Plausibility test of published kangaroo population estimates

Commercially exploited kangaroo species, mainland Australia, 1980–2026, with state-by-state analysis 2020–2026 and economic emissions intensity of the trade

October 2026

Data: Australian and state government population estimates, commercial quotas and actual take, as compiled in the supplied summary tables. Joey figures are modelled estimates. Tasmania is excluded throughout.

1. Key findings

If quotas had been fulfilled. If every quota from 2020 had been taken in full, with the same 50% of uncounted losses on top, the reconfigured mainland population would be about **5.8 million** in 2026. On that path South Australia reaches zero in 2026 and New South Wales falls below one million (0.87 million).

The long-run record (1982–2026) cannot be reconciled with the assumptions. Starting from the first mainland estimate (25.4 million in 1982), the take recorded in the 1980s and 1990s plus 50% uncounted losses exceeds what a 10% annual birth rate can replace. Under actual take the reconfigured population is exhausted by **1993**, and under fulfilled quotas by **1991**. To sustain the recorded take through 2026, the 1982 population would have needed to be at least 35.0 million. That is 38% more than was published.

Published year-on-year rises. 14 of the 44 year-on-year changes in the published mainland estimate are rises above 10% (1983, 1986, 1991, 1992, 1999, 2000, 2001, 2002, 2009, 2012, 2013, 2014, 2023, 2025). Under assumption 1 these can only be survey corrections or method changes, not breeding. The published figures would often need a growth rate of 20–60% a year once take and the uncounted losses are added back (Figure 4).

Take against quota. From 1980 to 2026 the mainland take was 103.9 million against quotas of 217.5 million (47.8%). Since 2013 it was 23.8%. On top of the take, an estimated **31.2 million joeys** (0.30 × take) and 20.8 million other non-take deaths (0.20 × take) are not in any official figure.

Emissions intensity. Paddock to processor gate, the trade emitted about 34,308 t CO_2-e (Scope 1) in 2026, or 42,771 t including upstream fuel (Scope 1+3). On A$25 per kangaroo that is **1.00 kg CO_2-e per dollar** (Scope 1) and 1.25 kg/$ (Scope 1+3). That is about 5.7 times the intensity of the economy as a whole (0.17 kg/$) and roughly level with agriculture (≈0.97 kg/$). Diesel for the chiller boxes is 93% of the total. Because that cost is fixed, intensity rises as the take falls: from a low of 0.38 kg/$ in 2002 to around 1.0 kg/$ today.

2. Plausibility test method

2.1 Assumptions

1. **Maximum reproduction rate: 10% per annum.** No year's population can grow by more than 10% through births. A larger published rise is only plausible as a survey correction or method change.
2. **Additional non-take mortality: +20% of actual take.** Vehicle strikes, drought, disease, predation and non-commercial (illegal or private) culling, modelled as 0.20 × actual take.
3. **Uncounted joey mortality: +30% of actual take.** Pouch young and young-at-foot of shot females, modelled as 0.30 × actual take. Not in any take or quota figure.

2.2 The reconfigured population

Each year the highest population the assumptions allow is:

$$\textbf{Maximum plausible}_t = N_{t-1} \times 1.10 - 1.5 \times \textbf{Take}_{t-1}$$

N_{t-1} is last year's reconfigured population. The 1.5 is the take plus 0.20 plus 0.30. The reconfigured population is then the lower of the published estimate and the maximum plausible:

$$N_t = \min(\textbf{Published}_t, \textbf{Maximum plausible}_t)$$

Falls in a published estimate are always accepted, because a survey can always find fewer animals. Rises are capped at what breeding could deliver. Each year's cap builds on the reconfigured figure, not the published one, so an implausible rise cannot become the base for later years. The population cannot go below zero.

Two series. The *actual take* series uses recorded take, which is the basis of the assessment. The *quotas fulfilled* series replaces take with the full commercial quota, with the 20% and 30% add-ons scaled to the quota. It shows what would have happened if every quota had been taken.

Other measures. The *implied growth rate* is the birth rate the published figures would need: $(\text{Published}_t + 1.5 \times \text{Take}_{t-1}) \div \text{Published}_{t-1} - 1$. The *theoretical ceiling* grows the base year at 10% with the losses taken off, ignoring every survey decline, so it is an upper bound. The *break-even population* is the population at which 10% growth just replaces the year's losses: 15 × take. For 2026 that is **20.5 million**.

Base years. The mainland test starts at 1982, the first year with a mainland estimate. Quota and take for 1980–1981 are reported and totalled, and drive the emissions series, but cannot drive the population model. The state test, and the 2026 estimate, start at 2020, the first year of the state tables. In each case the published estimate is the population at the start of the year, and the take is during it.

3. Mainland Australia, 1980–2026

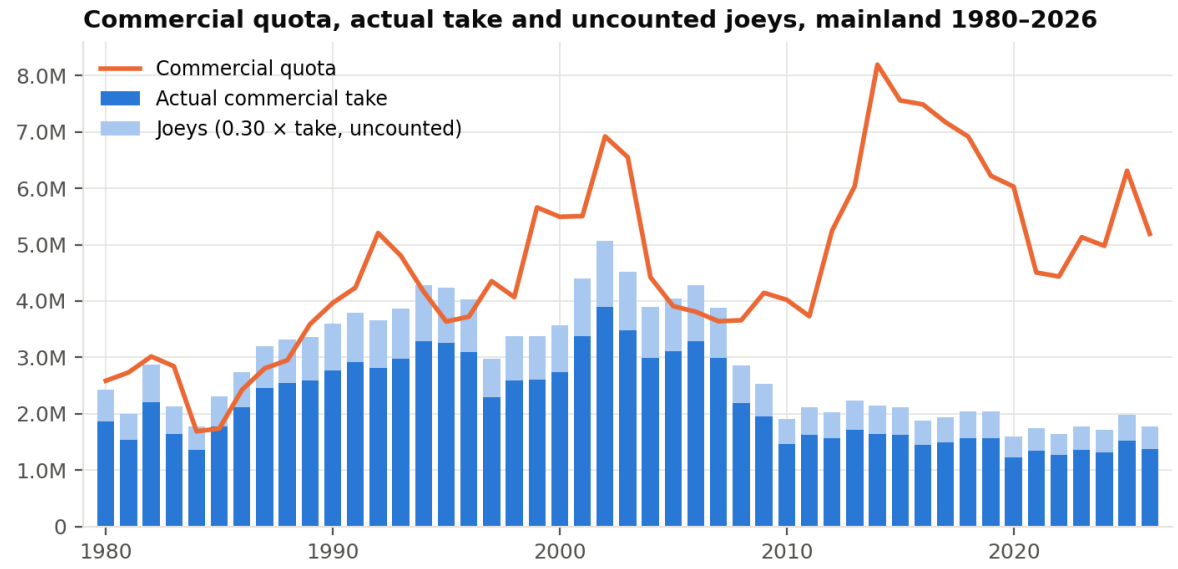


Figure 1. Commercial quota, actual take and uncounted joeys (0.30 × take), mainland, 1980–2026.

Take peaked at 3.9 million in 2002 and has been between 1.2 and 1.6 million a year since 2010. Quotas have moved away from the take since 2012, peaking at 8.2 million in 2014, while take has stayed flat even though significant extensions in shooting zones have occurred in the period. Only 23.8% of quota has been used since 2013.

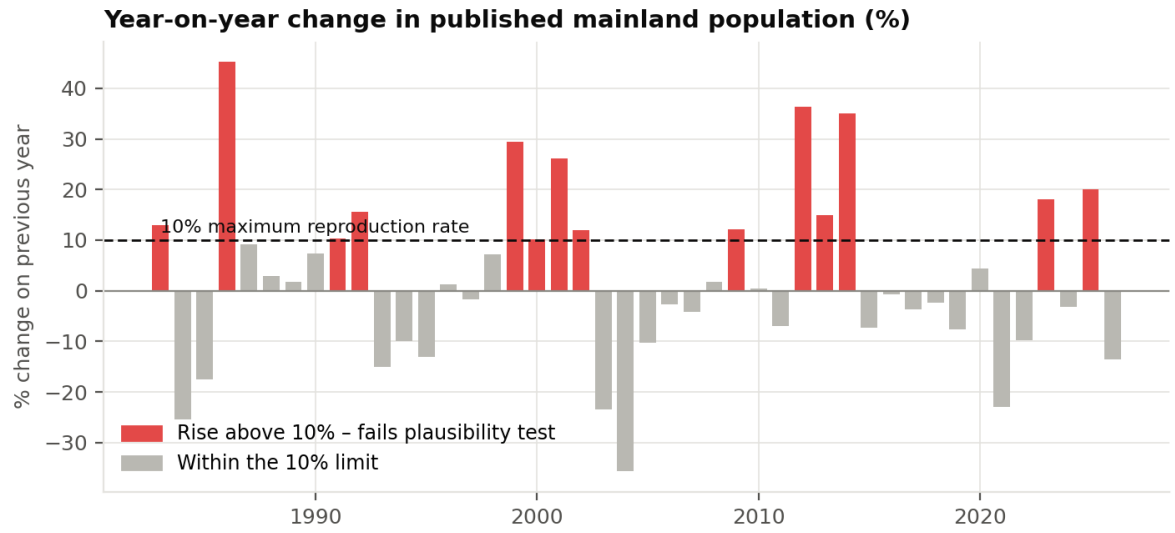


Figure 2. Year-on-year change in the published mainland population. Red bars are rises above the 10% maximum reproduction rate.

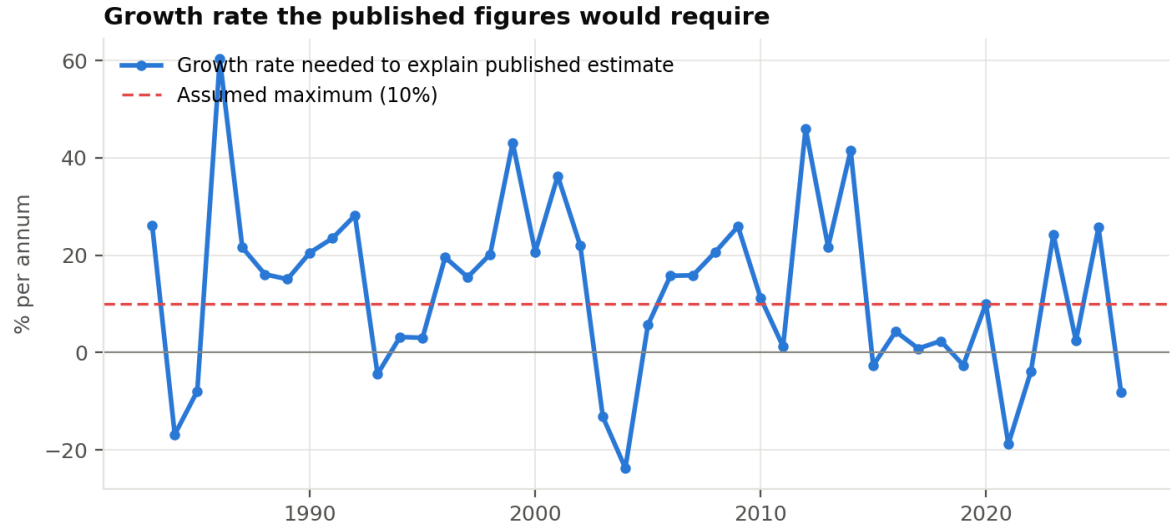


Figure 3. Growth rate the published estimates would need, once actual take and the 50% uncounted losses are added back.

Some of the largest rises (1986 +45%, 1999 +29%, 2001 +26%, 2012 +36%, 2014 +35%) coincide with periods when survey areas, species or methods are known to have changed. Assumption 1 allows a rise from that cause. They are still not population growth, and if accepted at face value they set the base for quotas in the years that follow.

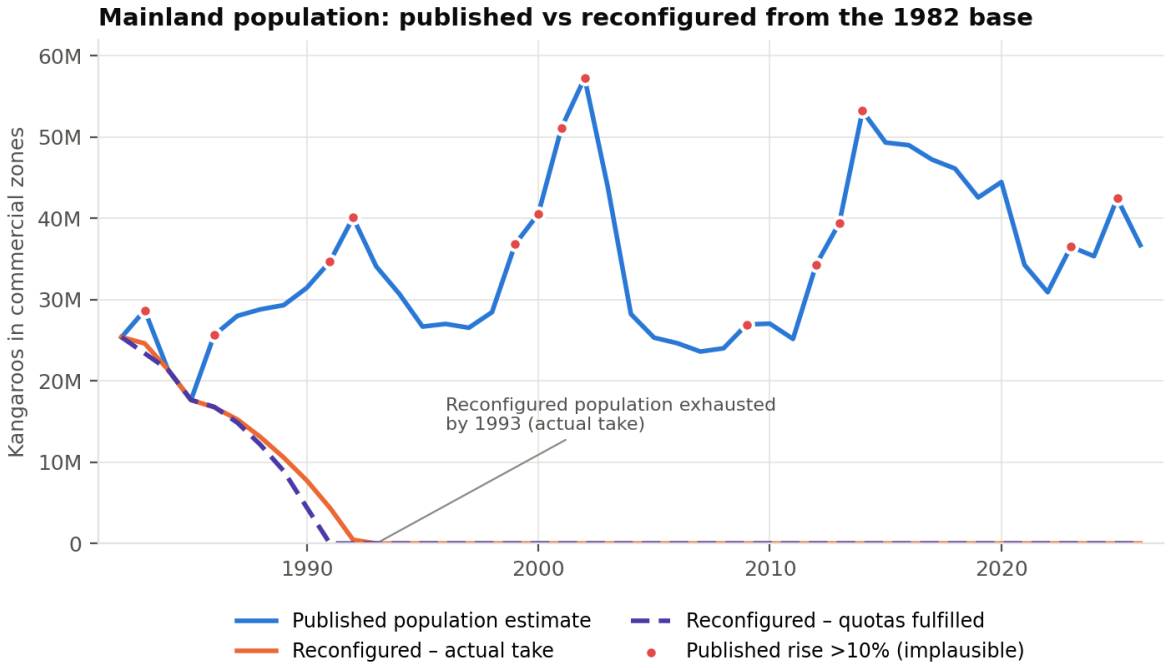


Figure 4. Published mainland population and the reconfigured population from the 1982 base, under actual take and fulfilled quotas.

Starting from 25.4 million in 1982, the takes of the 1980s (1.4–2.6 million a year) mean losses of 2.0–3.9 million a year once the 50% is added. Growth of at most 10% replaces only 1.7–2.5 million. The reconfigured population falls every year and is exhausted by **1993** under actual take (1991 under fulfilled quotas). With no caps at all, the theoretical projection is exhausted by 1997. For the recorded take to be supported through 2026, the 1982 population would have needed to be at least 35.0 million (52.6 million if quotas had been taken in full).

Interpretation. Kangaroos were obviously not wiped out by 1993, so at least one part of the long-run record fails the test. Either the early survey estimates were well below the real population, or the losses were smaller than assumed, or the population grew faster than 10% in good seasons. On the last point, the ecological literature reports maximum rates of increase above 10% for some species in favourable years. The test does not decide which explanation is right. It shows the published series and the recorded take cannot all hold together under the stated assumptions. This is why the 2026 estimate below rests on the shorter, internally consistent 2020–2026 state data, not on a 44-year chain.

Table 1. Mainland reconfigured population, 1982 base (actual take and fulfilled quotas), first decade

Year	Published	Change %	Max plausible	Reconfigured – actual take	Reconfigured – quotas fulfilled
1982	25,377,006	–	–	25,377,006	25,377,006
1983	28,682,674	13.0	24,604,139	24,604,139	23,390,707
1984	21,394,731	-25.4	29,097,249	21,394,731	21,394,731
1985	17,652,271	-17.5	21,490,990	17,652,271	17,652,271
1986	25,634,603	45.2	16,751,625	16,751,625	16,813,498
1987	27,994,194	9.2	25,030,159	15,258,883	14,859,448
1988	28,802,067	2.9	27,102,868	13,094,026	12,138,793
1989	29,309,811	1.8	27,853,752	10,574,906	8,927,972
1990	31,445,570	7.3	28,362,808	7,754,413	4,435,919
1991	34,678,979	10.3	30,445,252	4,384,979	0
1992	40,078,649	15.6	33,777,642	454,242	0
1993	34,072,416	-15.0	39,861,540	0	0
1994	30,692,613	-9.9	33,015,361	0	0

From 1993 both reconfigured series are zero. The full series is in Appendix B.

4. States and mainland, 2020–2026

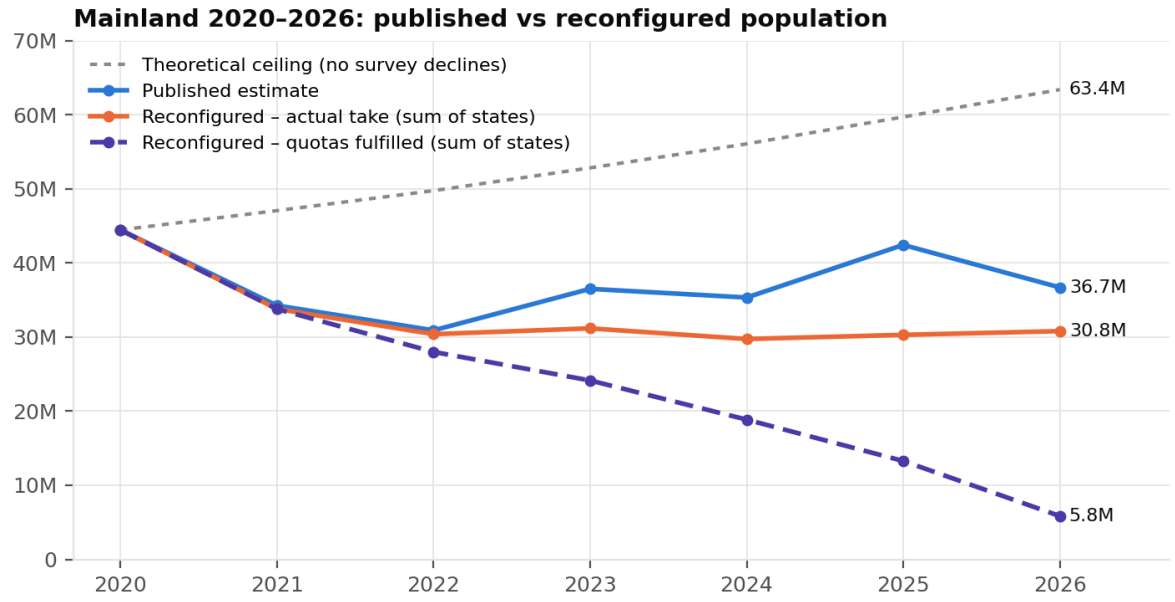


Figure 5. Mainland 2020–2026: published estimate, reconfigured population (sum of states) under actual take and fulfilled quotas, and the theoretical ceiling.

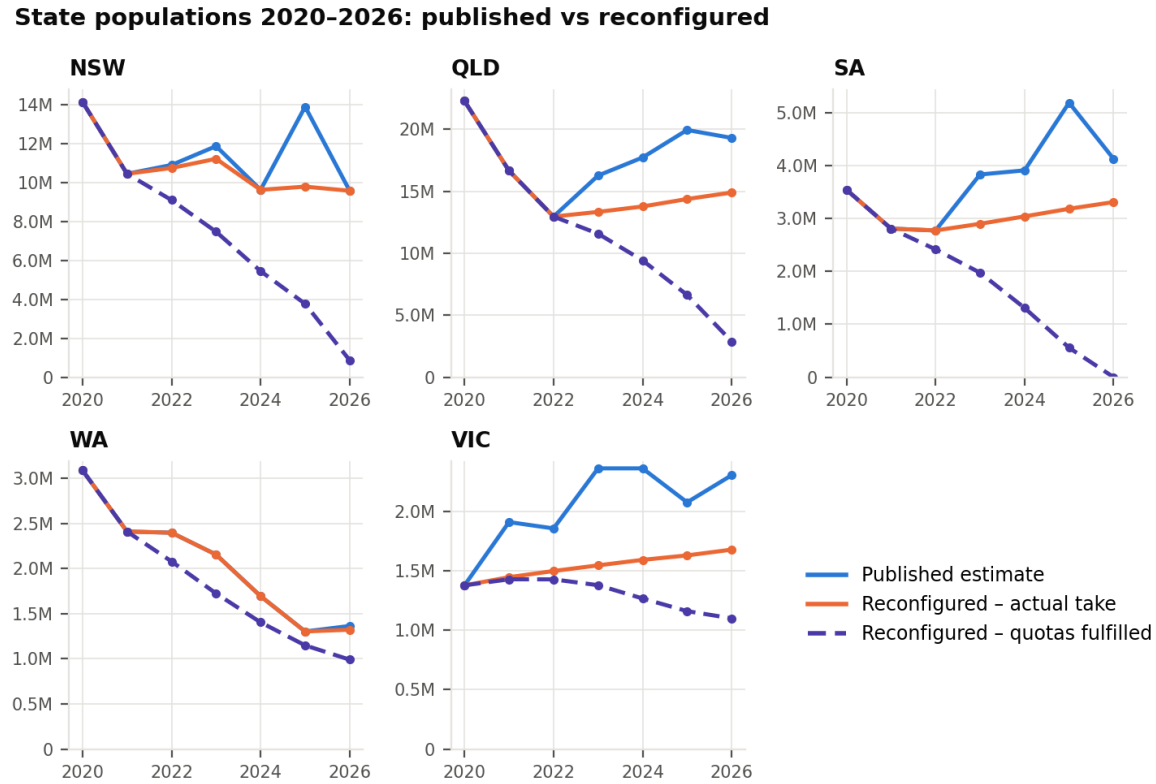


Figure 6. Published and reconfigured populations by state, 2020–2026.

Table 2. 2026 population by state: published, reconfigured and theoretical ceiling

State	Published 2026	Reconfigured – actual take	Difference %	Reconfigured – quotas fulfilled	Theoretical ceiling	Break-even population
NSW	9,586,809	9,586,809	0.0	868,986	19,298,226	8,205,000
QLD	19,308,148	14,899,058	-22.8	2,885,640	32,845,683	8,520,000
SA	4,129,219	3,312,265	-19.8	0	5,078,149	1,545,000
WA	1,364,695	1,323,499	-3.0	991,208	4,487,080	1,170,000

State	Published 2026	Reconfigured – actual take	Difference %	Reconfigured – quotas fulfilled	Theoretical ceiling	Break-even population
VIC	2,306,000	1,679,433	-27.2	1,101,156	1,679,433	1,095,000
Mainland (sum of states)	**36,694,871**	**30,801,063**	**-16.1**	**5,846,991**	**63,388,570**	**20,535,000**
Mainland (aggregate test)	36,694,871	35,791,663	-2.5	9,394,881	63,388,570	20,535,000

Theoretical ceiling: the 2020 estimate grown at 10% a year less 1.5 × take, with no survey declines. Break-even: 15 × 2026 take.

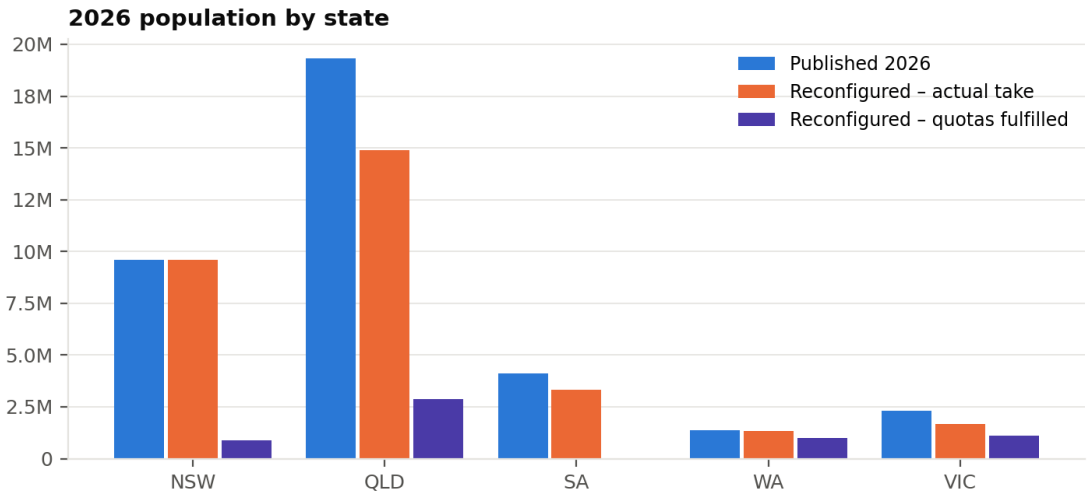


Figure 7. 2026 population by state.

5.1 State results

- **Queensland.** Published estimates rose from 13.0 million in 2022 to 19.3 million in 2026, a gain of 49% while 2.9 million were taken. The cap allows 14.9 million, so 4.4 million of the published figure fails the test. Queensland is the largest single source of the mainland gap.
- **New South Wales.** The 2025 jump to 13.9 million (+44%) is implausible. The 2026 published figure (9.6 million) is within the cap. Under fulfilled quotas NSW would have fallen to 0.87 million.
- **South Australia.** The rises in 2023 (+38%) and 2025 (+33%) fail the test. Reconfigured 2026 is 3.3 million against 4.1 million published. Under fulfilled quotas the population reaches zero in 2026. SA's figures include Kangaroo Island Tammar wallaby (≈385,000 in the 2025 quota report), which has had no commercial take.
- **Western Australia.** Published estimates fell 58% between 2020 and 2025, which is plausible as a decline. The 2026 rise to 1.4 million is close to the cap (1.3 million).
- **Victoria.** Victoria takes the largest share of its quota (43–80%). Its 2021 (+39%) and 2023 (+27%) rises fail the test. Reconfigured 2026 is 1.7 million against 2.3 million published (−27%), the largest proportional gap of any state.

6. Greenhouse gas emissions

6.1 Economic emissions intensity

Economic emissions intensity (EEI) is the greenhouse gas emitted per unit of economic output:

EEI (kg CO_2-e per $) = Total emissions (kg CO_2-e) ÷ Output value ($, CVM)

For the kangaroo trade, output each year is the actual commercial take × A$25, the assumed chain volume measure (constant-price) value of a kangaroo delivered to the processor. Joeys are excluded from output and emissions.

6.2 Why chain volume measures

Chain volume measures remove the effect of price change, so movements over time reflect real volume only. The ABS publishes national accounts CVMs with 2023–24 as the reference year. In the reference year CVM values equal current-price values. A$25 per kangaroo is therefore a 2023–24 price held constant for every year from 1980 to 2026, and the comparator industries are measured in 2023–24 values. Because the price is constant, all year-to-year change in intensity comes from physical activity (the size of the take relative to fixed overheads), not from inflation.

6.3 Boundary and activity data

The boundary is “paddock to processor gate”, where the A$25 value is struck. Included activities, as specified in the brief:

Table 3. Activity data and fuel assumptions

Activity	Brief specification	Fuel-use assumption	Annual fuel (2026)
Shooter vehicles	100 km return trip per load of 25 kangaroos; Toyota HiLux / Isuzu D-MAX single-cab diesel ute	10 L/100 km (real-world, loaded, off-road; ADR combined ≈ 8.0–8.4)	547,600 L diesel
Chiller boxes	900 shipping-container chillers, 24 h a day on diesel	1.5 L/h per unit (reefer diesel genset at chilled set-point)	11,826,000 L diesel
Compliance checks	20,000 km a year, same vehicle type	10 L/100 km	2,000 L diesel
Population surveys – fixed wing	1,000 flying hours, Cessna 206	55 L/h aviation gasoline	55,000 L avgas
Population surveys – helicopter	1,000 flying hours, medium helicopter	250 L/h aviation turbine fuel	250,000 L avtur

Chillers, compliance and surveys are fixed overheads, held constant for every year from 1980 to 2026 as the brief specifies. Shooter-vehicle fuel scales with take.

Excluded: joeys, processing, cold-chain transport after the processor gate, refrigerant (HFC) leakage from chillers, vehicle and equipment manufacture, and firearms and ammunition.

6.4 Emission factors

The primary measure counts direct combustion emissions (Scope 1), the same basis the national inventory uses for the comparator industries. The secondary measure adds the upstream emissions (Scope 3) of extracting, refining and delivering the fuels. Factors are from the Australian National Greenhouse Accounts (NGA) Factors 2025.

Table 4. Emission factors used (NGA Factors 2025)

Fuel	Energy content (GJ/kL)	Scope 1 (kg CO_2-e/GJ)	Scope 1 (kg CO_2-e/L)	Scope 3 (kg CO_2-e/GJ)	Scope 3 (kg CO_2-e/L)
Diesel – transport (utes)	38.6	70.41	2.718	17.3	0.668
Diesel – stationary (chillers)	38.6	70.20	2.710	17.3	0.668
Aviation gasoline	33.1	67.66	2.240	18.0	0.596
Aviation turbine fuel	36.8	70.21	2.584	18.0	0.662

6.5 Results

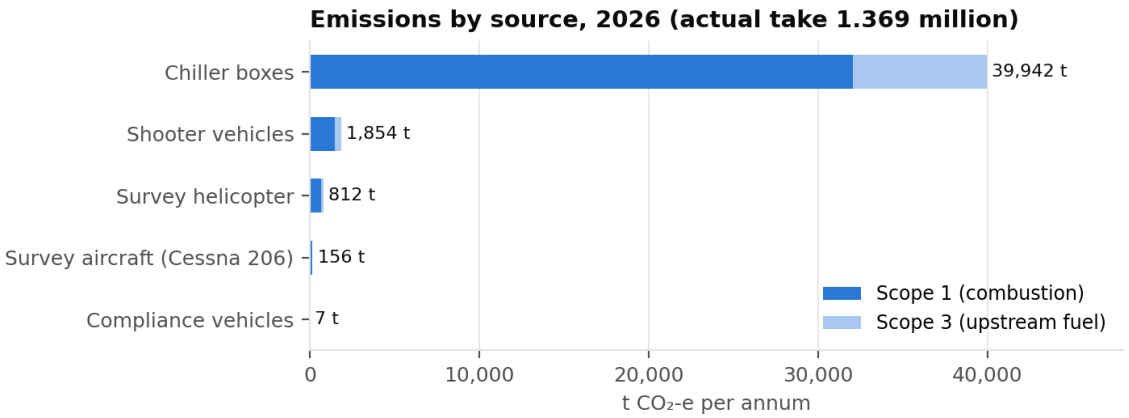


Figure 8. Emissions by source in 2026, Scope 1 and upstream Scope 3.

Table 5. Emissions inventory, 2026 (actual take 1,369,000; output A$34.2 million)

Source	Fuel (litres)	Scope 1 (t CO_2-e)	Scope 3 (t CO_2-e)	Scope 1+3 (t CO_2-e)	Share of Scope 1
Shooter vehicles	547,600	1,488	366	1,854	4.3%
Chiller boxes	11,826,000	32,045	7,897	39,942	93.4%
Compliance vehicles	2,000	5	1	7	0.0%
Survey aircraft (Cessna 206)	55,000	123	33	156	0.4%
Survey helicopter	250,000	646	166	812	1.9%
Total		**34,308**	**8,463**	**42,771**	**100.0%**

EEI 2026 = 34,307,973 kg ÷ A$34,225,000 =

1.00 kg CO_2-e per $ (Scope 1); 1.25 kg CO_2-e per $ (Scope 1+3). That is 25.1 kg CO_2-e per kangaroo delivered (31.2 kg including Scope 3).

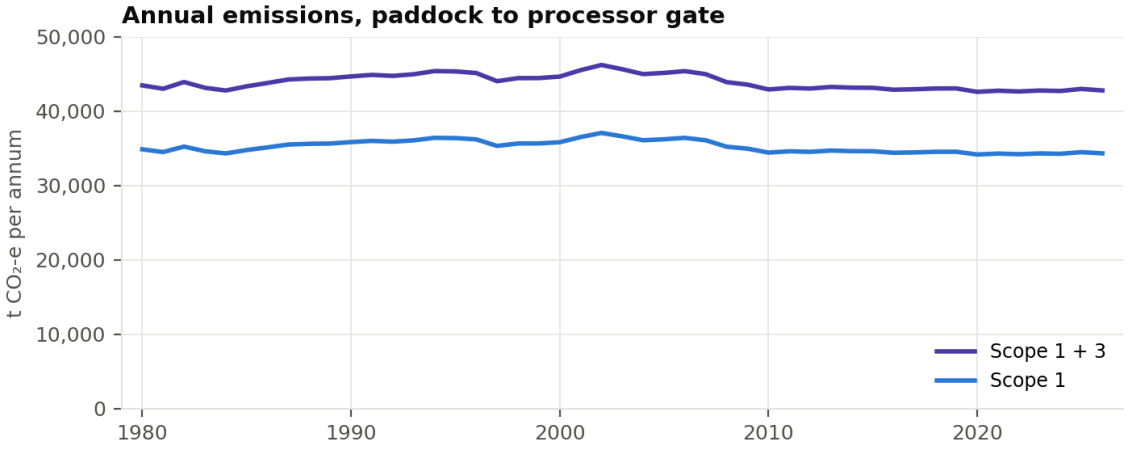


Figure 9. Annual emissions of the trade, 1980–2026.

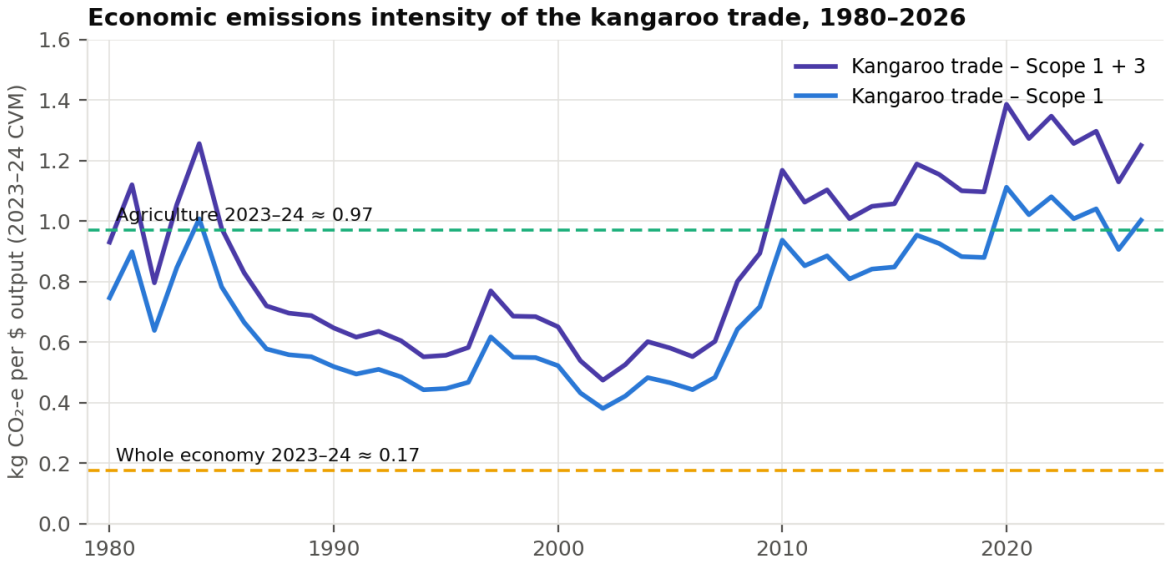


Figure 10. Economic emissions intensity 1980–2026, with 2023–24 comparators.

Total emissions barely move (≈34,000–37,000 t Scope 1), because the fixed chiller fleet dominates. Intensity is therefore driven by the take. It fell to 0.38 kg/$ at the 2002 peak take of 3.9 million, and has risen to around 1.0 kg/$ as take has fallen to 1.2–1.5 million. Every dollar of kangaroo output now carries roughly twice the emissions it did in the early 2000s. Cumulative emissions 1980–2026 are about 1,655 thousand t Scope 1 (2,064 thousand t Scope 1+3).

Table 6. Comparator industries, 2023–24 (reference-year CVM)

Comparator	EEI (kg CO_2-e per $)	Basis
Whole Australian economy	0.17	NIR 2024 net emissions 466.4 Mt; GDP 2023-24 approx. A$2.67 trillion (ABS, reference year CVM = current prices)
Agriculture (farm-gate)	0.97	Agriculture sector approx. 80 Mt (national inventory, 2023-24, indicative); ABARES GVP 2023-24 A$82.5 billion
Kangaroo trade 2023-24 (Scope 1, this study)	1.02	Average of 2023 and 2024 calendar years
Kangaroo trade 2023-24 (Scope 1+3, this study)	1.28	Average of 2023 and 2024 calendar years

Comparator figures are indicative and were not re-verified against the inventory data tables, because the Australian Government site could not be reached while preparing this report. Agriculture's ≈80 Mt includes enteric methane and other non-combustion sources, so it is broader than the kangaroo boundary. The whole-economy figure divides net national emissions by GDP. Please confirm both against the National Inventory by Economic Sector 2023–24 before publishing.

Table 7. Sensitivity of 2026 intensity to the key fuel assumptions

Case	Scope 1 (t CO_2-e)	EEI Scope 1 (kg/$)	EEI Scope 1+3 (kg/$)
Central case	34,308	1.00	1.25
Chiller fuel 1.0 L/h	23,626	0.69	0.86
Chiller fuel 2.5 L/h	55,671	1.63	2.03
Ute 8.4 L/100 km (ADR combined)	34,069	1.00	1.24
Ute 13 L/100 km (heavy off-road)	34,756	1.02	1.27
Helicopter 180 L/h (light-medium)	34,127	1.00	1.24
Helicopter 400 L/h (medium twin)	34,696	1.01	1.26

The result depends mostly on the chiller assumption. Between 1.0 and 2.5 L/h per chiller, 2026 intensity ranges from 0.69 to 1.63 kg/$. The vehicle and aircraft assumptions move it by less than ±2%.

6.6 State emissions

Shooter-vehicle emissions follow each state's take. Chillers and compliance driving are fixed infrastructure, shared out by each state's average share of take over 2020–2026 (NSW 38.2%, QLD 42.7%, SA 7.8%, WA 6.2%, VIC 5.1%). Survey flying is shared by each year's population-estimate

share. State figures add to the mainland total each year. State intensity rises when a state's take falls below its usual share, as in NSW 2022 and WA 2025.

Table 8. Emissions and intensity by state, 2020–2026

State / year	Actual take	Output A$ (CVM)	Scope 1 t CO_2-e	Scope 1+3 t CO_2-e	EEI S1 kg/$	EEI S1+3 kg/$
NSW 2020	469,186	11,729,650	12,992	16,196	1.11	1.38
NSW 2021	497,285	12,432,125	13,012	16,222	1.05	1.30
NSW 2022	402,719	10,067,975	12,946	16,140	1.29	1.60
NSW 2023	509,671	12,741,775	13,041	16,258	1.02	1.28
NSW 2024	532,415	13,310,375	13,026	16,238	0.98	1.22
NSW 2025	634,087	15,852,175	13,178	16,429	0.83	1.04
NSW 2026	547,000 †	13,675,000	13,033	16,246	0.95	1.19
QLD 2020	514,144	12,853,600	14,638	18,250	1.14	1.42
QLD 2021	601,164	15,029,100	14,721	18,353	0.98	1.22
QLD 2022	612,233	15,305,825	14,682	18,303	0.96	1.20
QLD 2023	597,750	14,943,750	14,686	18,309	0.98	1.23
QLD 2024	516,847	12,921,175	14,641	18,254	1.13	1.41
QLD 2025	609,842	15,246,050	14,718	18,349	0.97	1.20
QLD 2026	568,000 †	14,200,000	14,716	18,347	1.04	1.29
SA 2020	98,962	2,474,050	2,672	3,331	1.08	1.35
SA 2021	97,389	2,434,725	2,672	3,331	1.10	1.37
SA 2022	100,896	2,522,400	2,682	3,343	1.06	1.33
SA 2023	100,088	2,502,200	2,692	3,357	1.08	1.34
SA 2024	106,503	2,662,575	2,704	3,371	1.02	1.27
SA 2025	127,903	3,197,575	2,736	3,411	0.86	1.07
SA 2026	103,000 †	2,575,000	2,701	3,368	1.05	1.31
WA 2020	100,893	2,522,325	2,149	2,679	0.85	1.06
WA 2021	85,613	2,140,325	2,133	2,659	1.00	1.24
WA 2022	82,214	2,055,350	2,135	2,662	1.04	1.29
WA 2023	81,938	2,048,450	2,120	2,643	1.04	1.29
WA 2024	80,306	2,007,650	2,110	2,630	1.05	1.31
WA 2025	74,000 †	1,850,000	2,090	2,605	1.13	1.41
WA 2026	78,000 †	1,950,000	2,099	2,617	1.08	1.34
VIC 2020	46,064	1,151,600	1,705	2,126	1.48	1.85
VIC 2021	61,732	1,543,300	1,741	2,171	1.13	1.41
VIC 2022	68,346	1,708,650	1,752	2,184	1.03	1.28
VIC 2023	72,232	1,805,800	1,760	2,194	0.97	1.21
VIC 2024	81,160	2,029,000	1,771	2,208	0.87	1.09
VIC 2025	76,353	1,908,825	1,752	2,184	0.92	1.14
VIC 2026	73,000 †	1,825,000	1,759	2,193	0.96	1.20

7. Limitations

- The three assumptions are those set in the brief. A 10% cap is reliable: while governments claim that in good seasons some species can increase faster. Read the reconfigured population as what the assumptions allow, not as a census.
- Applying 1.5 × take every year assumes the 20% and 30% losses happen in every year and every state. In practice drought mortality varies a lot from year to year.
- Harvest zones, survey areas and the species covered have changed over time (for example, Tammar wallaby in SA, and Victoria from 2019). Some published jumps are partly changes in coverage. Under assumption 1 those are corrections, not growth.
- Takes for 2026 and some 2025 figures are estimates (marked †), and the WA 2026 population and quota are provisional.
- Emissions use the activity levels set in the brief and are held constant from 1980. The chiller fuel rate is the main uncertainty (Table 8).

Appendix A. State summary table 2020–2026 with added columns

Corrected figures with totals added. Joeys (0.30 × take) are kept separate from the official take and are not in any government figure. Populations are not added across years, because they are stock figures rather than flows. † = estimate.

State	Year	Population estimate	Quota	Actual take	Take % of quota	Joeys (0.30 × take)	Other non-take deaths (0.20 × take)	Scope 1 t CO_2-e	Scope 1+3 t CO_2-e	EEI S1 kg/$	EEI S1+3 kg/$
NSW	2020	14,158,405	2,126,176	469,186	22.1	140,756	93,837	12,992	16,196	1.11	1.38
NSW	2021	10,459,983	1,598,761	497,285	31.1	149,186	99,457	13,012	16,222	1.05	1.30
NSW	2022	10,913,343	1,692,207	402,719	23.8	120,816	80,544	12,946	16,140	1.29	1.60
NSW	2023	11,882,215	1,850,228	509,671	27.5	152,901	101,934	13,041	16,258	1.02	1.28
NSW	2024	9,634,900	1,484,072	532,415	35.9	159,725	106,483	13,026	16,238	0.98	1.22
NSW	2025	13,910,688	2,186,952	634,087	29.0	190,226	126,817	13,178	16,429	0.83	1.04
NSW	2026	9,586,809	1,453,025	547,000 †	37.6	164,100	109,400	13,033	16,246	0.95	1.19
NSW	**Total 2020–26**	**n/a**	**12,391,421**	**3,592,363**	**29.0**	**1,077,709**	**718,473**	**91,229**	**113,728**	**1.02**	**1.27**
QLD	2020	22,287,000	2,825,150	514,144	18.2	154,243	102,829	14,638	18,250	1.14	1.42
QLD	2021	16,663,850	1,981,150	601,164	30.3	180,349	120,233	14,721	18,353	0.98	1.22
QLD	2022	12,959,400	1,783,850	612,233	34.3	183,670	122,447	14,682	18,303	0.96	1.20
QLD	2023	16,267,200	2,210,400	597,750	27.0	179,325	119,550	14,686	18,309	0.98	1.23
QLD	2024	17,727,700	2,486,400	516,847	20.8	155,054	103,369	14,641	18,254	1.13	1.41
QLD	2025	19,948,800	2,941,550	609,842	20.7	182,953	121,968	14,718	18,349	0.97	1.20
QLD	2026	19,308,148	2,850,900	568,000 †	19.9	170,400	113,600	14,716	18,347	1.04	1.29
QLD	**Total 2020–26**	**n/a**	**17,079,400**	**4,019,980**	**23.5**	**1,205,994**	**803,996**	**102,803**	**128,164**	**1.02**	**1.28**
SA	2020	3,545,902	532,400	98,962	18.6	29,689	19,792	2,672	3,331	1.08	1.35
SA	2021	2,810,547	449,200	97,389	21.7	29,217	19,478	2,672	3,331	1.10	1.37
SA	2022	2,775,048	455,800	100,896	22.1	30,269	20,179	2,682	3,343	1.06	1.33
SA	2023	3,833,889	576,300	100,088	17.4	30,026	20,018	2,692	3,357	1.08	1.34
SA	2024	3,912,711	589,200	106,503	18.1	31,951	21,301	2,704	3,371	1.02	1.27
SA	2025	5,192,277	883,500	127,903	14.5	38,371	25,581	2,736	3,411	0.86	1.07
SA	2026	4,129,219	600,400	103,000 †	17.2	30,900	20,600	2,701	3,368	1.05	1.31
SA	**Total 2020–26**	**n/a**	**4,086,800**	**734,741**	**18.0**	**220,422**	**146,948**	**18,859**	**23,512**	**1.03**	**1.28**
WA	2020	3,090,605	489,130	100,893	20.6	30,268	20,179	2,149	2,679	0.85	1.06
WA	2021	2,412,050	381,880	85,613	22.4	25,684	17,123	2,133	2,659	1.00	1.24
WA	2022	2,399,190	375,410	82,214	21.9	24,664	16,443	2,135	2,662	1.04	1.29
WA	2023	2,156,550	328,470	81,938	24.9	24,581	16,388	2,120	2,643	1.04	1.29
WA	2024	1,695,390	263,935	80,306	30.4	24,092	16,061	2,110	2,630	1.05	1.31
WA	2025	1,304,090	182,390	74,000 †	40.6	22,200	14,800	2,090	2,605	1.13	1.41
WA	2026	1,364,695	191,880	78,000 †	40.7	23,400	15,600	2,099	2,617	1.08	1.34

State	Year	Population estimate	Quota	Actual take	Take % of quota	Joeys (0.30 × take)	Other non-take deaths (0.20 × take)	Scope 1 t CO_2-e	Scope 1+3 t CO_2-e	EEI S1 kg/$	EEI S1+3 kg/$
WA	**Total 2020–26**	**n/a**	**2,213,095**	**582,964**	**26.3**	**174,889**	**116,593**	**14,836**	**18,496**	**1.02**	**1.27**
VIC	2020	1,378,605	57,900	46,064	79.6	13,819	9,213	1,705	2,126	1.48	1.85
VIC	2021	1,911,550	95,680	61,732	64.5	18,520	12,346	1,741	2,171	1.13	1.41
VIC	2022	1,858,150	127,850	68,346	53.5	20,504	13,669	1,752	2,184	1.03	1.28
VIC	2023	2,363,850	166,750	72,232	43.3	21,670	14,446	1,760	2,194	0.97	1.21
VIC	2024	2,363,850	155,650	81,160	52.1	24,348	16,232	1,771	2,208	0.87	1.09
VIC	2025	2,078,000	117,600	76,353	64.9	22,906	15,271	1,752	2,184	0.92	1.14
VIC	2026	2,306,000	95,450	73,000 †	76.5	21,900	14,600	1,759	2,193	0.96	1.20
VIC	**Total 2020–26**	**n/a**	**816,880**	**478,887**	**58.6**	**143,666**	**95,777**	**12,240**	**15,259**	**1.02**	**1.27**
Australia	2020	44,460,517	6,030,756	1,229,249	20.4	368,775	245,850	34,156	42,581	1.11	1.39
Australia	2021	34,257,980	4,506,671	1,343,183	29.8	402,955	268,637	34,280	42,736	1.02	1.27
Australia	2022	30,905,131	4,435,117	1,266,408	28.6	379,922	253,282	34,196	42,632	1.08	1.35
Australia	2023	36,503,704	5,132,148	1,361,679	26.5	408,504	272,336	34,300	42,761	1.01	1.26
Australia	2024	35,334,551	4,979,257	1,317,231	26.5	395,169	263,446	34,252	42,700	1.04	1.30
Australia	2025	42,433,855	6,311,992	1,522,185 †	24.1	456,656	304,437	34,475	42,978	0.91	1.13
Australia	2026	36,694,871	5,191,655	1,369,000 †	26.4	410,700	273,800	34,308	42,771	1.00	1.25
Australia	**Total 2020–26**	**n/a**	**36,587,596**	**9,408,935**	**25.7**	**2,822,681**	**1,881,787**	**239,967**	**299,158**	**1.02**	**1.27**

Appendix B. Mainland series 1980–2026, with plausibility test and emissions

1980–2019 from the national series (corrected); 2020–2026 from the state master. The mainland population is the sum of the state estimates. Reconfigured populations start from the 1982 base. Red shading = published rise above 10%.

Year	NSW	QLD	SA	WA	VIC	Mainland population	Change %	Implied growth %	Reconfigured – actual	Reconfigured – quotas	Quota	Actual take	Take %	Joeys (0.30)	S1 t CO_2-e	S1+3 t CO_2-e	EEI S1	EEI S1+3
1980	–	–	–	–	–	–	–	–	–	–	2,585,000	1,868,534	72.3	560,560	34,851	43,447	0.75	0.93
1981	–	–	–	–	–	–	–	–	–	–	2,732,500	1,535,967	56.2	460,790	34,489	42,997	0.90	1.12
1982	10,724,400	10,258,111	2,831,595	1,562,900	–	25,377,006	–	–	25,377,006	25,377,006	3,016,000	2,207,045	73.2	662,114	35,219	43,905	0.64	0.80
1983	15,024,000	9,810,534	1,984,440	1,863,700	–	28,682,674	13.0	26.1	24,604,139	23,390,707	2,843,000	1,635,795	57.5	490,739	34,598	43,132	0.85	1.05
1984	8,692,000	9,362,957	1,175,274	2,164,500	–	21,394,731	-25.4	-16.9	21,394,731	21,394,731	1,688,000	1,362,143	80.7	408,643	34,301	42,761	1.01	1.26
1985	5,299,200	8,915,381	972,390	2,465,300	–	17,652,271	-17.5	-7.9	17,652,271	17,652,271	1,736,000	1,777,249	102.4	533,175	34,752	43,323	0.78	0.98
1986	8,178,490	13,177,659	1,519,554	2,758,900	–	25,634,603	45.2	60.3	16,751,625	16,813,498	2,423,600	2,111,936	87.1	633,581	35,116	43,777	0.67	0.83
1987	9,251,712	14,161,070	1,528,912	3,052,500	–	27,994,194	9.2	21.6	15,258,883	14,859,448	2,804,400	2,460,497	87.7	738,149	35,495	44,249	0.58	0.72
1988	10,918,210	13,164,580	1,373,177	3,346,100	–	28,802,067	2.9	16.1	13,094,026	12,138,793	2,949,800	2,552,348	86.5	765,704	35,594	44,373	0.56	0.70
1989	10,497,580	13,454,557	1,917,074	3,440,600	–	29,309,811	1.8	15.1	10,574,906	8,927,972	3,589,900	2,585,323	72.0	775,597	35,630	44,418	0.55	0.69
1990	14,661,800	11,372,565	1,876,105	3,535,100	–	31,445,570	7.3	20.5	7,754,413	4,435,919	3,966,650	2,763,250	69.7	828,975	35,824	44,659	0.52	0.65
1991	18,147,550	10,578,017	2,334,112	3,619,300	–	34,678,979	10.3	23.5	4,384,979	0	4,238,800	2,912,823	68.7	873,847	35,986	44,861	0.49	0.62
1992	19,341,530	15,490,000	2,038,285	3,208,834	–	40,078,649	15.6	28.2	454,242	0	5,207,700	2,816,649	54.1	844,995	35,882	44,731	0.51	0.64
1993	16,292,895	12,848,450	2,143,005	2,788,066	–	34,072,416	-15.0	-4.4	0	0	4,804,100	2,976,198	62.0	892,859	36,055	44,947	0.48	0.60
1994	15,074,671	11,243,091	2,007,551	2,367,300	–	30,692,613	-9.9	3.2	0	0	4,170,100	3,293,227	79.0	987,968	36,400	45,376	0.44	0.55
1995	11,910,151	10,641,491	2,106,069	2,021,900	–	26,679,611	-13.1	3.0	0	0	3,636,556	3,260,448	89.7	978,134	36,364	45,332	0.45	0.56
1996	12,573,628	9,481,179	3,274,881	1,676,500	–	27,006,188	1.2	19.6	0	0	3,723,000	3,101,123	83.3	930,337	36,191	45,116	0.47	0.58
1997	10,293,934	11,834,815	3,074,000	1,331,100	–	26,533,849	-1.7	15.5	0	0	4,353,800	2,289,687	52.6	686,906	35,309	44,017	0.62	0.77
1998	12,738,158	11,320,000	2,851,000	1,542,900	–	28,452,058	7.2	20.2	0	0	4,069,140	2,592,557	63.7	777,767	35,638	44,428	0.55	0.69
1999	13,875,049	16,970,000	3,382,000	2,599,000	–	36,826,049	29.4	43.1	0	0	5,661,146	2,599,203	45.9	779,761	35,645	44,437	0.55	0.68
2000	12,648,424	21,790,000	3,089,000	3,018,300	–	40,545,724	10.1	20.7	0	0	5,495,225	2,745,798	50.0	823,739	35,805	44,635	0.52	0.65
2001	12,387,857	32,150,000	3,098,000	3,490,245	–	51,126,102	26.1	36.3	0	0	5,507,200	3,383,355	61.4	1,015,007	36,498	45,498	0.43	0.54
2002	14,431,246	37,574,300	2,927,000	2,329,480	–	57,262,026	12.0	21.9	0	0	6,921,687	3,898,716	56.3	1,169,615	37,058	46,196	0.38	0.47
2003	15,928,604	22,856,128	2,744,000	2,316,800	–	43,845,532	-23.4	-13.2	0	0	6,552,194	3,474,483	53.0	1,042,345	36,597	45,622	0.42	0.53
2004	8,348,714	15,389,407	2,063,000	2,413,400	–	28,214,521	-35.7	-23.8	0	0	4,421,892	2,992,071	67.7	897,621	36,072	44,969	0.48	0.60
2005	6,940,893	12,925,683	2,397,000	3,051,345	–	25,314,921	-10.3	5.6	0	0	3,909,550	3,112,344	79.6	933,703	36,203	45,131	0.47	0.58
2006	5,722,631	14,207,860	2,069,000	2,636,800	–	24,636,291	-2.7	15.8	0	0	3,808,680	3,289,376	86.4	986,813	36,396	45,371	0.44	0.55
2007	5,980,671	13,156,658	2,213,000	2,256,600	–	23,606,929	-4.2	15.8	0	0	3,641,271	2,986,470	82.0	895,941	36,066	44,961	0.48	0.60
2008	6,401,797	13,086,638	1,903,000	2,617,175	–	24,008,610	1.7	20.7	0	0	3,659,129	2,193,207	59.9	657,962	35,204	43,887	0.64	0.80
2009	8,048,466	14,620,242	2,246,000	2,020,125	–	26,934,833	12.2	25.9	0	0	4,145,781	1,950,114	47.0	585,034	34,940	43,557	0.72	0.89
2010	7,203,286	15,125,067	2,154,000	2,557,970	–	27,040,323	0.4	11.3	0	0	4,023,021	1,469,760	36.5	440,928	34,418	42,907	0.94	1.17
2011	8,522,112	12,172,807	2,205,000	2,258,107	–	25,158,026	-7.0	1.2	0	0	3,730,710	1,623,576	43.5	487,073	34,585	43,115	0.85	1.06
2012	9,815,115	20,345,243	2,327,600	1,815,719	–	34,303,677	36.4	46.0	0	0	5,249,680	1,560,586	29.7	468,176	34,516	43,030	0.88	1.10
2013	11,390,593	24,088,150	2,726,938	1,204,799	–	39,410,480	14.9	21.7	0	0	6,039,401	1,716,139	28.4	514,842	34,685	43,241	0.81	1.01
2014	15,330,399	32,803,900	3,222,717	1,841,501	–	53,198,517	35.0	41.5	0	0	8,194,624	1,645,930	20.1	493,779	34,609	43,146	0.84	1.05
2015	17,169,059	27,159,850	3,327,826	1,656,292	–	49,313,027	-7.3	-2.7	0	0	7,560,091	1,632,098	21.6	489,629	34,594	43,127	0.85	1.06
2016	16,297,628	26,162,000	4,141,007	2,392,800	–	48,993,435	-0.6	4.3	0	0	7,490,100	1,442,874	19.3	432,862	34,388	42,871	0.95	1.19
2017	17,458,418	22,566,750	4,711,159	2,489,700	–	47,226,027	-3.6	0.8	0	0	7,174,072	1,488,269	20.7	446,481	34,438	42,932	0.93	1.15

Year	NSW	QLD	SA	WA	VIC	Mainland population	Change %	Implied growth %	Reconfigured – actual	Reconfigured – quotas	Quota	Actual take	Take %	Joeys (0.30)	S1 t CO_2-e	S1+3 t CO_2-e	EEI S1	EEI S1+3
2018	14,403,862	22,935,950	5,034,677	3,734,775	–	46,109,264	-2.4	2.4	0	0	6,918,174	1,565,140	22.6	469,542	34,521	43,036	0.88	1.10
2019	12,832,394	21,071,900	4,407,116	4,249,560	–	42,560,970	-7.7	-2.6	0	0	6,222,301	1,570,473	25.2	471,142	34,527	43,043	0.88	1.10
2020	14,158,405	22,287,000	3,545,902	3,090,605	1,378,605	44,460,517	4.5	10.0	0	0	6,030,756	1,229,249	20.4	368,775	34,156	42,581	1.11	1.39
2021	10,459,983	16,663,850	2,810,547	2,412,050	1,911,550	34,257,980	-22.9	-18.8	0	0	4,506,671	1,343,183	29.8	402,955	34,280	42,736	1.02	1.27
2022	10,913,343	12,959,400	2,775,048	2,399,190	1,858,150	30,905,131	-9.8	-3.9	0	0	4,435,117	1,266,408	28.6	379,922	34,196	42,632	1.08	1.35
2023	11,882,215	16,267,200	3,833,889	2,156,550	2,363,850	36,503,704	18.1	24.3	0	0	5,132,148	1,361,679	26.5	408,504	34,300	42,761	1.01	1.26
2024	9,634,900	17,727,700	3,912,711	1,695,390	2,363,850	35,334,551	-3.2	2.4	0	0	4,979,257	1,317,231	26.5	395,169	34,252	42,700	1.04	1.30
2025	13,910,688	19,948,800	5,192,277	1,304,090	2,078,000	42,433,855	20.1	25.7	0	0	6,311,992	1,522,185	24.1	456,656	34,475	42,978	0.91	1.13
2026	9,586,809	19,308,148	4,129,219	1,364,695	2,306,000	36,694,871	-13.5	-8.1	0	0	5,191,655	1,369,000	26.4	410,700	34,308	42,771	1.00	1.25
Total						**n/a**					**217,451,571**	**103,851,716**	**47.8**	**see below**	**1,655,426**	**2,063,719**	**0.64**	**0.79**
Joeys														**31,155,515**				

Joeys total (separate from take): 31,155,515. Other non-take deaths (0.20 × take): 20,770,343. Since 2013: quota 86,186,359, take 20,469,858 (23.8%).

Appendix C. Reconfigured population tables by state, 2020–2026

NSW

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2020	14,158,405	–	2,126,176	469,186	–	14,158,405	14,158,405	14,158,405	–
2021	10,459,983	-26.1	1,598,761	497,285	14,870,467	10,459,983	10,459,983	14,870,467	-21.2
2022	10,913,343	4.3	1,692,207	402,719	10,760,054	10,760,054	9,107,840	15,611,586	11.5
2023	11,882,215	8.9	1,850,228	509,671	11,231,981	11,231,981	7,480,313	16,568,666	14.4
2024	9,634,900	-18.9	1,484,072	532,415	11,590,672	9,634,900	5,453,003	17,461,026	-12.5
2025	13,910,688	44.4	2,186,952	634,087	9,799,768	9,799,768	3,772,195	18,408,506	52.7
2026	9,586,809	-31.1	1,453,025	547,000 †	9,828,614	9,586,809	868,986	19,298,226	-24.2

QLD

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2020	22,287,000	–	2,825,150	514,144	–	22,287,000	22,287,000	22,287,000	–
2021	16,663,850	-25.2	1,981,150	601,164	23,744,484	16,663,850	16,663,850	23,744,484	-21.8
2022	12,959,400	-22.2	1,783,850	612,233	17,428,489	12,959,400	12,959,400	25,217,186	-16.8
2023	16,267,200	25.5	2,210,400	597,750	13,336,991	13,336,991	11,579,565	26,820,556	32.6
2024	17,727,700	9.0	2,486,400	516,847	13,774,065	13,774,065	9,421,922	28,605,986	14.5
2025	19,948,800	12.5	2,941,550	609,842	14,376,201	14,376,201	6,634,514	30,691,314	16.9
2026	19,308,148	-3.2	2,850,900	568,000 †	14,899,058	14,899,058	2,885,640	32,845,683	1.4

SA

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2020	3,545,902	–	532,400	98,962	–	3,545,902	3,545,902	3,545,902	–
2021	2,810,547	-20.7	449,200	97,389	3,752,049	2,810,547	2,810,547	3,752,049	-16.6
2022	2,775,048	-1.3	455,800	100,896	2,945,518	2,775,048	2,417,802	3,981,171	3.9
2023	3,833,889	38.2	576,300	100,088	2,901,209	2,901,209	1,975,882	4,227,944	43.6
2024	3,912,711	2.1	589,200	106,503	3,041,198	3,041,198	1,309,020	4,500,606	6.0
2025	5,192,277	32.7	883,500	127,903	3,185,563	3,185,563	556,122	4,790,912	36.8
2026	4,129,219	-20.5	600,400	103,000 †	3,312,265	3,312,265	0	5,078,149	-16.8

WA

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2020	3,090,605	–	489,130	100,893	–	3,090,605	3,090,605	3,090,605	–
2021	2,412,050	-22.0	381,880	85,613	3,248,326	2,412,050	2,412,050	3,248,326	-17.1
2022	2,399,190	-0.5	375,410	82,214	2,524,836	2,399,190	2,080,435	3,444,739	4.8
2023	2,156,550	-10.1	328,470	81,938	2,515,788	2,156,550	1,725,364	3,665,892	-5.0
2024	1,695,390	-21.4	263,935	80,306	2,249,298	1,695,390	1,405,195	3,909,574	-15.7

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2025	1,304,090	-23.1	182,390	74,000 †	1,744,470	1,304,090	1,149,812	4,180,073	-16.0
2026	1,364,695	4.6	191,880	78,000 †	1,323,499	1,323,499	991,208	4,487,080	13.2

VIC

Year	Published	Change %	Quota	Actual take	Max plausible (actual)	Reconfigured – actual take	Reconfigured – quotas fulfilled	Theoretical ceiling	Implied growth %
2020	1,378,605	–	57,900	46,064	–	1,378,605	1,378,605	1,378,605	–
2021	1,911,550	38.7	95,680	61,732	1,447,370	1,447,370	1,429,616	1,447,370	43.7
2022	1,858,150	-2.8	127,850	68,346	1,499,508	1,499,508	1,429,057	1,499,508	2.1
2023	2,363,850	27.2	166,750	72,232	1,546,940	1,546,940	1,380,188	1,546,940	32.7
2024	2,363,850	0.0	155,650	81,160	1,593,286	1,593,286	1,268,082	1,593,286	4.6
2025	2,078,000	-12.1	117,600	76,353	1,630,875	1,630,875	1,161,415	1,630,875	-6.9
2026	2,306,000	11.0	95,450	73,000 †	1,679,433	1,679,433	1,101,156	1,679,433	16.5

Mainland (sum of states and aggregate test)

Year	Published	Reconfigured – actual (sum of states)	Reconfigured – quotas (sum of states)	Reconfigured – actual (aggregate)	Reconfigured – quotas (aggregate)	Theoretical ceiling (aggregate)
2020	44,460,517	44,460,517	44,460,517	44,460,517	44,460,517	44,460,517
2021	34,257,980	33,793,800	33,776,046	34,257,980	34,257,980	47,062,695
2022	30,905,131	30,393,200	27,994,534	30,905,131	30,905,131	49,754,190
2023	36,503,704	31,173,670	24,141,311	32,096,032	27,342,969	52,829,997
2024	35,334,551	29,738,839	18,857,221	33,263,117	22,379,043	56,070,478
2025	42,433,855	30,296,496	13,274,057	34,613,582	17,148,062	59,701,680
2026	36,694,871	30,801,063	5,846,991	35,791,663	9,394,881	63,388,570