correction. Three files were image scans and were read by optical character recognition. The documents are listed below.

Table 3.1. Documents reviewed in this Part

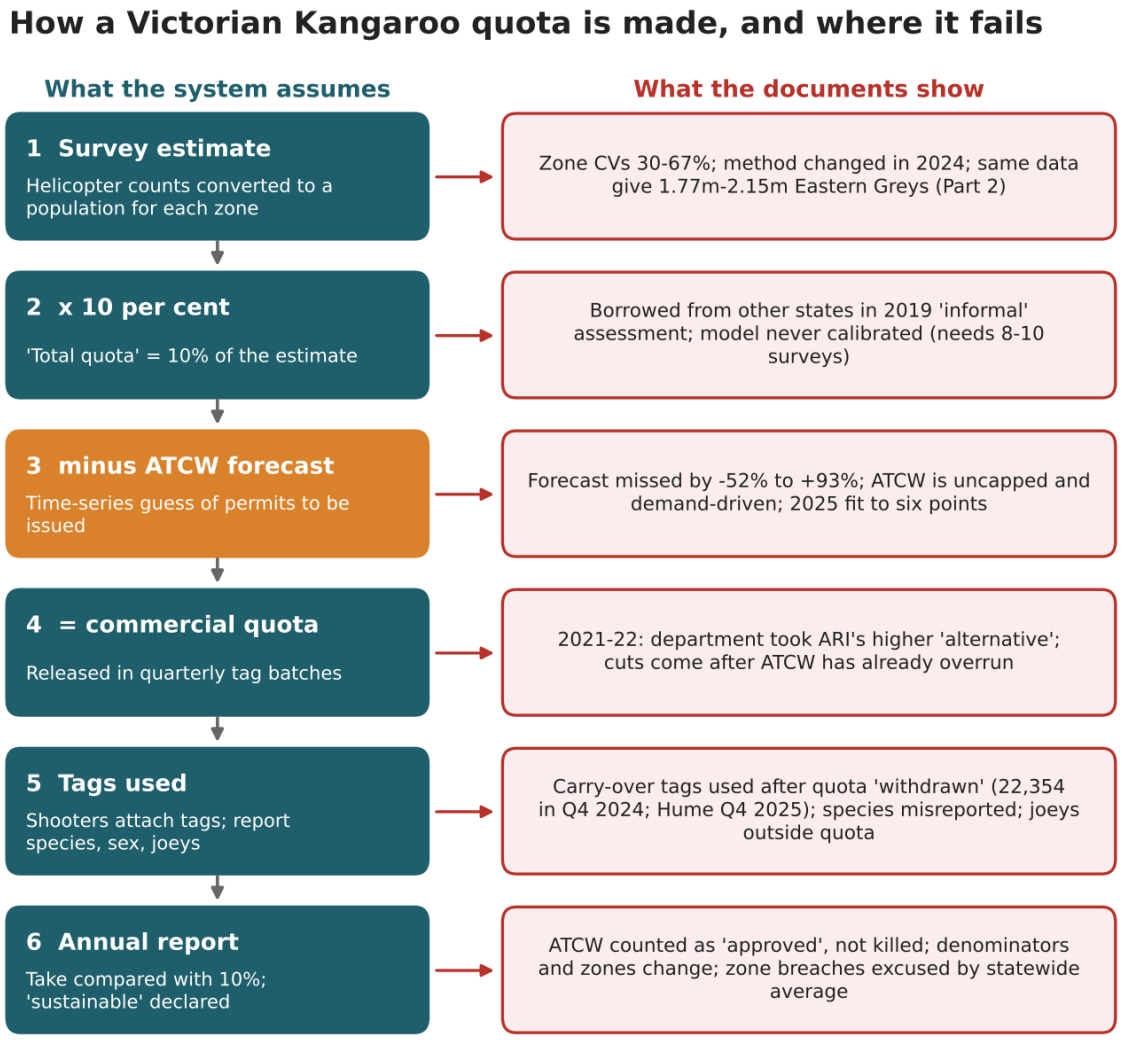
Document	Author / date	What it is
Interim harvest quotas for kangaroos in Victoria, Oct-Dec 2019	ARI, 2019 (unpublished, OFFICIAL-Sensitive)	The first quota: 10% a year, applied as 2.5% for one quarter
Kangaroo Pet Food Trial Evaluation Report	DELWP, Dec 2018 (scan)	Evaluation of the 2014-2019 trial that preceded the harvest
Letter, Secretary DELWP to Secretary DJPR	J. Bradley, early 2020 (scan, FOI)	Withholding quota in fire-affected zones
Kangaroo harvest quotas for Victoria, 2020 (TR308)	Scroggie & Ramsey, ARI	Simple stochastic model; 137,800 total
Kangaroo harvest quotas for Victoria, 2021 (TR323)	Ramsey & Scroggie, ARI	2020 survey; ATCW forecasting; 191,200 total
Kangaroo harvest quotas for Victoria, 2022	Ramsey & Scroggie, ARI	One-year projection model; 185,850 total
Kangaroo harvest quotas for Victoria, 2023	Ramsey, ARI	2022 survey; 236,350 total
Kangaroo harvest quotas for Victoria, 2025	Scroggie & Moloney, ARI	New zones, species quotas; 207,800 total
2025 Kangaroo Harvest Quota Determination	DEECA	Commercial quota 106,750
Conditions of Authorisation, KHMP 2021-2023	DJPR, v2 Dec 2020	22 conditions on commercial shooters
KHP 2019 Report	DELWP, 2020	October-December 2019
KHP 2020 report (two copies)	DELWP/DJPR (scan)	First full year
KHP quarterly reports Q1-Q3 2021	DJPR, FOI release version (scan)	Quota releases, tags, harvest, compliance
KHP Quarter Four report 2021	DJPR	As above
KHP 2022 Annual Report	DEECA/DJSIR, 2023	Includes ATCW and total take

Document	Author / date	What it is
KHP 2023 Annual Report (original and April 2025 correction)	DEECA	Joey figure corrected from 2,513 to 19,842
KHP 2024 Annual Summary Report	DJSIR	Commercial data only
KHP 2025 Annual Report	DJSIR	Commercial data and ATCW total
Victorian Kangaroo Harvest Management Plan 2019	DELWP, 2019	The founding plan: objectives, targets, safeguards
KHP Annual Report 2021	DELWP	Includes ATCW and total take by zone
KHP Annual Report 2025	DEECA, April 2026	ATCW and total take by zone and species
KHP 2020 report (text version)	DELWP/DJPR	Readable copy of the scanned 2020 report
KHP quarterly reports: Q1 2023; Q1, Q2, Q3 2024; Q1, Q2, Q4 2025; Q1 2026	DJPR/DJSIR	Quarterly quota, tags, harvest, compliance

Where a document in a series was missing, we searched the Government websites. This added the Q4 2024 and Q3 2025 quarterly reports and ARI's 2024 quota report (TR371). Quarterly reports for Q2 to Q4 2023 could not be found online. For other gaps we have used the DEECA 2024 annual report, the 2026 quota determination and the 2026 ARI quota report, all published on the Victorian Government's wildlife website, and the earlier Parts of this volume. DEECA and DJSIR now publish separate annual reports with different content; the DJSIR 2024 summary supplied here contains no ATCW figures, which are only in the DEECA version. For 2025 both versions were available to the research.

3.2 How a quota is made

Every year ARI takes the latest survey estimate for each zone, multiplies it by 10 per cent to get a "total quota", subtracts a forecast of how many Kangaroos ATCW permit holders will be approved to kill, and recommends the remainder as the commercial quota. DEECA then sets the commercial quota, releases it in quarterly batches of numbered tags, and reports afterwards whether the total stayed within 10 per cent.



Sources: ARI interim report 2019, TR308, TR315, TR323, quota reports 2022-2026; KHP reports 2019-2025; Part 2 of this volume.

Figure 3.1. The quota pipeline. Each step carries an assumption that the documents show to be weak. Derived from the documents reviewed.

Three features of this design matter for everything that follows.

- **Only the commercial part is capped.** Landholders "can apply to the Conservation Regulator for an ATCW at any time" (2025 determination). When ATCW killing runs ahead of the forecast, the only lever is to cut the commercial quota, usually late in the year.
- **ATCW numbers are permissions, not deaths.** The annual reports state that ATCW figures are "the maximum numbers of kangaroos approved for control". Holders are not required to report what they kill. The 2025 DJSIR report changes the wording to "controlled" without explaining whether the basis changed.
- **The test is applied after the event, to a moving denominator.** The percentage reported depends on which population figure is used: the old survey, a projection, the next survey, the harvest zones only, or the whole survey area. Each has been used in different years (section 3.5).

3.3 Where the 10 per cent came from

3.3.1 The interim quota, 2019

The unpublished 2019 interim report, marked OFFICIAL-Sensitive and still carrying template text ("Edited by YYYYY", "We thank X, Y and Z"), set the first quotas because there was "a desire to commence commercial harvesting during October - December 2019". Its core admission:

> *No quantitative models of Victorian kangaroo population dynamics exist to provide a basis for a formal risk-assessment of varying harvest rates in Victoria. ARI interim report, 2019*

Instead ARI took 10 per cent a year from other states, divided it by four for the quarter, and recommended quotas for Red, Eastern Grey and Western Grey Kangaroos. Reds were dropped before the program began. The report called its own risk assessment "informal".

3.3.2 The six safety assumptions

The 2019 report and TR308 (2020) set out why 10 per cent was "of very low ecological risk". These are the conditions the rest of the program depends on. The record since is summarised below.

Table 3.2. ARI's 2019-2020 safety assumptions against the record

Assumption (ARI 2019-2020)	What has happened since
Forests, parks and reserves are refuges where no harvesting occurs	The 2021-23 plan allowed "harvesting on specified public land". Large ATCWs operate on public land: over 10,000 Western Greys approved in the Mallee in one quarter of 2019.
Population estimates are "almost certainly biased low", so 10% is really less	Part 2 showed the Central zone and a few transects drive totals, and the same 2022 data give Western Grey estimates from 207,000 to 615,000. The bias is not reliably low.
Commercial shooting is male-biased, protecting breeding females	About a third of the commercial kill is female. ATCW, now about 70% of the take, has no sex reporting (section 3.9).
Quota released progressively so ATCW can never push the total over the limit	Commercial quota is staged, but ATCW is not. Totals exceeded 10% in nine zone-years (section 3.7).
Surveys at least every three years; more often if the rate rises above 10%	Surveys every two years, but quotas have been set on projections (2022) and on the previous survey (2024, 2026).
Detailed harvest records of species, sex, age and location	Species misreported; joeys under-reported eightfold in 2023; ATCW unrecorded (section 3.9).

3.3.3 What the stochastic model actually showed

TR308 built a simple model from parameters borrowed from arid-zone studies and expert opinion. It found 10 per cent "very low" risk and 20 per cent "unacceptably high". It recommended 10 per cent for 2020 to 2025 and warned that anything above 10 per cent would need annual or biennial surveys and "detailed analysis of additional monitoring and harvest data".

Three choices in the model favour the harvest. "Quasi-extinction" was defined as falling below 0.25 Kangaroos per km^2, a 95 per cent fall from the assumed 5 per km^2. The authors called this threshold "somewhat arbitrary". The example run in its Figure 2, at a 15 per cent harvest, shows the population settling at about 3 per km^2, a 40 per cent reduction, which the model counts as safe. And the model treated both grey species as one, although the Western Grey is at the edge of its range in Victoria.

TR315, the spatial model of 2020, found risk became high above 15 per cent and fell "greatly" only under a "strongly male-biased" harvest; it modelled male shares of 50 to 90 per cent. DEECA's 2023 and 2024 annual reports state that "a harvest quota of 10 to 20 per cent of kangaroo populations is considered sustainable". The claim goes back to the 2019 plan, which says a 10 to 20 per cent quota "is generally considered ecologically sustainable, and Victoria's quotas will be set within this range". ARI's own TR308 concluded that rates above 10 per cent were not yet acceptable for Victoria and that rates above 20 per cent were unsustainable. By 2025 DEECA's report had changed again, describing other jurisdictions as permitting "up to 15 per cent". Three different benchmarks have been used to call the same harvest conservative.

ARI repeatedly justifies 10 per cent as conservative because other states set quotas of about 15 per cent. NSW does set Eastern Grey quotas at 15 per cent, but for commercial harvest only, and actual NSW commercial take is far lower, by October 2025 shooters had taken 24 per cent of the Eastern Grey quota, about 4 per cent of the population. Victoria's total take, at 12 per cent in 2025, is three times that rate.

3.3.4 The warning that was ignored: the Pet Food Trial

The December 2018 evaluation of the Kangaroo Pet Food Trial is the most important document in this set for understanding what followed. It found that introducing a commercial incentive into the ATCW system changed behaviour.

- Numbers approved for control in trial areas averaged 260 per cent of the long-term average, with shooters encouraging landholders to apply for more and "even completing applications for them".
- "Very few applications for an ATCW are refused", and permits are often issued for a set proportion of the number the landholder reports.
- An audit of one year of processor records found 62 possible offences of illegal take and 283 incomplete records; 37 overshooting cases were under investigation.
- The report concluded that compliance options were "insufficient to manage the risks associated with commercialising the control of kangaroos" and that commercial pressure "could also threaten the sustainability of kangaroo populations".

The Government moved to a full commercial harvest within a year. Every ARI quota report from 2021 to 2023 then recommended that ATCW control be shifted into the commercial program, on the basis that this would improve tracking and reduce waste. None addresses the trial's finding that commercial involvement inflates demand. By 2023 the annual report described ATCW assessment as "rigorous", with lethal control approved only after "all practical non-lethal measures have been exhausted". No evidence is given, and the trial evaluation says the opposite.

3.3.5 The 2019 plan: promises and delivery

The Victorian Kangaroo Harvest Management Plan 2019 set out the commitments under which commercial harvesting began. Its targets can be tested against the record.

Table 3.3. Commitments in the 2019 plan against the record

2019 plan commitment	Target date	What the documents show
Thresholds or triggers to suspend or reduce harvest when a zone's population falls below a set density	By June 2020, all zones	No suspension threshold appears in any quota or harvest report to 2026. Quotas were cut only when ATCW ran over, never on a population trigger.
Population models for all zones using survey, harvest, ATCW and climate data, updated annually	By June 2020	The projection model was used once (2022), missed by 27%, and was dropped. ARI says calibration needs 8-10 surveys.

2019 plan commitment	Target date	What the documents show
Peer review of survey methods and the harvest model by universities or agencies	Ongoing	No peer review of any quota report or model is cited in the documents reviewed.
Public land excluded from harvest, acting as "sanctuary zones"	From 2019	The 2021-23 plan allowed harvesting on specified public land; public-land ATCWs took 17% of Loddon Mallee Western Greys in 2025.
Tags issued never exceed the commercial quota for any zone	Ongoing	North East over-allocated in Q1 2021 (2,020 v 2,015) and Q1 2024 (2,820 released v 2,250 available).
Quotas reviewed quarterly and adjusted if ATCW exceeds expectations	During 2020	Reviews happen, but carried-over tags keep shooting going after a release is withheld (section 3.10).
Precautionary principle: conservative quotas where data are uncertain	Ongoing	In 2021 and 2022 the department adopted ARI's higher alternative quota (section 3.4).
No cap on ATCW: "there are no plans to impose a quota on ATCW numbers"	-	Delivered. ATCW became the majority of the take and the cause of every recent breach.

The 2019 plan's own risk table also says the commercial industry "is capable of a significant degree of self-regulation" because it is not viable at low densities. That reasoning does not apply to ATCW killing, which is driven by landholder damage claims and rises when ‘Kangaroos crowd onto farms’ in drought.

The plan's quota schedule for the first quarter set the Mallee's total take at 1,187. The 2019 harvest report shows 6,499 killed or approved for killing in that zone in the same three months: 5.5 times the limit, in the first quarter the program operated.

3.4 Quotas year by year

Table 3.4. From recommendation to kill, 2019-2026

Year	Population used	Total quota (10%)	ARI commercial rec.	Commercial quota set (final)	Commercial kill	Notes
Q4 2019	1,378,605 (2018)	2.5% for quarter	-	14,090	7,835	Mallee 13.7% in one quarter
2020	1,378,605 (2018)	137,800	-	57,900	46,064	Fires: two zones closed Jan-Aug
2021	1,911,550 (2020)	191,200	71,800	95,680 (93,640; 79,450 released)	62,234	Alternative table adopted
2022	1,858,150 (projected)	185,850	113,350	127,850 (118,980)	68,346	Alternative table adopted
2023	2,363,850 (2022)	236,350	166,750	166,750	72,232	No adjustment
2024	2,363,850 then 2,230,500	236,350 then 223,050	155,650	155,650 (111,575)	81,160	Two cuts; Q4 withdrawn
2025	2,078,000 (2024, harvest zones)	207,800	117,600	106,750 (94,700)	76,363	Q4 cut in three zones
2026	2,078,000 (2024)	207,800	-	95,450	-	Same survey as 2025

Sources: ARI interim report and quota reports; KHP annual and quarterly reports; DEECA 2024 annual report; 2025 and 2026 determinations. The 2021 commercial kill is from the DEECA 2022 report; the four quarterly reports sum to 61,732.

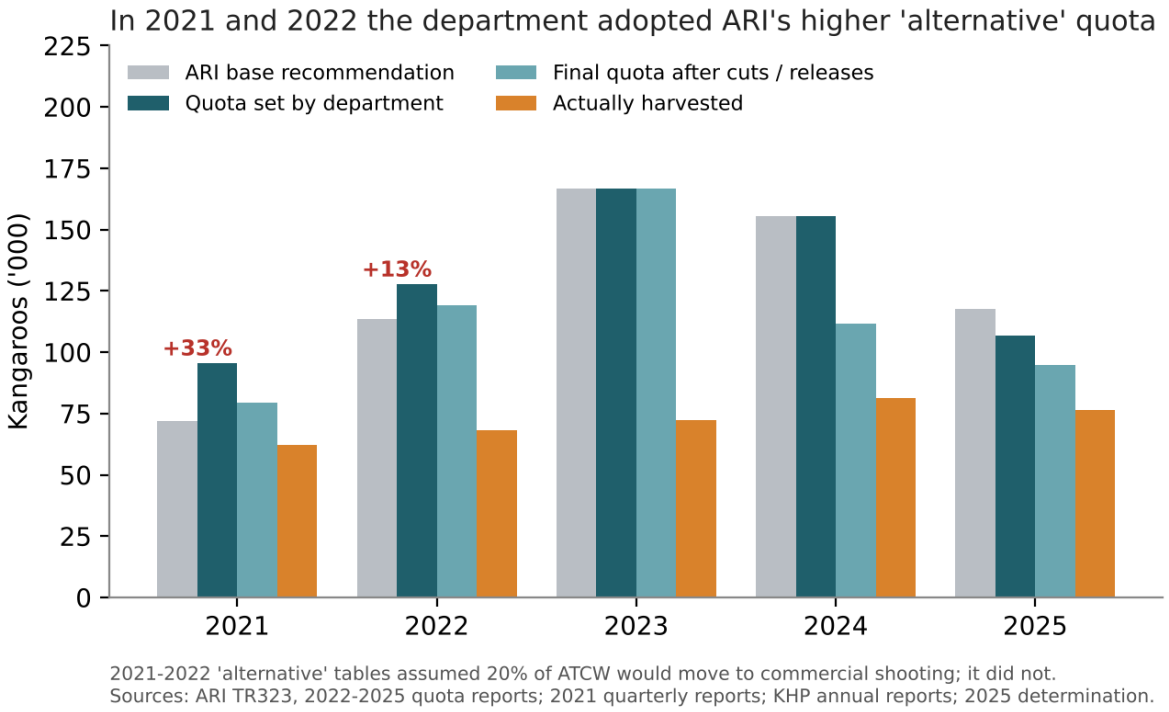


Figure 3.2. ARI's base recommendation, the quota the department set, the final quota and the commercial kill. 2024 from ARI TR371, obtained online.

3.4.1 2021: the alternative that became the rule

TR323 found that ATCW killing in the Mallee and North East averaged 18.7 and 14.5 per cent of those populations between 2017 and 2019, well above 10 per cent. It recommended no commercial quota in either zone. As a second option it offered Table 8, which assumed 20 per cent of predicted ATCW killing would be done by commercial shooters instead.

Table 8 does not reduce the take in the over-harvested zones. It moves Kangaroos from one column to the other. In the Mallee the adjusted ATCW (4,440) plus commercial quota (1,110) equals 5,550, 50 per cent above the zone's 3,700 limit. In the North East, 32,240 plus 8,060 equals 40,300, 68 per cent above its 24,000 limit. The 2021 quarterly reports confirm the department adopted Table 8: the 2021 commercial quota of 95,680 is exactly Table 8's figure. The Mallee and North East quotas "were exhausted in the third week of January 2021".

The 2022 report repeated the pattern. It recommended 113,350 and offered a Table 8 alternative of 127,850, which again exceeded the Mallee and North East limits. The 2022 annual report shows 127,850 was set as the initial quota.

3.4.2 2022: a projection that missed by 27 per cent

With no 2021 survey, the 2022 quota came from a one-year projection. It predicted a 2.8 per cent decline to 1,858,150. The survey flown in September 2022 reported 2,363,850, which is 27 per cent higher than the projection and 24 per cent higher than 2020. ARI did not reconcile the two, and the model was dropped. The 2022 report also measured 2021's take by multiplying the commercial tags *allocated* by the end of September by four-thirds (85,333), not the tags used. The actual 2021 commercial kill was about 62,200, so the take was overstated by about 23,000.

3.4.3 2024 and 2025: quotas cut after the event

ARI's 2024 report (TR371), published with an OFFICIAL-Sensitive marking and a cover dated a year after its citation, recommended 155,650 on the 2022 survey. It cut the Upper Wimmera quota by 700 "to offset" the Mallee, where predicted ATCW (6,300) already exceeded the zone's total take (5,600): the offsetting TR323 had shown does not protect the over-harvested zone. In 2024 the commercial quota was set at 155,650, cut to 142,350 in July and 111,575 in September after the population figure was revised to 2,230,500 and ATCW ran ahead of forecast. In 2025 it was cut in October from 106,750 to 94,700. The 2025 DJSIR annual report gives the revised figure as 97,400 in its text and 94,700 in its table.

3.5 The total take

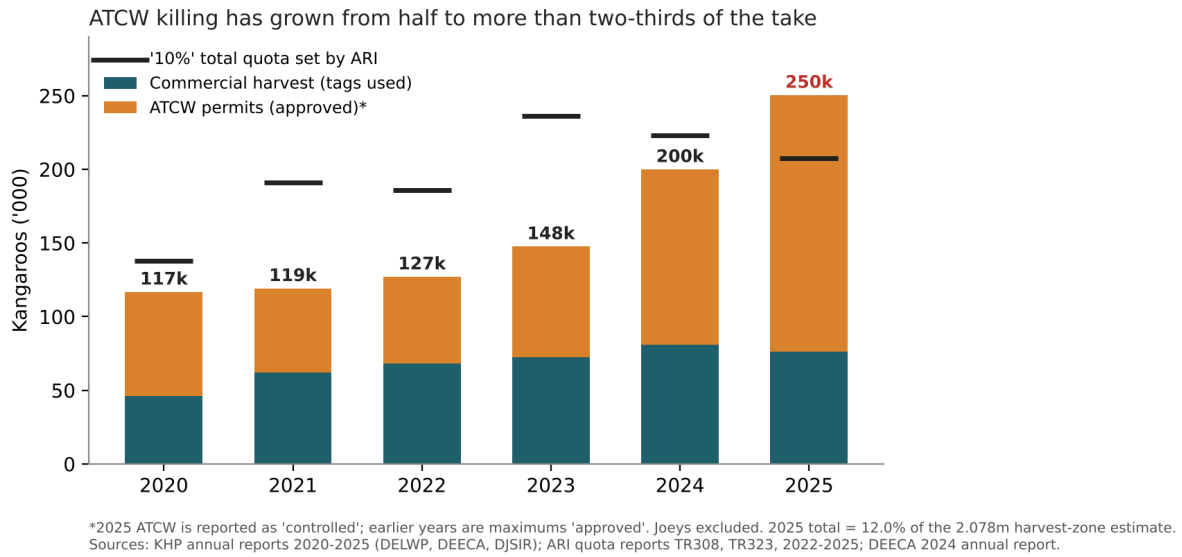


Figure 3.3. Commercial and ATCW take against the total quota, 2020-2025.

Table 3.5. Total take by year as reported

Year	Commercial	ATCW	Total	Reported %	Population used for %
2020	46,064	70,752	116,816	8.5%	1,378,605 (2018 survey)
2021	62,234	56,942	119,176	about 6%	1,911,550 (2020 survey)
2022	68,346	58,771	127,117	"no more than seven per cent"	1,858,150 (projection)
2023	72,232	75,375	147,607	6%	2,363,850 (2022 survey)
2024	81,160	118,823	199,983	9.0%	2,230,500 (revised)
2025	76,363	174,022	250,385	not stated (12.0% derived)	2,078,000 (harvest zones)

The total take more than doubled between 2021 and 2025 while the quota calculation's population base was roughly unchanged. Commercial killing rose 23 per cent. ATCW killing intent rose 206 per cent.

3.5.1 The moving denominator

The 2020 annual report put that year's take at 8.5 per cent of the 2018 estimate. ARI's 2023 report described the same take as "around 6%" by dividing by the population estimated in late 2020. The 2025

DJSIR report does not calculate the percentage. ARI's 2026 report gives "about 11.1 per cent" by dividing 257,003 by 2.306 million, a figure that includes about 228,000 Kangaroos in the exclusion zone where commercial shooting is banned. Measured against the harvest zones, the take was 12.0 to 12.4 per cent. Every choice of denominator in these documents lowers the reported percentage.

3.5.2 Two departments, two totals

DJSIR's 2025 report gives 76,363 commercial plus 174,022 ATCW, a total of 250,385. ARI's 2026 report gives 257,003. The 6,618 difference is not explained. Two departments now publish separate annual reports with different content: DEECA's includes ATCW by zone and total take, DJSIR's does not.

3.6 ATCW: the uncapped majority

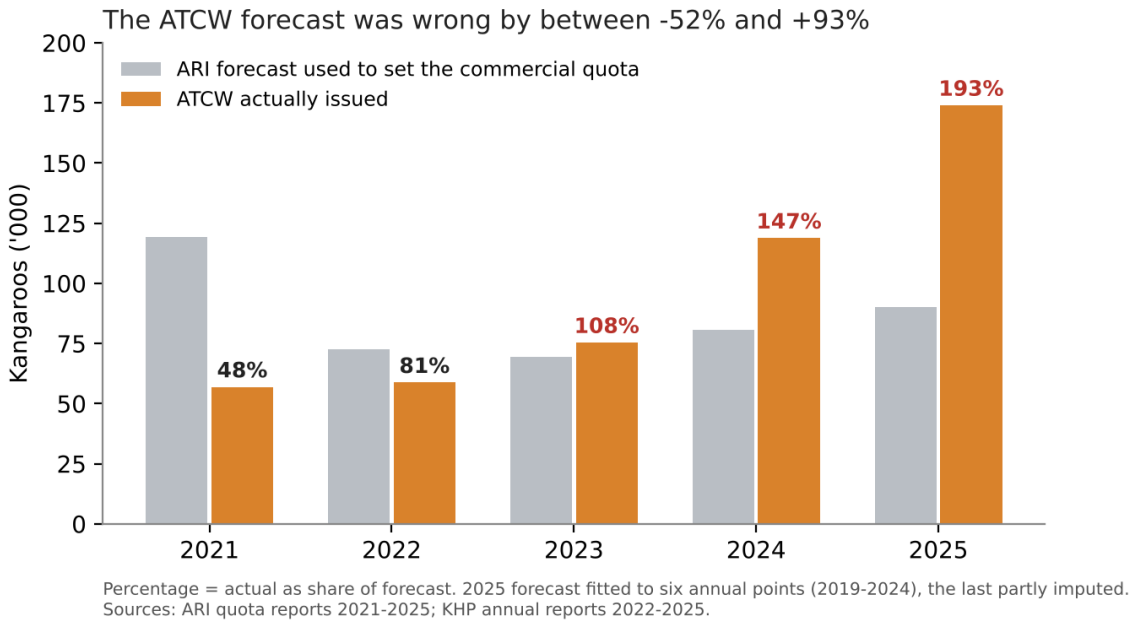


Figure 3.4. ARI's ATCW forecasts against the ATCW numbers actually issued.

The commercial quota is whatever is left of 10 per cent after the ATCW forecast is subtracted, so a wrong forecast feeds straight into the kill. The forecasts were too high in 2021 and 2022, when commercial shooters were given opportunities they did not use, and much too low in 2024 and 2025, when ATCW alone came close to the 10 per cent.

3.6.1 How the forecasts were made

- From 2021 to 2023 ARI fitted exponential smoothing and ARIMA models to annual ATCW numbers from 2002. Accuracy scores (MASE) ran from 0.6 to 1.25, so the models were only modestly better than, and sometimes worse than, simply repeating the previous year.
- TR323's Table 3.6 says "best fit ARIMA model" while its text says equal-weight averages of both models were used.
- For 2025, after the zones were redrawn, the series was cut to 2019 to 2024: six points, the last partly imputed. The text says "2019-2025".
- For 2026 ARI switched to a new "dynamic multilevel model" using data from 2003 to 2025, the third forecasting method in five years (2026 ARI quota report, list of figures).

3.6.2 Drought: the system runs backwards

The 2025 report attributes the record ATCW numbers to drought, which 'drives Kangaroos onto pasture, crops and farm water'. In June 2025 the Government sped up ATCW permit processing in response. A proportional harvest is meant to take fewer animals when a population is stressed. Victoria's arrangement takes more: drought increases damage claims, permits are approved faster, and the commercial quota is cut only after the total has been reached.

3.6.3 The Western Grey

The Western Grey Kangaroo is at the eastern edge of its range in north-west Victoria. TR323 warned that depletion "must be considered more serious" for this species, with "much more limited capacity for recovery". The record:

- Q4 2019: 6,430 Western Greys killed in the Mallee in three months, about 15 per cent of the zone's Western Greys, under public-land ATCWs.
- 2017-2019: ATCW averaged 18.7 per cent of the Mallee population a year.
- 2022, 2023 and 2024: Mallee total take 15.3, 13.2 and 11.8 per cent.
- 2025: ATCW approved 16,344 Western Greys statewide, more than twice the 7,650 forecast and 77 per cent of the species' 21,100 total quota on its own. Part 2 found Loddon Mallee Western Grey take of 17.1 to 21.4 per cent.

3.7 Zones over the limit

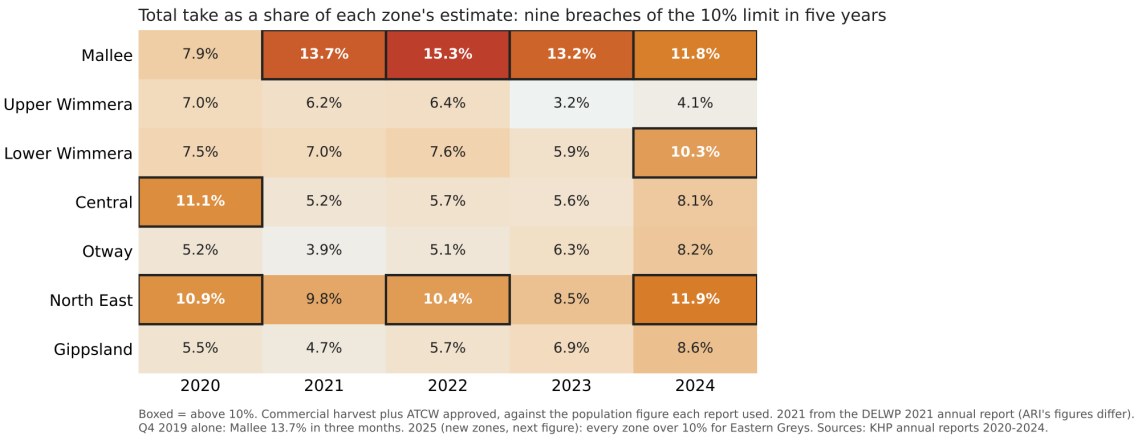
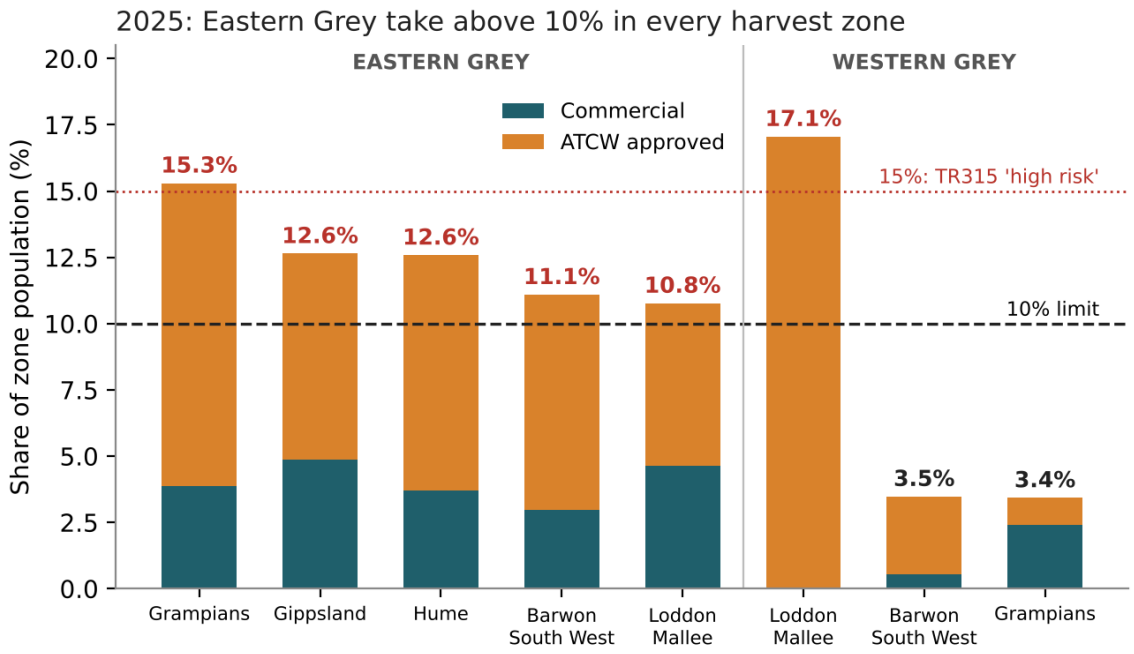


Figure 3.5. Total take as a share of each zone's population figure, 2020-2024 (annual report figures).

The 10 per cent rule applies to each zone, and from 2025 to each species within each zone. On the departments' own numbers it was exceeded in nine zone-years between 2020 and 2024, in six zone-species combinations in 2025, and in the Mallee in the program's first quarter.

ARI and the department do not always agree on which zones were over. For 2021 ARI's 2022 quota report shows the North East at 12.7 per cent and the Mallee at 7.7 per cent; the DELWP 2021 annual report shows the North East at 9.8 per cent and the Mallee at 13.7 per cent. ARI used allocated tags and imputed figures; DELWP used year-end returns. Figure 3.5 uses the annual reports.



Source: DEECA KHP Annual Report 2025, Tables 2, 4 and 5 (population = ARI 2024 model estimates).

Figure 3.6. Total take by zone and species in 2025, the first year of species-specific quotas.

In 2025, DEECA's own annual report states that the Eastern Grey take "was also above 10 per cent of the population in each of the Harvest Zones" and that withholding the fourth-quarter quota "could not maintain control numbers within the recommended total quota". In Loddon Mallee, where no commercial Western Grey quota was issued, ATCW permits alone took 17.1 per cent of Western Greys, "almost all" on public land for habitat protection. In the Grampians, DEECA made no fourth-quarter change because Eastern Grey commercial quota was already almost used, although the zone's total Eastern Grey take was 15.3 per cent.

3.7.1 The statewide excuse

> *as the numbers in these two zones only surpassed recommended levels in the final stages of the year, only by very small amounts and because the statewide total was below the recommended level, no further action was taken.* KHP 2020 report, on Central and North East

ARI had tested exactly this reasoning. TR323 modelled heavier harvesting in one zone offset by lighter harvesting next door and found that the extra risk in the over-harvested zone "cannot be effectively mitigated by compensatory under-harvesting in an adjacent zone". The 2019, 2021, 2022 and 2023 reports used the same reasoning for the Mallee; in 2021 the Mallee breach was put down to permits issued "in the final weeks of 2021". In 2023 DEECA released the last Mallee quota knowing ATCW would exceed the limit, because the remaining 500 tags were "less than 1%" of the population.

3.7.2 The North East after the fires

After the 2019-20 fires, the Secretary of DELWP wrote to the Secretary of DJPR asking that quota be withheld in the North East and Gippsland. Harvesting resumed in August 2020 with three local government areas closed. ARI's 2021 report then found the North East population had declined since 2018, with ATCW averaging 14.5 per cent of it in 2017-2019 and forecast at about 17 per cent. ARI recommended no commercial quota. The department released 8,060. North East total take was 10.9,

12.7, 10.4, 8.5 and 11.9 per cent in 2020 to 2024. In Q4 2021 the North East quota was set to zero, yet 373 tags were consumed.

The 2020 report also reverses the revised quotas: its text says Gippsland was cut to 11,300 and the North East to 3,100, while its table shows the opposite.

3.8 Population inputs that do not compute



Figure 3.7. Implied annual growth in zone estimates against the growth limits in ARI's own models.

Kangaroos breed slowly: usually one young a year, females maturing at about two. TR308 called 65 per cent annual growth the "upper end of biological plausibility" with no harvesting. The 2022 quota model assumed a maximum of 20 per cent. Yet the survey estimates that set the quotas imply:

- Central zone: 274,953 in 2018 to 658,950 in 2020, a 140 per cent rise, or 55 per cent a year before adding back the 6 to 11 per cent being killed. This single change added about 38,400 to the 2021 total quota.
- Gippsland: up 90 per cent in two years, through the 2019-20 bushfires.
- North East and Mallee: falling between 2018 and 2020 under ATCW killing above 10 per cent, then rising 22 per cent a year to 2022 while the killing continued.

These are not real population changes; they are the swings of an imprecise survey, as Part 2 showed. The quotas, though, are recalculated from each new point estimate as if it were exact. In 2022 the North East estimate of 355,950 had a standard error of 163,663, a coefficient of variation of 46 per cent, and a 95 per cent range of 144,550 to 876,600. The quota took 10 per cent of the middle figure.

In 2024 the population figure for quota-setting was revised mid-year from 2,363,850 to 2,230,500, cutting the quota twice. The basis for the revision is not explained in the documents reviewed.

3.8.1 Arithmetic and copying errors

- TR308 Table 1 gives an Eastern Grey total of exactly 1,250,000 from seven unrounded zone figures, and a combined total of 1,378,605 that should be 1,378,603. The 1,378,605 is repeated in the 2019 and 2020 annual reports.
- TR323 (2021) carries 2020 page headers; the 2022 report carries 2021 headers.

- The 2025 ARI report gives the forecast Eastern Grey ATCW as 84,550 in its summary and 82,550 in its table, gives the total quota as 207,800 in the summary and 230,600 in its text, and its results text gives the ATCW share of the Eastern Grey quota as 40 per cent against 44.2 per cent in its table.
- The 2025 determination states the total quota of 207,800 consists of 186,700 Eastern Greys and "13,450 western grey kangaroos"; the correct figure is 21,100. Its table labels the population column "+10% buffer", although the buffer was added to the ATCW forecast.
- The DEECA 2025 annual report says ARI estimated the 2025 population "using a spatial harvest model" incorporating harvest and ATCW data, and cites "Ramsey, 2024". The 2025 quota report was written by Scroggie and Moloney and used model-based distance sampling of the 2024 survey. The 2020, 2021 and 2022 reports also attribute quotas to a spatial model with rainfall that was not used.
- Just over 1,700 Kangaroos euthanised by DEECA teams after the 2025 Grampians and Little Desert fires are reported separately and do not appear in the total take; DEECA made no change to the quota after the fires.
- The 2025 determination says ARI has recommended the "total statewide take" stay under 10 per cent. ARI's reports apply 10 per cent to each zone and species.

3.9 Who is killed

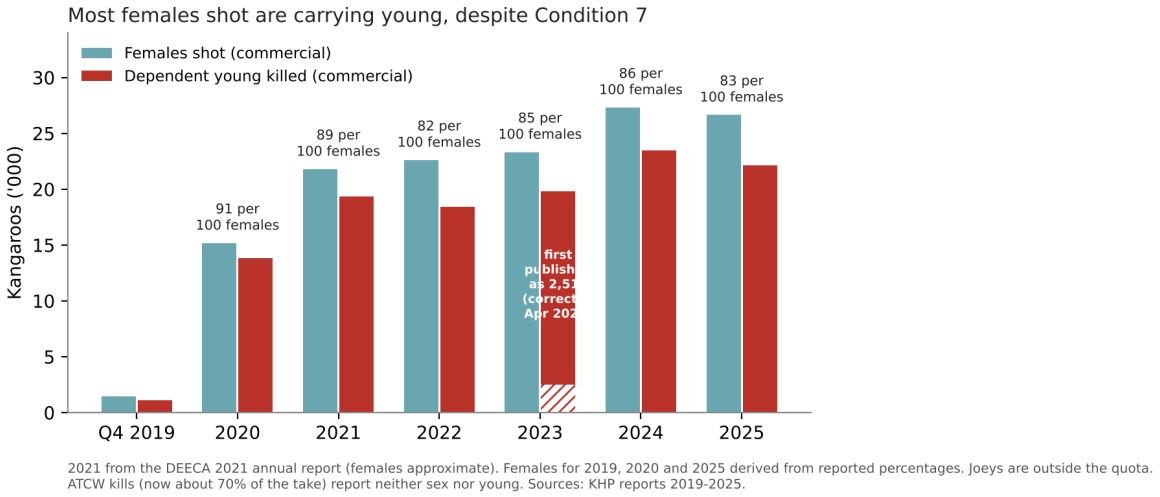


Figure 3.8. Females and dependent young killed by commercial shooters.

Part 1 reported 118,221 dependent young killed by commercial shooters to the end of 2025. The documents in this batch add three points.

3.9.1 Condition 7

The 2021 conditions of authorisation state: "Kangaroos with obvious dependent young must not be shot" (Condition 7). Condition 9 then requires every shot female to be checked for pouch young, which "must be euthanased", and Condition 16 exempts pouch young and young at foot from tagging. In 2022 to 2025 shooters recorded 82 to 86 dependent young for every 100 females shot. Either Condition 7 is routinely broken, or "obvious" is read so narrowly as to mean nothing. No offence for breaching it is reported in any compliance table.

3.9.2 The 2,513 that became 19,842

The 2023 annual report originally stated that 2,513 dependent young were killed. A version updated in April 2025 corrects this to 19,842, attributing the error to data from DJSIR. The corrected figure is almost eight times the original. It went unnoticed for more than a year, and the correction appears only in a re-issued file.

3.9.3 Species and sex records

- 2019: harvesters reported 16 per cent Western Greys, including from zones where none occur. 2020: 35 per cent, with 94 per cent of Gippsland's and 62 per cent of Central's kill reported as Western Greys, though neither zone has the species.
- 2021 quarterly reports: Western Greys were 42 to 48 per cent of reported kills in some quarters, and the number of females reported in January exceeded the number of animals identified to species.
- 2021: harvesters reported 19,405 Western Greys and 29,863 Eastern Greys: 39 per cent Western Grey in a state where the species is under 10 per cent of the population, with 12,966 kills unidentified. The report blames "harvester errors while using the app".
- 2022: species was recorded for 55,561 of 68,346 tagged Kangaroos; 12,785 (19 per cent) had none. The report says this "has no impact on population modelling". 2023: species reports total 73,623 against 72,232 tags used.
- From 2022 the department "only applied" Western Grey reports in zones where the species is known to occur, editing the raw data rather than fixing the reporting.

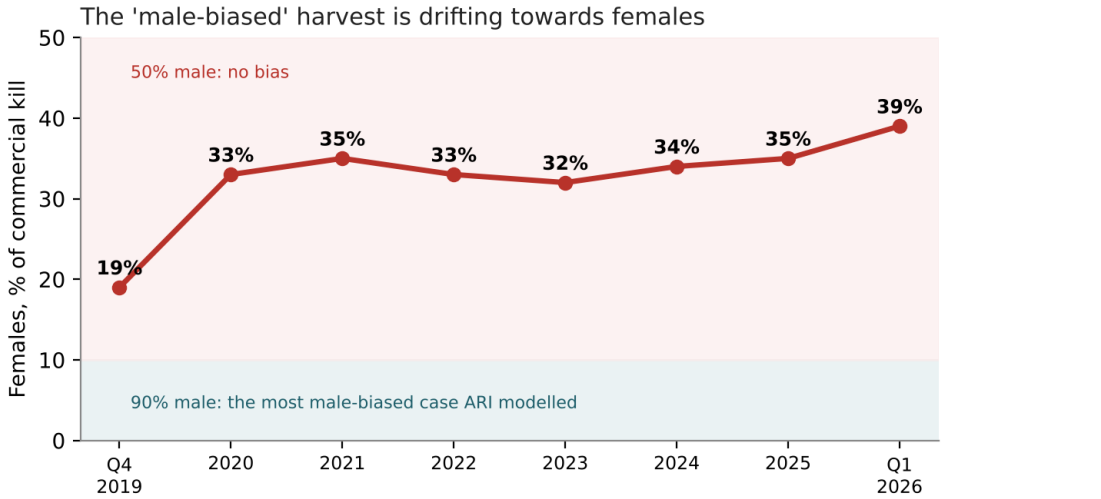


Figure 3.9. Females as a share of the commercial kill.

3.9.4 More young than mothers

In 2024 harvesters in the Upper Wimmera reported 1,209 dependent young killed but only 1,048 females shot; in Q2 and Q3 2024 the young exceeded females in that zone in both quarters. The 2024 quarterly reports label the column "young at foot", the annual report "dependent young". Neither defines the term. In Q4 2024, when no new quota was released, harvesters still reported 6,816 dependent young killed (annual total less the first three quarters).

The male bias that TR315 relies on is weak: females are about a third of the commercial kill, and the male share is near the bottom of the 50 to 90 per cent range ARI modelled and falling: females were 39 per cent of the commercial kill in Q1 2026, and 46 per cent of Eastern Greys shot in Barwon South West. For ATCW, now about 70 per cent of the take, sex, age and young are not recorded at all.

3.10 Quota management in practice

3.10.1 Suspensions that do not suspend

Quota is released quarterly, and tags not used in one quarter carry over. In September 2024 DEECA withdrew the fourth-quarter release in every zone. The Q4 2024 report shows 15,955 carried-over tags released and 22,354 Kangaroos shot in October to December, 28 per cent of the year's commercial kill. In Gippsland 360 tags were released and 1,961 Kangaroos shot; in Lower Wimmera 5,510 released and 7,400 shot. In the North East and Otway no tags were available or released and no harvester received any, yet 413 and 1,128 Kangaroos were shot there. The report explains none of this. In 2025 the fourth-quarter quota was removed in Hume, Gippsland and Loddon Mallee, yet 13,423 tags were used in those zones in October to December.

The Q4 2025 report shows how. In Hume the fourth-quarter release was "fully withheld", but 5,100 tags left unallocated in the first quarter were still "available" in the fourth; 5,160 were allocated and 4,602 used. Gippsland and Loddon Mallee had zero available but were allocated 50 and 200 tags "reallocated" from earlier. Across the state 17,230 Kangaroos were shot in October to December 2025; only 5,590 on tags allocated in that quarter. October 2025, the month the quota was cut, was Hume's busiest month of the year (4,027).

The quarterly reports repeat the pattern. In Q2 2025 the report says 13,886 tags were "consumed during Quarter 2" while its own monthly table shows 19,686 Kangaroos shot in April to June: the difference was killed on first-quarter tags. The 2026 schedule is front-loaded: 37 per cent of the annual quota is released in Q1 and 12 per cent in Q4, so most tags are in shooters' hands before the year's ATCW numbers are known.

3.10.2 Over-allocation and inconsistent tables

- Q1 2021: 2,020 tags allocated in the North East against a quota of 2,015.
- Q4 2021: North East quota zero, 373 tags consumed; Mallee 290 allocated, 369 consumed.
- Q1 2024: North East released 2,820 tags against 2,250 available ("-570" remaining). Q3 2024: North East shows 975 tags released and 897 consumed by "0" harvesters.
- Q3 2024: the table total for available quota (50,330) and remaining quota (21,650) are copied from Q2; the zone rows add to 52,625 and 27,090.
- The Q3 2024 report says the quota was "further reduced" to "11,175"; the figure is 111,575. The 2021 annual report's quota table totals 93,640 and its harvest table 95,680 for the same quota. Harvester authorisations are described as valid "2024-2027" in three 2024 reports and "2024-2026" in later ones.
- Every 2021 quarterly report notes that "tagged carcasses for processing figures are inconsistent with quota consumed figures"; in Q1 14,652 carcasses were recorded against 13,743 tags.

3.10.3 A 10 per cent buffer for industry

The 2025 determination added 10 per cent to the ATCW forecast "to provide more certainty and consistency for industry throughout the year". ARI's report had recommended the buffer as "insurance

against ATCWs exceeding the forecasts". The determination presents a safeguard for Kangaroos as a convenience for shooters. Actual ATCW was 93 per cent above the unbuffered forecast.

3.11 Compliance and oversight

Table 3.6. Compliance as reported

Year	Authorised harvesters	'Active' definition	In-field audit rate	Offences / investigations
2020	87	More than 700 Kangaroos a year	34.6% programmed, 11.5% unannounced	3 information reports
2021	123	At or above the state mean (610)	36% programmed, 17% unannounced; 0, 0, 14, 11 inspections by quarter	57 detected or reported; 3 proved
2022	157	At or above the state mean (435)	60%	13 investigations
2023	178 (DJSIR)	Active in all four previous quarters (17 harvesters)	158%	4 investigations, 4 substantiated
2024	130	As 2023 (29 harvesters)	75%	18 investigations, 0 substantiated
2025	156	As 2023	75%	5 investigations, 4 substantiated

In 2025 the quarterly reports show 1 per cent of active harvesters audited in the field in Q1, none in Q2 ("audits will commence in Q3"), 5 per cent in Q3 and 40 per cent in Q4, yet the annual report gives 75 per cent. In Q4 2024, 6 of 58 active harvesters (10 per cent) were audited in the field, against 75 per cent in that year's annual report, which defines only 29 harvesters as active. The Q1 2026 report gives the number of audits as "100%" and measures field audits of "new harvesters" (0 per cent), a fourth change of metric. The definition of an "active" harvester, which sets the audit percentage, changed three times (more than 700 a year; at or above the mean; active in all four previous quarters). Under the 2023 definition only 17 harvesters counted as active, although quota was issued in 267 zone allocations, and the audit rate came out at 158 per cent. Fieldwork remains limited by the problem the Pet Food Trial identified: shooting happens at night on private land.

The 2021-2023 KHMP and conditions added interstate export of carcasses human consumption, and harvesting on specified public land. Each extends the commercial reach of the program. None was accompanied by a change to the quota method.

3.12 How this links to Parts 1 and 2

- **Plans (Part 1).** The plans promise a precautionary, "conservative" harvest within 10 per cent, transparent reporting and suspension when populations are threatened. The quota and harvest reports show the 10 per cent breached, reporting split between departments with key data missing, and suspensions that do not stop shooting.
- **Surveys (Part 2).** The quotas take 10 per cent of point estimates with zone coefficients of variation of 30 to 67 per cent, driven by a few transects and the Central zone. The Wimmera, where commercial killing is heaviest, fell about 40 per cent between 2022 and 2024 by ARI's own figures. The 2024 harvest data show Lower Wimmera total take at 10.3 per cent that year.

- **The closed loop.** The same small ARI team designs the survey, estimates the population, builds the risk model, forecasts ATCW, recommends the quota and writes the reports used to judge sustainability. The documents reviewed contain no external peer review of any quota report.

3.13 Register of contradictions and anomalies

#	Claim or rule	Source	What the documents show	Source
1	10% is very low risk and based on evidence	TR308; plans	No Victorian model existed; 'informal' assessment; model still uncalibrated	ARI 2019; 2022 quota report
2	Quota includes all killing; total within 10%	All quota reports	Nine zone-years over 10% (2020-24); 12.0% statewide in 2025	Annual reports; DEECA 2024
3	No commercial quota in Mallee and North East	TR323 base recommendation	Department adopted 'alternative': 1,110 and 8,060	Q1 2021 report
4	Alternative keeps take within limits	TR323, 2022 report	Mallee and North East totals in Table 8 exceed limits by 50-68%	TR323 Table 8
5	Breach in one zone offset by statewide total	2020 report	Compensation does not protect the over-harvested zone	TR323 section 3.3
6	10-20% is sustainable	DEECA 2023, 2024 reports	>10% unacceptable now (TR308); >15% high risk (TR315)	TR308; TR315
7	ATCW assessment is rigorous; non-lethal exhausted	2023 annual report	'Very few applications are refused'	KPFT evaluation 2018
8	Moving ATCW into commercial program improves outcomes	TR323, 2022, 2023 reports	Commercial incentive inflated ATCW demand 2.6 times	KPFT evaluation
9	2022 population about -3% from 2020	2022 quota projection	Survey: +24%	2023 quota report
10	Maximum growth about 20% a year	2022 quota model	Survey implies 55% a year in Central (2018-20)	TR308, TR323
11	2021 take 146,726 (KHP 85,333)	2022 quota report	KHP figure was allocated tags x 4/3; actual about 62,200	Quarterly reports; 2022 annual report
12	Quota 'withdrawn' in Q4 2024	DEECA 2024	22,354 killed in Oct-Dec on carried-over tags	DJSIR 2024 summary
13	Q4 2025 quota removed in three zones	DJSIR 2025	13,423 tags used there in Oct-Dec	DJSIR 2025 Table 3
14	Kangaroos with obvious young must not be shot	Condition 7	82-86 young per 100 females shot	Annual reports 2022-25
15	2,513 dependent young in 2023	2023 report (original)	19,842 (corrected April 2025)	2023 report (revised)
16	Harvest is male-biased, so low risk	Annual reports citing TR315	About one-third female; ATCW sex unknown	Annual reports
17	Species reports reliable enough	Annual reports	Western Greys reported where absent; 19% unrecorded in 2022	2019, 2020, 2022 reports
18	Spatial model with rainfall set the 2020 and 2022 quotas	2020, 2022 annual reports	2020 used TR308's simple model; 2022 used a one-year projection with no rainfall	TR308; 2022 quota report
19	Gippsland cut to 11,300, North East to 3,100	2020 report text	Table shows the reverse	2020 report Table 1

#	Claim or rule	Source	What the documents show	Source
20	Total quota 207,800 = 186,700 EGK + 13,450 WGK	2025 determination	WGK total quota is 21,100	ARI 2025 Table S1
21	Quota reduced to 97,400	DJSIR 2025 text	94,700 in the same report's table and Q3/Q4 reports	DJSIR 2025
22	2025 total take 257,003 (11.1%)	ARI 2026	250,385 (12.0% of harvest zones)	DJSIR 2025
23	10% buffer 'for industry'	2025 determination	ARI framed it as insurance against ATCW overrun	ARI 2025
24	Fires assessed before harvest resumed	2020 report	North East then found declining, ATCW 14.5-17%; commercial quota released anyway	TR323
25	Suspension thresholds for every zone by June 2020	KHMP 2019	No threshold appears in any later quota or harvest report	Quota reports 2020-2026
26	Peer review of survey and harvest model	KHMP 2019	None cited	All documents reviewed
27	Public land as sanctuary	KHMP 2019	Harvest on specified public land allowed; 17% of Loddon Mallee Western Greys killed under public-land ATCWs (2025)	2020 report; DEECA 2025
28	Q4 2025 quota fully withheld in Hume	DEECA 2025	4,602 shot in Hume in Q4 on 5,100 carried-over Q1 tags	Q4 2025 report
29	13,886 tags consumed in Q2 2025	Q2 2025 report	Monthly table: 19,686 shot	Q2 2025 report
30	Every female is shot only without obvious young; young counted per female	Condition 7; annual reports	Upper Wimmera 2024: 1,209 young v 1,048 females	2024 reports
31	10% is conservative against other states' 10-20% (2019) / up to 15% (2025)	KHMP 2019; DEECA 2025	Benchmark changes; ARI says over 10% unacceptable for Victoria now	TR308
32	2021 harvest: 39% Western Grey	2021 annual report	Species is under 10% of population; 12,966 unidentified	2021 annual report
33	Active harvesters audited 75% (2024 and 2025)	Annual reports	Quarterly 2025: 1%, 0%, 5%, 40%; Q4 2024: 6 of 58	Quarterly reports
34	Q4 2024 quota withdrawn in all zones	DEECA 2024; Q4 2024 report	North East and Otway: 0 tags released, 0 harvesters, 1,541 shot	Q4 2024 report
35	2023 total take 147,607 (6%)	DEECA 2023 report	ARI TR371: 159,610 (6.8%)	ARI TR371

3.14 Likely outcomes for Kangaroos and for biodiversity management

3.14.1 For Kangaroos

On the Government's own figures, the program has moved from the range ARI called "very low risk" into the range its model's flag. In 2025 the take was 12.4 per cent of Eastern Greys across the harvest zones, above 10 per cent in every zone, and above 15 per cent for Eastern Greys in the Grampians and Western Greys in Loddon Mallee. TR308 said rates above 10 per cent carry unacceptable risk until much

better data exist; TR315 said rates above 15 per cent risk driving populations below half their unharvested size unless the kill is strongly male-biased. It is not.

Four features make local decline more likely than the statewide numbers suggest:

1. **The kill is pro-cyclical.** ATCW demand rises in drought, when recruitment falls, and the permit process was sped up in 2025. Proportional harvesting is meant to do the opposite.
2. **The survey cannot see local decline in time.** With zone coefficients of variation of 30 to 67 per cent and surveys every two years, a fall of a third can go undetected. Part 2 found exactly that in the Wimmera.
3. **The losses are spreading.** The Mallee, North East and Wimmera recurred as over-limit to 2024; in 2025 every zone was. The Western Grey at its range edge is the most exposed.
4. **The uncounted dead.** Joeys of ATCW-shot females, young at foot left to fend for themselves, and wounded animals are in no total. Commercial records alone show 118,221 dependent young killed since 2019 (Part 1, section 1.10); no equivalent figure exists for ATCW killing.

The likely result is a statewide estimate that looks stable, held up by the peri-urban Central zone and the exclusion zone, around a set of farming regions where grey Kangaroos are progressively thinned. That is the pattern the 2022-2024 Wimmera figures already show.

3.14.2 For biodiversity management in Victoria

- **A permit system with no ceiling.** The ATCW system for Kangaroos operates as a demand-driven licence to kill a protected species, monitored only by permissions issued. The same system covers other native wildlife. Kangaroos are the one species where a quota exists to show the gap.
- **Science used as cover.** The "10 per cent" gives the appearance of a scientific limit, but nothing in the system enforces it and the departments re-describe breaches as sustainable. That erodes the credibility of evidence-based wildlife management generally.
- **Conservation culls and commercial killing compete for the same allowance.** Public-land ATCWs to protect other species in the Mallee were counted in the same 10 per cent as commercial and farm killing, and were the reason given for Mallee breaches. Ecological management of grassy woodlands and Mallee parks becomes hostage to commercial demand.
- **Precedent.** The 2023 annual report notes the new model-based method allows quotas "for any arbitrary area". Combined with commercial harvesting on specified public land and interstate export, the program has the tools to expand without new scrutiny.
- **Records unfit for purpose.** A biodiversity regulator cannot manage what it does not count. Eightfold errors in joey numbers, invented species records and no ATCW returns mean the State does not know how many Kangaroos it kills.

3.15 Recommendations and FOI requests

3.15.1 Recommendations

1. Make 10 per cent a hard limit for each zone and species, covering ATCW as well as commercial killing, with ATCW approvals paused when the limit is reached.
2. Require ATCW holders to report the number killed, sex and young, as the 2018 trial evaluation implied, and report actual kills rather than permissions.
3. Count pouch young and young at foot in the take and the quota.

4. Cancel carried-over tags when a quota release is withdrawn, and release quota evenly through the year rather than front-loading it.
5. Introduce a drought trigger that reduces quotas and tightens ATCW assessment, rather than speeding it up.
6. Investigate compliance with Condition 7 and publish the results.
7. Deliver the 2019 plan's promised suspension thresholds and peer review and publish both.
8. Commission an independent review of the quota method, forecasting and population inputs, with data and code published.
9. Publish one annual report covering commercial and ATCW killing by zone and species, with old-zone series continued for trend comparison, and correct the errors listed in section 3.13.

3.15.2 FOI requests

- Decision papers and briefings for adopting the higher "alternative" quotas in 2021 and 2022.
- The basis for revising the population figure to 2,230,500 in July 2024, and why ARI's 2024 report is marked OFFICIAL-Sensitive.
- ATCW data by LGA, species and land tenure, 2019-2025, including any actual kill returns from public land managers.
- The tag carry-over rules and the number of tags outstanding at each quota withdrawal in 2024 and 2025.
- The April 2025 correction of the 2023 joey figure: how the error arose and whether other years were checked.
- Compliance investigations and outcomes involving Condition 7.
- Any external peer review of ARI's quota reports or the TR308 and TR315 models.
- Why the 2026 Q2 harvest report was not published until (November?) 2026 and conjointly with the Q3 report? Neither report published at time of writing.

3.15.3 Gaps that remain

Not in any document supplied: the basis for the July 2024 population revision; the 2026 ARI report's zone-level ATCW forecasts with the new drought index; quarterly reports for Q2-Q4 2023 (not found online); DEECA's 2022-2024 harvest data by sex and young at zone level; and any ATCW data by land tenure. These are the priorities for the next Freedom of Information requests.

Sources

1. ARI (2019). Interim harvest quotas for kangaroos in Victoria, October-December 2019. Unpublished client report.
2. DELWP (2018). Kangaroo Pet Food Trial Evaluation Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0019/412723/KPFT-Evaluation-Report_Dec_2018a.pdf
3. Scroggie & Ramsey (2019). Kangaroo harvest quotas for Victoria, 2020. ARI TR308.
4. Scroggie & Ramsey (2020). A spatial harvest model for kangaroo populations in Victoria. ARI TR315. https://www.ari.vic.gov.au/__data/assets/pdf_file/0013/511303/ARI-Technical-Report-315-Spatial-harvest-model-for-kangaroo-populations-Victoria.pdf
5. Ramsey & Scroggie (2020). Kangaroo harvest quotas for Victoria, 2021. ARI TR323.
6. Ramsey & Scroggie (2021). Kangaroo harvest quotas for Victoria, 2022. ARI.
7. Ramsey (2022). Kangaroo harvest quotas for Victoria, 2023. ARI.

8. Scroggie & Moloney (2024). Kangaroo harvest quotas for Victoria, 2025. ARI. https://wildlife.vic.gov.au/__data/assets/pdf_file/0032/729455/Kangaroo-harvest-quotas-for-Victoria-2025-ARI-tech-report.pdf
9. Ramsey (2025). Kangaroo harvest quotas for Victoria, 2026. ARI TR396. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0039/775659/Kangaroo-harvest-quotas-for-Victoria-2026-FINAL.pdf
10. DEECA (2024). 2025 Kangaroo Harvest Quota Determination. https://wildlife.vic.gov.au/__data/assets/pdf_file/0028/729460/2025-Kangaroo-Harvest-Quota-Determination.pdf
11. DEECA (2025). 2026 Quota Determination. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0031/775660/2026-Quota-Determination-Final.pdf
12. DJPR (2020). Conditions of Authorisation, Victorian Kangaroo Harvest Management Plan 2021-2023, v2.
13. DELWP. Letter, Secretary J. Bradley to Secretary S. Phemister, Kangaroo Harvesting Program (FOI release).
14. DELWP (2020). Kangaroo Harvesting Program 2019 Report; DELWP/DJPR (2021) 2020 report.
15. DJPR (2021). Kangaroo Harvest Program quarterly reports Q1-Q4 2021 (release versions).
16. DEECA (2023). Kangaroo Harvesting Program 2022 Annual Report.
17. DEECA (2024, revised April 2025). Kangaroo Harvesting Program Annual Report 2023.
18. DEECA (2025). Kangaroo Harvesting Program Annual Report 2024. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0039/744879/Kangaroo-Harvesting-Program-Annual-Report-2024_FINAL.pdf
19. DJSIR. Kangaroo Harvesting Program 2024 Annual Summary Report; 2025 Annual Report. https://djsir.vic.gov.au/__data/assets/pdf_file/0008/2488661/Kangaroo-Harvesting-Program-2025-Annual-Report.pdf
20. DEECA (2026). Kangaroo Harvesting Program 2025 Annual Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0033/784842/Kangaroo-Harvesting-Program-2025-Annual-Report.pdf
21. DJSIR. Kangaroo Harvesting Program Report Q3 2025. https://djsir.vic.gov.au/__data/assets/pdf_file/0004/2439886/Kangaroo-Harvesting-Program-Report-Q3-2025.pdf
22. Star Mail (20 June 2025). Kangaroo control permit process sped up in response to drought conditions in Victoria. https://ferntreegully.mailcommunity.com.au/news/2025-06-20/kangaroo-control-permit-process-sped-up-in-response-to-drought-conditions-in-victoria/
23. NSW DCCEEW. How commercial harvesting is regulated (quota rates). https://www.environment.nsw.gov.au/topics/animals-and-plants/wildlife-management/kangaroo-management/understanding-kangaroo-management-nsw/how-commercial-harvesting-regulated
24. NSW DCCEEW. 2025 NSW Kangaroo Management Program commercial take, October 2025. https://www.environment.nsw.gov.au/sites/default/files/2025-11/2025-october-nsw-kangaroo-management-program-kangaroo-wallaroo-commercial-take.pdf
25. Ramsey (2023/2024). Kangaroo harvest quotas for Victoria, 2024. ARI TR371. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0032/692285/Kangaroo-Quota-2024-ARI-Tech-Report_FINAL.pdf
26. DJSIR. Kangaroo Harvesting Program Report Q4 2024. https://djsir.vic.gov.au/__data/assets/pdf_file/0020/2402174/Kangaroo-Harvesting-Program-Report-Q4-.pdf
27. DELWP (2019). Victorian Kangaroo Harvest Management Plan 2019.
28. DELWP (2022). Kangaroo Harvesting Program Annual Report 2021.
29. DJPR/DJSIR. Kangaroo Harvesting Program quarterly reports Q1 2023; Q1-Q3 2024; Q1, Q2, Q4 2025; Q1 2026. https://djsir.vic.gov.au/__data/assets/pdf_file/0012/2488665/Kangaroo-Harvesting-Program-Report-Q4-2025.pdf
30. The Kangaroo Report, Volume 6 Parts 1 and 2 (2026).

Figures marked derived are the author's calculations from the sources above. ARI and departmental material is reproduced under the State of Victoria's CC BY 4.0 licence. Figures from scanned documents were read by optical character recognition and checked against totals where possible.

PART 4

Synthesis

What Victoria's own documents show about its Kangaroo plans, surveys, quotas and killing, and how they intersect with the ATCW permit system examined in Volume 2

Author	Peter Hylands
Prepared	November 2026
Scope	Part 4 draws together Part 1 (The Paper Trail: plans, politics and governance), Part 2 (Counting Kangaroos: the surveys) and Part 3 (Quotas and the Kill). It describes the evidence base for the volume and sets the findings beside Volume 2's analysis of Authority to Control Wildlife (ATCW) permits.

Summary

Volume 6 tests one claim: that Victoria's commercial Kangaroo harvest is ecologically sustainable and humane. It does so almost entirely from the Victorian and Commonwealth Governments' own documents, 67 unique files in all, about 15 of them obtained under Freedom of Information, plus about 19 further documents retrieved online. Together they span 26 years, from the 2000 parliamentary inquiry to the first-quarter harvest report of 2026.

The three Parts examine the three links on which the claim depends, and each link fails on the Government's own evidence:

1. **The plans promise safeguards that were never delivered or were later removed** (Part 1). Population thresholds to suspend harvesting were promised for June 2020 and are absent from the 2024-2028 plan. Public land went from "sanctuary" to open for control and, in principle, for commercial shooting. The plans concede there is no legal mechanism to cap ATCW killing.
2. **The surveys cannot measure what the quotas assume** (Part 2). Zone estimates carry uncertainties of 30 to 67 per cent, are dominated by a few transects and Melbourne's urban fringe, and change by hundreds of thousands with the analysis method. A fall of about 40 per cent in the most heavily harvested zone went unreported.
3. **The quotas and kill records do not hold the line** (Part 3). The 10 per cent rule was borrowed, never calibrated and, with ATCW uncapped, is a calculation rather than a limit. In 2025 the Eastern Grey take exceeded 10 per cent in every harvest zone, ATCW permits made up 70 per cent of the take, and 118,221 dependent young killed by commercial shooters since 2019 sit outside every total.

The ATCW system is where these failures meet. Volume 2 showed that ATCW permits authorise more killing than the commercial harvest and that Victoria, alone among the states with a commercial program, publishes no count of what permit holders actually kill. Volume 6 shows how that uncounted

majority now drives every breach of the quota and every late cut to it, and how a commercial program sold as a way to reduce ATCW killing has coincided with ATCW killing tripling.

BOTTOM LINE

Victoria's claim of sustainability rests on a chain: plan, survey, quota, kill, report. The same department and institute control every link, none has been independently reviewed, and the Government's own documents show each link breaking. The claim cannot be sustained on the evidence the Government itself has published.

4.1 How Volume 6 was built

Volume 6 was assembled in three stages over November 2026, each built from a batch of documents supplied for analysis and supplemented by web searches where a document in a series was missing or a current figure needed checking. Every finding is traceable to a named document; derived figures are marked as such.

Table 4.1. The evidence base for Volume 6

Part	Subject	Files supplied	New unique files	Pages	Charts, diagrams, maps	Register entries
1 The Paper Trail	Plans, politics, the Pet Food Trial, governance, joeys, money	18	18	28	8	20
2 Counting Kangaroos	Survey design, results, operations, ground surveys, methods	19	19	22	9	12
3 Quotas and the Kill	Quota reports, harvest and ATCW data, quarterly reports, 2019 plan	37	30	29	10	35
Total		74	67	79	27	67

Of the 74 files supplied, seven were exact duplicates, leaving 67 unique files. Several documents appear in more than one version: the 2017 survey design (June draft and August final), the 2017 survey report (three versions), the 2024-2028 plan (draft, published and Commonwealth-approved), the 2020 harvest report (scan and text) and the 2023 harvest report (original and April 2025 correction). Comparing versions produced some of the volume's most important findings, such as the rewritten purpose of the survey and the claims deleted from the approved export plan. At least 15 files were released under Freedom of Information, and three were image scans read by optical character recognition.

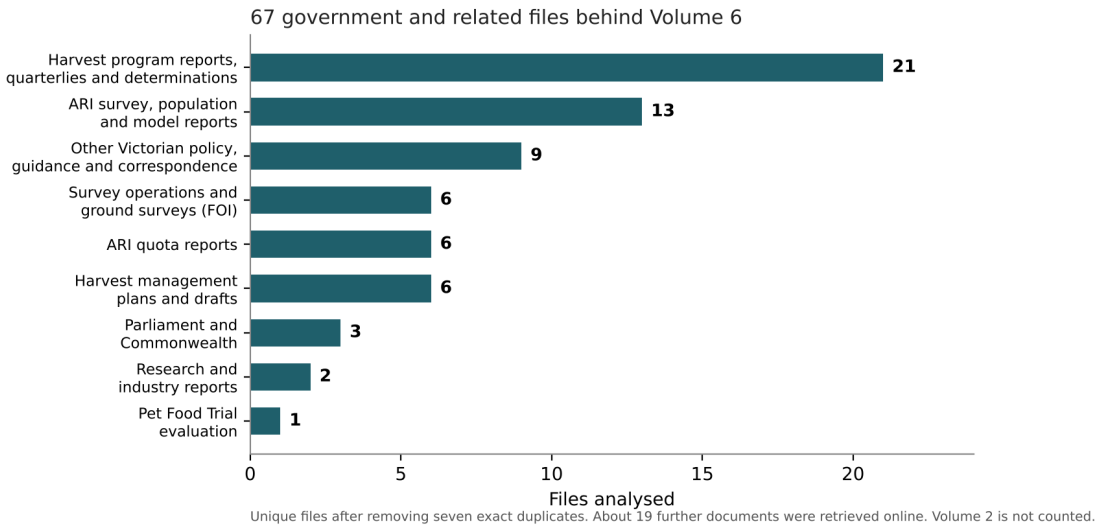


Figure 4.1. The 67 unique files by type.

About 19 further documents were retrieved online to fill gaps: ARI's 2024 and 2026 quota reports, the 2026 quota determination, DEECA's 2024 annual report, the Q4 2024 and Q3 2025 quarterly reports, the Commonwealth's trade declarations, a 2025 peer-reviewed paper by the ARI team, New South Wales quota data, news reports and Government media releases. Quarterly reports for Q2 to Q4 2023 could not be found.

The analysis also draws on the earlier volumes of The Kangaroo Report, Volumes 1 to 5, which Part 1 cross-referenced for contradictions, and Volume 2, which this Part uses for the national ATCW comparison. In total the three Parts record 67 contradictions or anomalies in their registers.

Method

- Text extraction from every file, with scans converted by optical character recognition.
- Line-by-line comparison of document versions to find what was added or deleted.
- Re-calculation of every total, percentage and ratio the documents report, and reconciliation between documents reporting the same figure.
- Time series built across years and zones, with changes of method, zone boundaries and definitions tracked.
- Checks against independent sources: New South Wales harvest data, peer-reviewed literature, Commonwealth records and news reports.
- Corrections where our own earlier work was wrong. Part 2 corrected the description of the 2,306,000 population figure used in Part 1 and in Volume 2 (section 4.6.5).

4.2 Part 1: The Paper Trail

Part 1 follows the policy record from the Parliament of Victoria's 2000 inquiry to the 2024-2028 plan approved by the Commonwealth for export.

- **The trade was built against Parliament's advice.** In 2000 the Environment and Natural Resources Committee declined to support a Kangaroo industry from Victoria's wild populations, warning of "excessive pressure to increase the cull".

- **The pilot failed its evaluation and was made permanent.** The Kangaroo Pet Food Trial raised ATCW approvals to 260 per cent of the long-term average, produced 62 possible illegal-take offences in one audit, and cost more than it returned. Commercial harvesting began within a year.
- **Safeguards were promised, postponed and removed.** Suspension thresholds were due by June 2020, postponed in the 2021-2023 plan and absent from the 2024-2028 plan. Public land went from "sanctuary zones" to available for control and, in principle, commercial shooting.
- **The export plan was edited to remove claims that had become false**, including that the ATCW share of the kill was falling.
- **A closed loop.** The same small ARI team designs the survey, estimates the population, builds the model and recommends the quota. The Government rejected the Wildlife Act Review's call for an independent regulator in 2025.
- **Joeys, welfare and money.** At least 118,221 dependent young were killed by commercial shooters to the end of 2025, outside every quota and total. The program costs taxpayers $1.2 to $1.8 million a year, and in 2025 a further $1.8 million in drought rebates paid for professional shooters working under ATCWs.

4.3 Part 2: Counting Kangaroos

Part 2 examines the five helicopter surveys (2017 to 2024) that every quota rests on.

- **The survey's purpose was rewritten.** The June 2017 draft design said the survey was to enable skin exports; the published version said it was to inform ATCW decisions.
- **The estimates are imprecise and method dependent.** Zone coefficients of variation ran from 32 to 67 per cent against a 20 per cent target. The same 2022 data give Western Grey estimates from 207,000 to 615,000 depending on the analysis.
- **A few transects and the city fringe drive the totals.** The Central zone, about 7 per cent of the surveyed land, supplied about 40 per cent of the Eastern Grey estimate. One North East transect held up to 48 per cent of that zone's count.
- **Where the transects are.** Ground crews searched habitat edges and still saw 0.3 to 0.8 Kangaroos per kilometre on farmland. About half the far north-west aerial transects appear to cross Murray-Sunset National Park.
- **The decline that disappeared.** Eastern Greys in the old Lower Wimmera zone, where commercial and ATCW killing is heaviest, fell 41 to 44 per cent between 2022 and 2024 by both of ARI's methods. The zone was then merged away and the statewide total called "very similar".
- **Counts and estimates diverge.** From 2020 to 2022 the count rate fell 5 per cent while the estimate rose 24 per cent; from 2022 to 2024 the count rate rose 58 per cent while the estimate fell 2 per cent.

4.4 Part 3: Quotas and the Kill

Part 3 follows the survey numbers through the quota reports to the harvest and ATCW records from October 2019 to the first quarter of 2026.

- **The 10 per cent rule was borrowed and never calibrated.** ARI said in 2019 that no Victorian model existed; the model built since needs eight to ten surveys to calibrate and has had five.
- **The higher option was taken.** In 2021 and 2022 the department adopted ARI's "alternative" quotas, which exceeded the limits in the Mallee and North East by 50 to 68 per cent.

- **ATCW tripled and became the majority.** Approved ATCW numbers rose from 56,942 in 2021 to 174,022 in 2025, when forecasts were 93 per cent too low. Total take rose from 119,176 to 250,385.
- **Fifteen zone breaches in six years.** In 2025 the Eastern Grey take exceeded 10 per cent in every zone, 15.3 per cent in the Grampians; Western Greys in Loddon Mallee reached 17.1 per cent, almost all under public-land ATCWs.
- **Withheld quotas did not stop shooting.** Carried-over tags allowed 22,354 Kangaroos to be shot after the Q4 2024 quota was withdrawn and 4,602 in Hume after its Q4 2025 release was "fully withheld".
- **Unreliable records.** A joey count understated eightfold, Western Greys recorded where none live, more young than females in one zone, and audit rates reported as 75 per cent when the quarterly figures were 1 to 40 per cent.
- **The male bias that makes the harvest "safe" is fading**, with females 39 per cent of the commercial kill in Q1 2026.

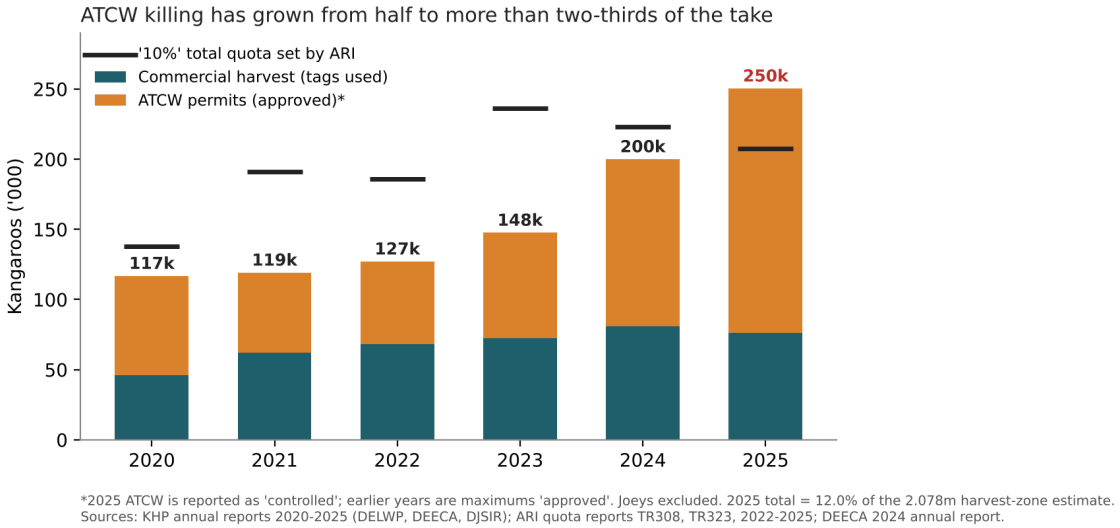


Figure 4.2. Commercial and ATCW take against the total quota, 2020-2025 (from Part 3).

4.5 How the three Parts fit together

The three Parts are not separate critiques. They follow one chain of reasoning that the Government uses to justify the harvest, and the failure at each link feeds the next.

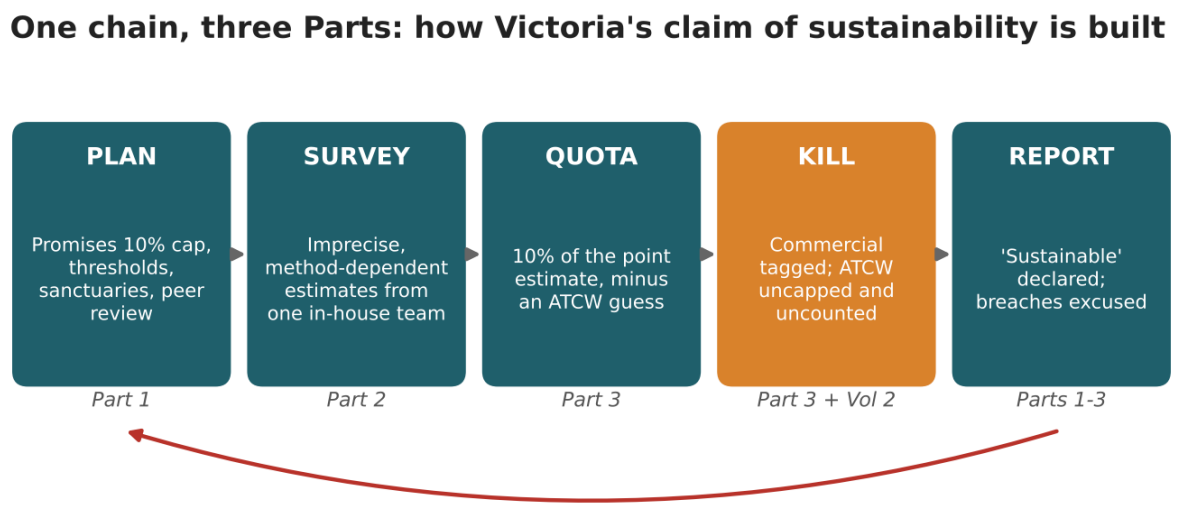


Figure 4.3. The chain from plan to report, and where each Part found it broken.

1. **The plan sets a rule it cannot enforce.** It caps the total at 10 per cent but expressly does not cap ATCW, so the rule binds only commercial shooters.
2. **The survey supplies a number too uncertain to apply the rule.** If the true population is 40 per cent above or below the estimate, well within the zone error ranges of 30 to 67 per cent, a quota of 10 per cent of the estimate is really about 6 to 17 per cent of the population.
3. **The quota is built on a forecast of the uncapped part.** When ATCW runs high, as it did in 2024 and 2025, the total breaches the limit and only the commercial quota can be cut, late and incompletely.
4. **The kill record counts only part of the dead.** ATCW permits report maxima, joeys are excluded, species and sex records are unreliable, and fire-related deaths are reported separately.
5. **The report closes the loop.** Breaches are measured against changing denominators, excused by the statewide average, or not calculated at all, and the next year's quota begins from the same estimate.

Because the same institutions control every link, an error at one link is not caught at the next. The 2019 plan's promise of external peer review was the one safeguard designed to break that loop, and Part 3 found no evidence it was ever delivered.

4.6 The ATCW intersection: Volume 2 and Volume 6

4.6.1 What Volume 2 established

Volume 2, The Commercial Exploitation of Kangaroos in Australia by State (October 2026), examined every jurisdiction. Its Victorian chapter and its addendum on Parks Victoria are the direct companions to this volume.

- **Two systems, two standards of counting.** Commercial kills are tagged and reported by zone, sex and species. ATCW kills are reported only as the maximum a permit allows; holders need not report what they kill.
- **The direction of policy.** Volume 2 found that Victorian policy since 2024 has moved killing out of the reported commercial system and onto ATCWs, including on public land, where nothing is counted. In February 2025 the Government said public land managers could opt into the commercial program under "a separate quota", with no such quotas published.
- **The Mallee parks.** Parks Victoria has shot Kangaroos in the Mallee parks since 1984, with targets of about 86,000 between 2004 and 2022. Red Kangaroos, now confined to the far north-west, made up 73 per cent of recent targets, yet only 6 to 14 per cent of Red Kangaroo targets were reached. The department told FOI applicants it could not separate public-land ATCWs from private-land ones which is not the case.
- **No evidence of damage.** In 2024 a senior official stated he was unaware of any national or state statistics on damage caused by Kangaroos, although damage is the legal basis for every ATCW.
- **National context.** Every jurisdiction authorises non-commercial killing. In 2025 New South Wales authorised 439,620 and recorded 187,220 killed; Queensland 375,236 and 47,120; South Australia 183,655 and 8,791. Victoria authorised 174,022 and recorded none.

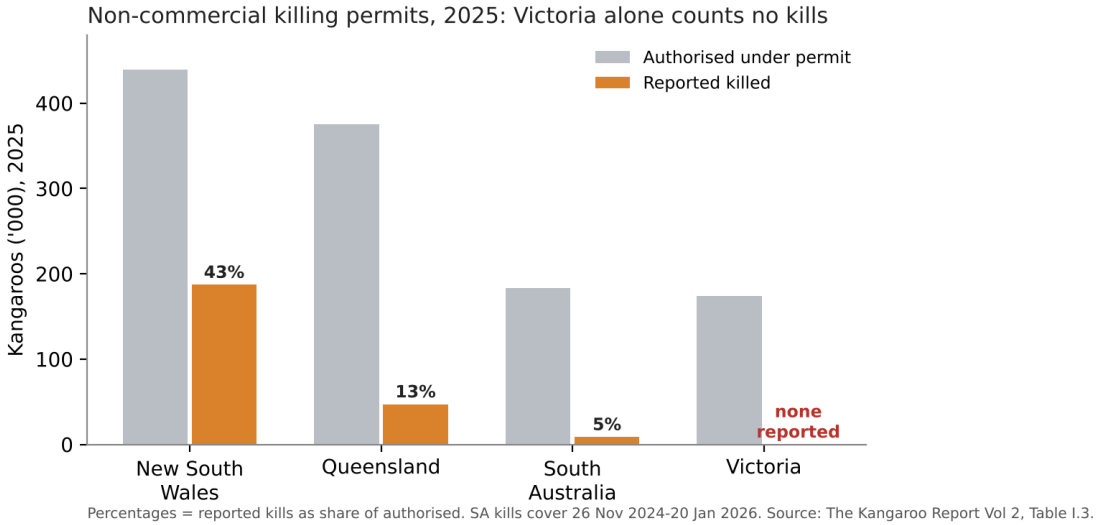


Figure 4.4. Non-commercial killing authorised and reported, 2025 (from Volume 2).

4.6.2 What Volume 6 adds

Volume 6 traces how the ATCW system and the commercial harvest became entangled, using the Government's own records.

Table 4.2. The ATCW thread through Volume 6

Finding	Evidence	Part
Commercialising ATCW inflated demand	Pet Food Trial: approvals 260% of long-term average; shooters completing applications for landholders	1, 3
No cap on ATCW, by design	2019 plan: "there are no plans to impose a quota on ATCW numbers"; 2024-28 plan: "no legal mechanism"	1, 3
The harvest was meant to replace ATCW; ATCW tripled instead	56,942 (2021) to 174,022 (2025); ATCW share from under half to 70%	3
ATCW drives every recent breach	2024: 3 zones over 10%; 2025: every Eastern Grey zone; Loddon Mallee Western Greys 17.1% from public-land ATCWs alone	3
The forecast the quota depends on fails	-52% to +93%; 2025 fitted to six data points; a third method for 2026 using a drought index	3
Government pays for ATCW shooting	$1.8 million drought rebates in 2025 for professional shooters, travel and ammunition, no tags required	1
Permits sped up in drought	June 2025 change to ATCW processing as ATCW reached a record	3
Assessment claimed rigorous	2023 and 2025 reports: all non-lethal measures exhausted; Pet Food Trial: very few applications refused	3
ATCW young, sex and kills unrecorded	No returns required; joeys of ATCW-shot females in no total	1, 3

4.6.3 Two readings of the ATCW numbers, one conclusion

Volume 2 stresses that ATCW figures are maxima, so the Government's "total take" and its breach of 10 per cent are not verified counts. Volume 6 takes the Government's figures at face value and finds the limit breached in every zone in 2025. These are two sides of the same problem.

- If permit holders kill close to the numbers authorised, the 10 per cent rule was broken across the state in 2025 and in several zones in most years since 2020.
- If they kill far fewer, nobody knows the total take, and the Government cannot show the harvest is sustainable. The commercial quota is still cut to make room for ATCW killing that may not happen, so the quota is not a measure of anything.

Either way, the claim that total killing is held within 10 per cent of the population cannot be supported. The only remedy is to count what ATCW holders kill.

4.6.4 Public land: from sanctuary to the biggest single breach

The two volumes meet most sharply in the Mallee. The 2019 plan promised public land would act as "sanctuary zones". Volume 2 documents four decades of park shooting, with Red Kangaroo targets that are rarely met. Volume 6 shows that in 2025 public-land ATCWs alone took 17.1 per cent of Loddon Mallee's Western Greys, a species ARI warned has "much more limited capacity for recovery" at its range edge. Conservation culling and commercial demand now compete for the same 10 per cent, and the Western Grey is losing on both counts.

4.6.5 Points to reconcile between Volume 2 and Volume 6

Read together, the two volumes agree on direction and on almost every figure. A few differences should be resolved before either is reissued.

Table 4.3. Figures to reconcile

Volume 2 states	Volume 6 finds	Suggested action
The 2,306,000 estimate was "modelled, not surveyed" and "rose by 228,000" without a survey (Ch. 1 and I.4)	2,306,000 is the 2024 survey total including about 228,000 in the exclusion zone; 2,078,000 is the harvest-zone figure that set the 2025 and 2026 quotas (Part 2, section 2.12)	Amend Volume 2 Chapter 1, the Introduction and its research questions
Western Greys were 2,711 of the Q1 2026 commercial kill (12.5%)	The Q1 2026 report shows 668 tags used on Western Grey-only quota (505 Grampians, 163 Barwon South West) and gives no species count	Check the source of 2,711 against the Q1 2026 report
Females were 39 to 50 per cent of recent commercial kills	DEECA: 35% in 2025; DJSIR Q1 2026: 39% overall, 46% for Barwon South West Eastern Greys	Cite the zone or source for the 50% upper figure
From 2026 unused tags are cancelled after three months	Part 3 found carried-over tags allowed shooting after quotas were withheld in 2024 and 2025	Note this as a partial response to the carry-over problem

4.7 What Volume 6 means

4.7.1 For Kangaroos

The Government's own records show the killing rising, the uncounted share rising, and the protective assumptions falling away. Total take more than doubled between 2021 and 2025. Every Eastern Grey zone exceeded 10 per cent in 2025, two zones and species exceeded the 15 per cent ARI's model treats as high risk, and the male bias the model depends on is weakening. The surveys cannot detect local decline in time, and in the Wimmera, they already missed one. The kill is pro-cyclical: drought increases damage claims, permits are approved faster, and the commercial quota is cut only after the limit is passed. The most exposed are the Western Grey at the edge of its range and the Red Kangaroo in the Mallee parks.

4.7.2 For biodiversity management in Victoria

- **A protected species managed by permission, not by count.** If the State cannot say how many Kangaroos it kills, it cannot claim to manage them, and the same ATCW system governs other native wildlife.
- **Science without independence.** A single team producing the plan's evidence, the estimate, the quota and the verdict is not a scientific check. The Wildlife Act Review's call for an independent regulator was rejected.
- **Conservation and commerce entangled.** Habitat-protection culls on public land, commercial harvest on farms and drought-driven permits all draw on one allowance, so each can be used to excuse the others.
- **Records that cannot be trusted.** An eightfold joey error, species recorded where they do not occur and tables copied between quarters undermine the reporting that the plans call the basis of accountability.

4.8 Consolidated recommendations

1. Count ATCW kills: require returns of numbers killed, sex and young for every permit, public and private land, and publish them by zone and species.

2. Make 10 per cent a binding limit for each zone and species that includes ATCW, with permits paused when it is reached.
3. Restore suspension thresholds and a drought trigger that reduces killing rather than speeding up permits.
4. Commission independent peer review of the survey, model and quota method, and establish the independent regulator recommended by the Wildlife Act Review.
5. Count dependent young and young at foot in the take and enforce or rewrite Condition 7.
6. Report trends on consistent zones and methods and publish the transect coordinates and raw counts.
7. Cancel carried-over tags whenever a quota release is withheld.
8. Remove the Red Kangaroo from ATCW authorisations, rule out commercial shooting on public land, and review the Western Grey's status in the Mallee (with Volume 2).
9. Publish one annual report covering all Kangaroo killing and correct the errors listed in the registers of Parts 1 to 3.

Priority Freedom of Information requests

- ATCW permits and any returns by LGA, species and land tenure, 2019-2025.
- Decision papers for adopting ARI's higher alternative quotas in 2021 and 2022, and for the 2024 mid-year population revision.
- The transect coordinates (FlyCoords2018.csv) and raw counts for all surveys.
- Any separate commercial quotas sought or issued to public land managers since February 2025.
- Any external peer review of ARI's survey, model or quota reports.

4.9 The record in numbers

Table 4.4. Key figures from Volume 6

Measure	Figure	Source
Unique government and related files analysed	67 (plus about 19 online)	Section 4.1
Contradictions and anomalies recorded	67 (20 + 12 + 35)	Registers, Parts 1-3
Grey Kangaroos killed or approved for killing, Oct 2019-Dec 2025	About 1.0 million (414,234 commercial; 583,095 ATCW approved)	Part 3
Dependent young killed by commercial shooters, Oct 2019-Dec 2025	118,221 (ATCW not recorded)	Part 1
Total take 2025	250,385; 12.4% of Eastern Greys in harvest zones	DEECA 2025
ATCW share of 2025 take	70%	Part 3
ATCW 2025 as share of forecast	193%	Part 3
Zone or species breaches of 10%, 2020-2025	15	Part 3
Central zone share of Eastern Grey estimate	About 40% from 7% of the land	Part 2
Lower Wimmera Eastern Grey change, 2022-2024	-41 to -44%	Part 2
Zone survey uncertainty (CV)	30-67%	Part 2

Measure	Figure	Source
Females in commercial kill, Q1 2026	39%	Part 3

Sources

1. Hylands, P. (2026). The Kangaroo Report, Volume 6, Part 1: The Paper Trail. Nature Knowledge Channel.
2. Hylands, P. (2026). The Kangaroo Report, Volume 6, Part 2: Counting Kangaroos. Nature Knowledge Channel.
3. Hylands, P. (2026). The Kangaroo Report, Volume 6, Part 3: Quotas and the Kill. Nature Knowledge Channel.
4. Hylands, P. (2026). The Kangaroo Report, Volume 2: The Commercial Exploitation of Kangaroos in Australia by State. Nature Knowledge Channel, October 2026.
5. Hylands, P. (2026). The Kangaroo Report, Volumes 1, 3, 4 and 5. Nature Knowledge Channel.
6. DEECA (2026). Kangaroo Harvesting Program Annual Report 2025. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0033/784842/Kangaroo-Harvesting-Program-2025-Annual-Report.pdf
7. DELWP (2019). Victorian Kangaroo Harvest Management Plan 2019. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0026/436067/VictorianKangarooHarvestManagementPlan2019.pdf
8. DELWP (2018). Kangaroo Pet Food Trial Evaluation Report. https://www.wildlife.vic.gov.au/__data/assets/pdf_file/0019/412723/KPFT-Evaluation-Report_Dec_2018a.pdf
9. DJSIR. Kangaroo Harvesting Program Report Q1 2026. https://djsir.vic.gov.au/__data/assets/pdf_file/0010/2488663/Kangaroo-Harvesting-Program-Report-Q1-2026.pdf
10. The full list of documents for each Part is given in that Part's Sources section.