2025 Quota Submission for Commercially Harvested Macropods in Queensland

Queensland Government

Prepared by: Macropod Management Program, Queensland Parks and Wildlife Services and Partnerships, Department of Environment and Science

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Executive summary

The commercial macropod harvest in Queensland is focused on three species (red kangaroo *Osphranter rufus*, eastern grey kangaroo *Macropus giganteus*, and common wallaroo *Osphranter robustus*) located in six zones: no harvest zone, and harvest zones 1 to 5.

The harvest is administered through a quota submission which is released annually and outlines proposed quotas for each species in each zone for the following calendar year. Quotas are set up to 20% of the estimated population for each species in each zone, depending on survey intensity and the standard error associated with population estimates.

This quota submission outlines the following factors that relate to macropod populations:

- population trends (estimates obtained through aerial surveys)
- review of previous harvests
- the extent of non-commercial harvest mortality
- the extent of areas not subject to any harvest
- rainfall trends.

For 2024, aerial surveys were conducted at 15 monitor blocks across Queensland. Since regionalisation of the Queensland commercial macropod harvest was introduced in 2003, an estimate of macropod population size in zones 1 and 5 (former western and eastern zones) has been made annually. The model used to estimate these populations is based on a small sample area and the reduced sampling effort is reflected in a conservative quota. This model was updated in 2012 to incorporate almost a decade of survey data and to generate trigger points for the commercial quota allocation.

Overall combined 2024 population estimate totals for all three species increased across the state. However, regional differences were significant. Population estimates decreased for eastern grey kangaroos in zone 1 and 3 and increased in all other zones. For red kangaroos population estimates decreased in zones 1 and 3, and decreased slightly in zone 5, and increased in zones 2 and 4. Whilst the population estimates increased for common wallaroos in zone 2, they decreased slightly in all other zones. While there was an increase for the population estimate for eastern grey kangaroos in zone 2, the estimate remains below a predetermined trigger point. The quota allocated for this species in zone 2 will be reduced by half for the 2024 harvest period.

Examination of long-term trends in population and block density estimates, indicates that the 2024 estimates are comparable to fluctuations of previous years. Population estimates for all three commercially harvested species consistently number more than 1 million across the Queensland harvest zones.

In the 2023 harvest period, only 27% of the commercial harvest quota was utilised, with the highest percentage of quota used being 71.9% for common wallaroo in zone 4. The overall harvest was male biased, with females comprising less than 13.8% of the overall harvest.

Figures available as at 12 August 2023, indicate that the harvest will be below quotas for each species in each zone in 2024. Non-commercial take under damage mitigation permits (DMPs) were also below the maximum available quota for the 2023 harvest period, a trend that is likely to be repeated in 2024.

The three commercially harvested macropod species continue to be protected from harvesting within the harvest zones in national parks and state forests. The protected area within the harvest zones is 128,529km^2. Macropods are further protected from harvest in Queensland within the non-harvest zones.

Drought declarations have ceased for all of the harvest zones with many areas showing an increase in macropod densities. However, the legacy of eight years drought still impacts some areas. This is reflected in the halved quota for eastern grey kangaroos in zone 2, for the 2025 harvest period.

This quota submission contains a summary of the recommended quotas for each of the species in each of the harvest zones for 2025. Additionally, the submission outlines the basis of how these quotas were determined.

Population estimates for 2024 and proposed sustainable use quotas for the 2025 commercial harvest. Note estimates in red signify a trigger point has been reached.

Species	Population estimate zone	2024 estimated population (rounded to the nearest 50)	2025 sustainable use quota (rounded to the nearest 50)	Proportion of population (% rounded to the nearest whole number)
Red kangaroo	Zone 1	928,950	92,900	10%
	Zone 2	4,344,200	868,850	20%
	Zone 3	1,318,050	263,600	20%
	Zone 4	645,150	129,050	20%
	Zone 5	230,800	23,100	10%
	Combined	7,467,150	1,377,500	18%
Eastern grey kangaroo	Zone 1	0	NA	NA
	Zone 2	637,850	47,850	7%
	Zone 3	523,100	78,450	15%
	Zone 4	5,110,700	766,600	15%
	Zone 5	4,400,750	440,100	10%
	Combined	10,672,400	1,333,000	12%
Common wallaroo	Zone 1	109,350	10,950	10%
	Zone 2	785,550	117,850	15%
	Zone 3	184,850	27,750	15%
	Zone 4	31,100	4,650	15%
	Zone 5	698,400	69,850	10%
	Combined	1,809,250	231,050	13%

Contents

Introduction

The commercial harvesting in Queensland of three macropod species—red kangaroo *Osphranter rufus,* eastern grey kangaroo *Macropus giganteus* and common wallaroo *Osphranter robustus*—is regulated through:

- *Environment Protection and Biodiversity Conservation Act 1999*
- Queensland Wildlife Trade Management Plan for Export—Commercially Harvested Macropods 2023–2027
- *Nature Conservation Act 1992*
  - Nature Conservation (Animals) Regulation 2020
  - Nature Conservation (Macropod) Conservation Plan 2017
- Harvest Period Notice for taking macropods
- *Animal Care and Protection Act 2001*
- *Food Production (Safety) Act 2000.*

The Department of Environment, Science and Innovation (DESI) administers the harvest of macropods in Queensland in accordance with the International Union for Conservation of Nature (IUCN) Recommendation 18.24, 'the ethical, wise and sustainable use of some wildlife can provide an alternative or supplementary means of productive land-use, and can be consistent with and encourage conservation, where such use is in accordance with appropriate safeguards' (IUCN 1990) and the Wildlife Trade Management Plan for Export—Commercially Harvested Macropods 2023–27, 'to provide for the sustainable use of macropod species covered by the plan, in accordance with the principles of ecologically sustainable development' (Anon 2022).

Management of the harvest is facilitated via a quota that sets the number of animals that can be taken. Quotas are established largely based on aerial surveys of the commercially harvested species and have been used in Queensland since 1975. The Director-General of DESI, declares a harvest period open annually via the harvest period notice and sets quotas for this period having regard to the Queensland Wildlife Trade Management Plan for Export—Commercially Harvested Macropods 2023–27. Quotas are provided to the Commonwealth Minister for The Environment for endorsement.

Quotas in Queensland are set up to 20% of the estimated population for each species in each zone. Harvesting at these levels will ensure a sustainable yield and long-term conservation of macropod populations.

From 2003 to 2022, quotas were set for each species for four harvest zones to ensure that harvest pressure is distributed across the range of the species. As of 2023 the quotas are set for each species in six harvest zones (figure 1):

Harvest zone from 2023 onwards

- no harvest zone (quota zero)
- zone 1 (formerly western zone)
- zone 2 (formerly north region of central zone)
- zone 3 (formerly south region of central zone)
- zone 4 (formerly east region of central zone)
- zone 5 (formerly eastern zone)

2003 – 2022 harvest zones

- no harvest zone (quota zero)
- eastern harvest zone
- central harvest zone
- western harvest zone.

This quota submission contains a summary of the recommended quotas for each of the species in each of the harvest zones for 2025. Additionally, the submission outlines the basis of how these quotas were determined.

The Harvest Period Notice for taking macropods in 2025 is due for release in December 2024. The release of this notice will allow the harvest period to be declared open on 1 January 2025. The notice will outline specific conditions for the 2025 harvest period.

The proposed quotas were calculated using a fixed proportion of the estimated macropod populations within the Queensland harvest areas. Proportions were adjusted for each species across the harvest zones in relation to the margins of error present in population estimates derived from aerial surveys. The maximum proportions used for each species were 15% of the populations for eastern grey kangaroos and common wallaroos and 20% of the population for red kangaroos. For zones 1 and 5,

where survey effort is less extensive, a more conservative maximum proportion of 10% was applied for all three species.

These sustainable-use harvest proportions are based on research and modelling undertaken by Caughley et al. (1987) and Hacker et al. (2002) and are currently accepted by the scientific community, DESI and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) for determining state quota limits.

This quota submission also outlines the following factors that relate to macropod populations:

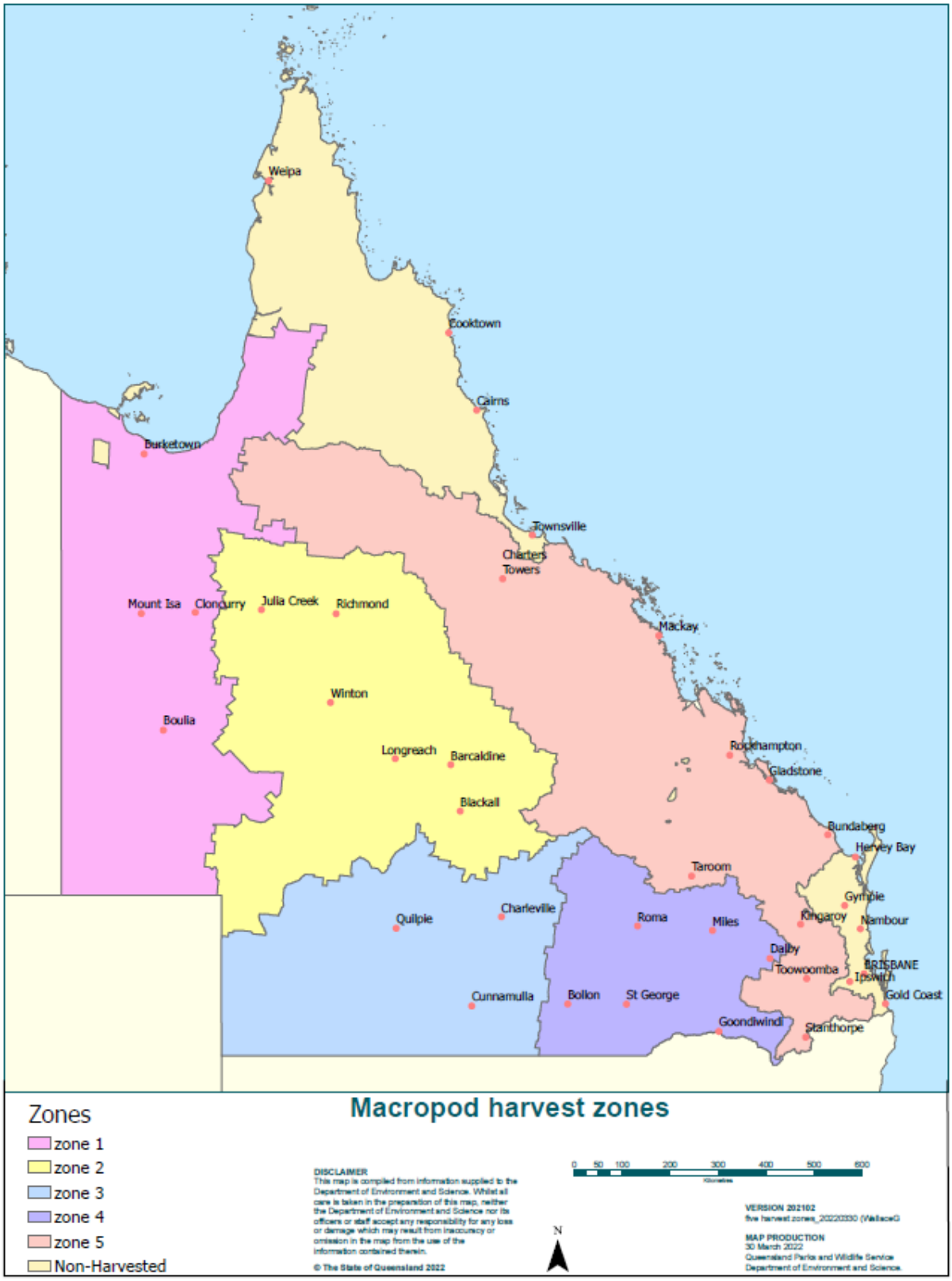
- population trends (estimates obtained through aerial surveys)
- review of previous harvests
- the extent of non-commercial harvest mortality
- the extent of areas not subject to any harvest
- rainfall trends.

Proposed quotas

Table 1. 2024 estimated populations and 2025 proposed quotas for each macropod species in each harvest zone. Note estimates in red signify a trigger point has been reached.

Species	Population estimate zone	2024 estimated population (rounded to the nearest 50)	2025 sustainable use quota (rounded to the nearest 50)	Proportion of population (% rounded to the nearest whole number)
Red kangaroo	Zone 1	928,950	92,900	10%
	Zone 2	4,344,200	868,850	20%
	Zone 3	1,318,050	263,600	20%
	Zone 4	645,150	129,050	20%
	Zone 5	230,800	23,100	10%
	Combined	7,467,150	1,377,500	18%
Eastern grey kangaroo	Zone 1	0	NA	NA
	Zone 2	637,850	47,850	7%
	Zone 3	523,100	78,450	15%
	Zone 4	5,110,700	766,600	15%
	Zone 5	4,400,750	440,100	10%
	Combined	10,672,400	1,333,000	12%
Common wallaroo	Zone 1	109,350	10,950	10%
	Zone 2	785,550	117,850	15%
	Zone 3	184,850	27,750	15%
	Zone 4	31,100	4,650	15%
	Zone 5	698,400	69,850	10%
	Combined	1,809,250	231,050	12%

Figure 1. Queensland macropod harvest zones



Zone 1 consists of Boulia, Burke, Carpentaria, Cloncurry, Diamantina and Mount Isa local government areas.

Zone 2 consists of Barcaldine, Barcoo, Blackall-Tambo, Flinders, Longreach, McKinlay, Richmond and Winton local government areas.

Zone 3 consists of Bulloo, Murweh, Paroo and Quilpie local government areas.

Zone 4 consists of Balonne, Goondiwindi, Maranoa and Western Downs local government areas.

Zone 5 consists of Banana, Bundaberg, Burdekin, Central Highlands, Charters Towers, Croydon, Etheridge, Gladstone, Isaac, Livingstone, Lockyer Valley, Mackay, North Burnett, Rockhampton, Scenic Rim, Somerset, South Burnett, Southern Downs, Toowoomba and Whitsunday local government areas.

Long-term population trends

Population estimates

Since 1992, the Queensland Government has coordinated an annual program of aerial surveys to directly monitor populations of the three commercially harvested macropod species. These surveys occur over 22 representative monitor blocks across the State and are utilised to obtain population estimates that inform the quota. The methodology of the surveys is outlined in detail on the Queensland Government website (https://www.qld.gov.au/environment/plants-animals/wildlife-permits/macropods/macropods-quotas). Since 2011 a correction factor of 1.85 has been applied to population estimates for common wallaroo in Queensland. Prior to this a correction factor of 1.2 was applied.

Current harvesting rates (quotas up to 20% of population estimates) are considered sustainable. None of the three commercially harvested species has shown a consistent decline in abundance since 1992 (figures 2, 3, 4 and 5), which would necessitate a reassessment of the harvest take and species conservation status. Whilst no consistent declines have been observed, the macropod populations in Queensland have fluctuated over time.

Figure 2. Macropod population trends across all Queensland harvest zones since 1992

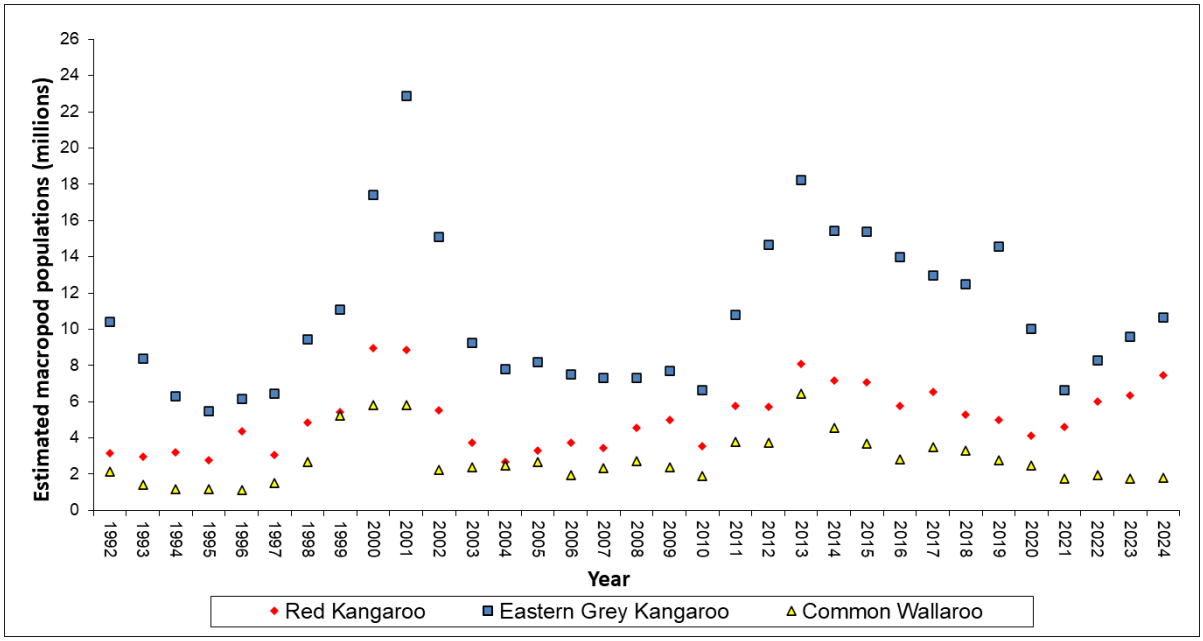


Figure 3. Red kangaroo population estimates (with one standard error) since 1992

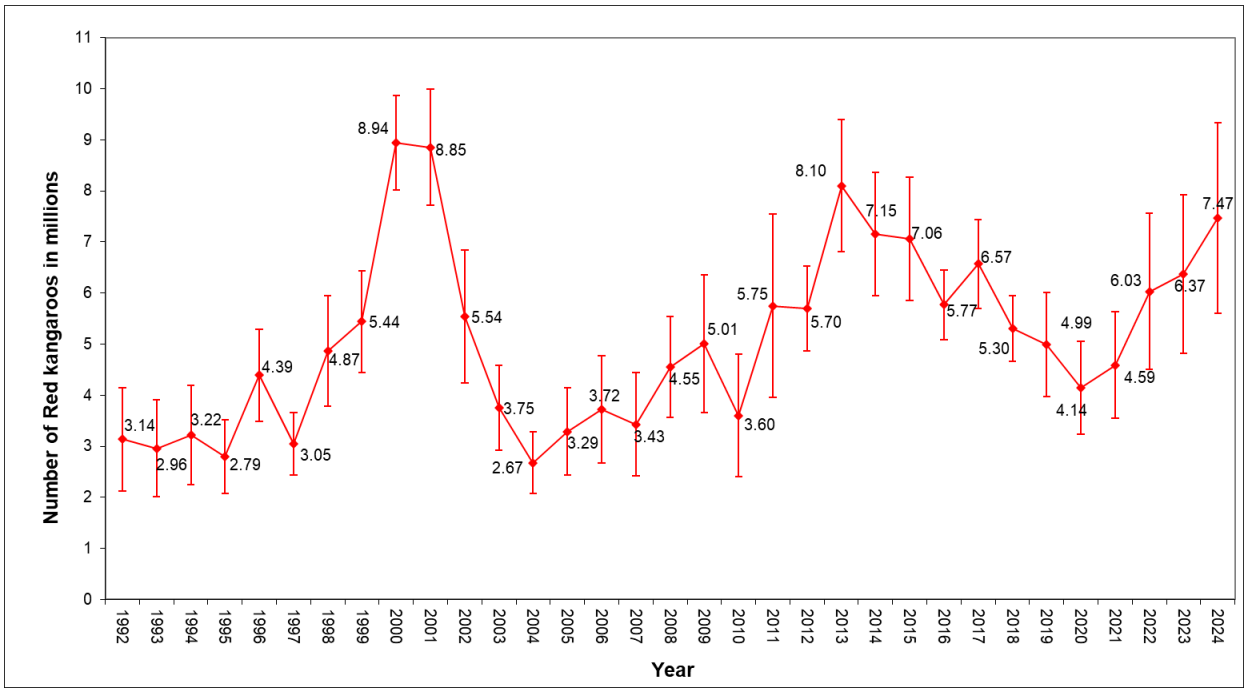


Figure 4. Eastern grey kangaroo population estimates (with one standard error) since 1992

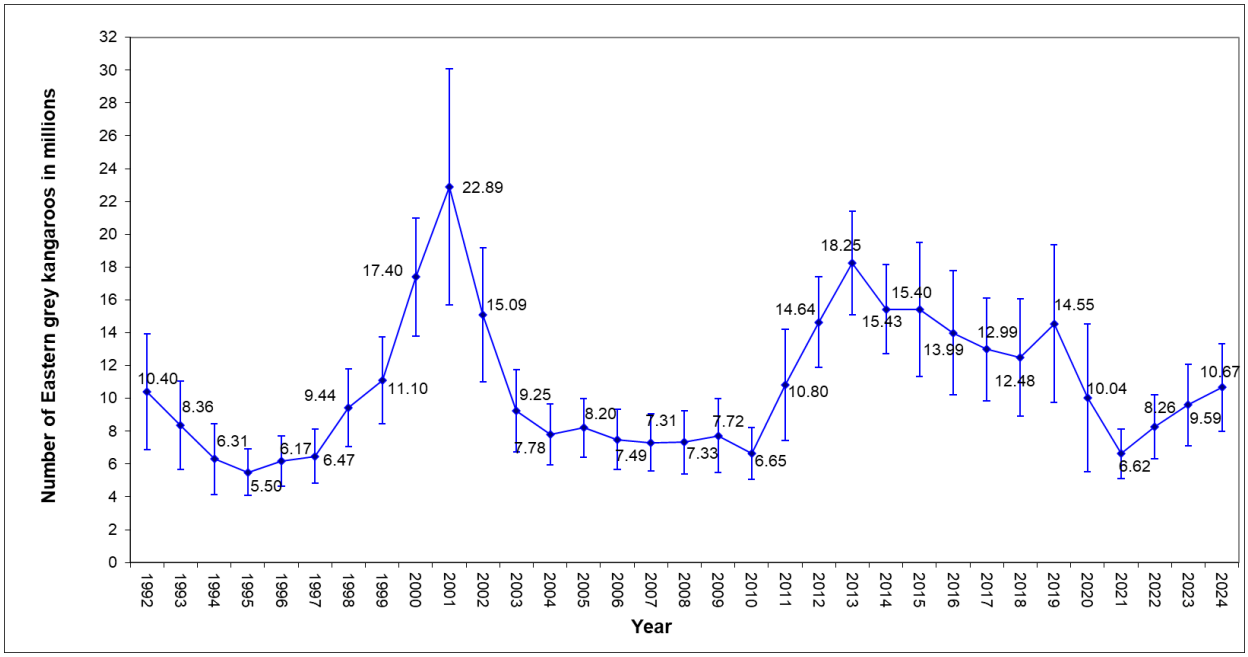
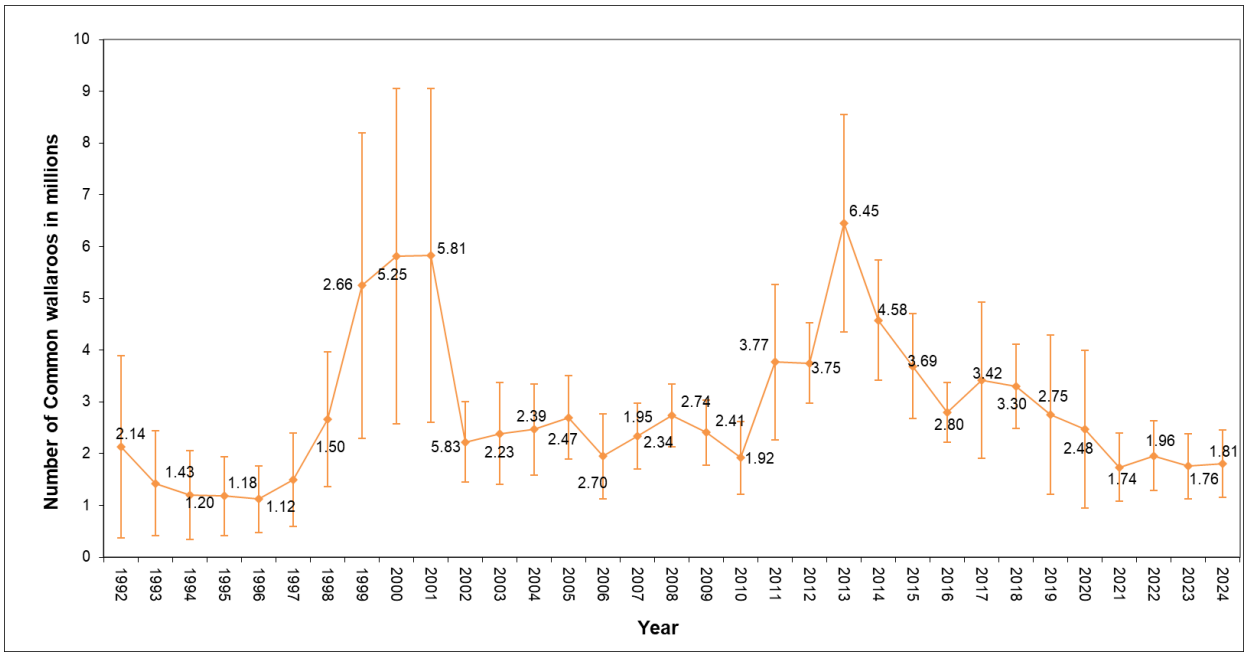


Figure 5. Common wallaroo population estimates (with one standard error) since 1992. Estimates include a 1.85 correction factor from 2011 and a 1.2 correction factor for 1992 to 2010.



Density estimates

To contribute to ensuring commercially harvested macropod species are maintained across their distributions, density estimates are calculated for representative survey blocks as part of the aerial survey program (Appendix 1). For the purposes of interpreting this data, the density estimates for each species are presented in the harvest zones (figure 6).

This data is monitored for any significant decreases in densities which is possible for all data collected since 2005. Examination of trends in density for the three commercially harvested macropod species in the areas outlined above for the period 2005–2024 demonstrates densities fluctuate over time (figures 7–11).

For red kangaroos, densities are greatest in the zone 2 (figure 8), with densities lowest in the zone 5 (figure 11). Low densities in the zone 5 (eastern Queensland) are expected as this area incorporates the edge of the distributional range for this species.

For eastern grey kangaroos, highest densities are recorded in the zone 4 (figure 10) and zone 5 (figure 11). Eastern grey kangaroos occur in consistently low densities in zone 1 (western Queensland) at the edge of their distributional range. As such, there is no quota for eastern grey kangaroos in this zone (table 1). In 2024, no eastern grey kangaroos were counted in zone 1 during aerial surveys. This does not necessarily mean they are completely absent from the zone; it is more likely that the survey effort was insufficient to detect extremely low densities.

Common wallaroos, occur in highest densities in the zone 2 (figure 8). This area is further divided into two regions for the purposes of estimating populations due to the considerably higher densities historically recorded around Blackall, Tambo and Longreach when compared to the rest of the zones (figure 8 and Appendix 1). Lowest densities for this species occur in zone 1 and 4 (figures 7 and 10, respectively). Density fluctuations for this species do not follow the same patterns as those exhibited by red and eastern grey kangaroos (figures 7–11).

Figure 6. Zones used to calculate population estimates of commercially harvested macropods

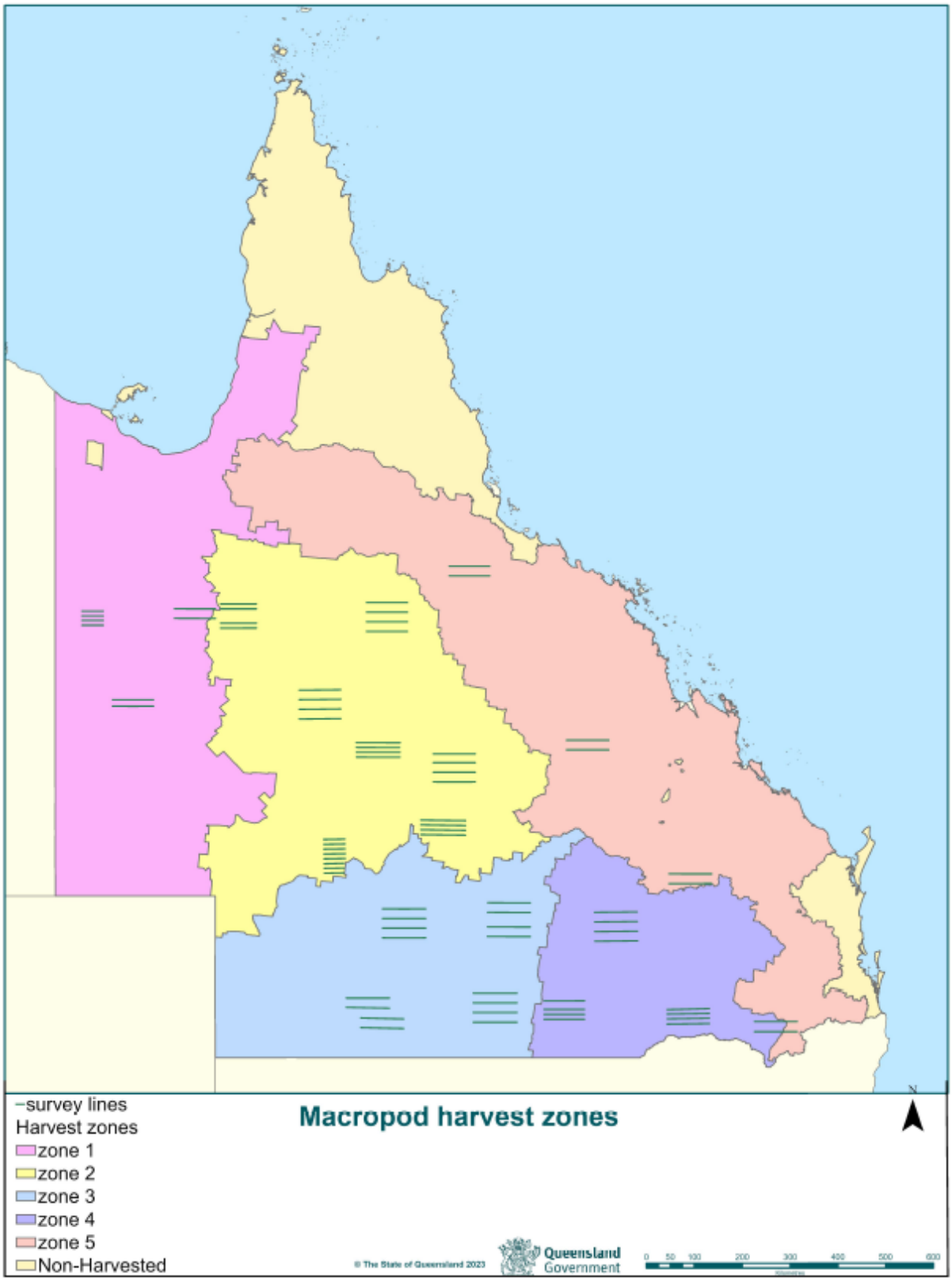
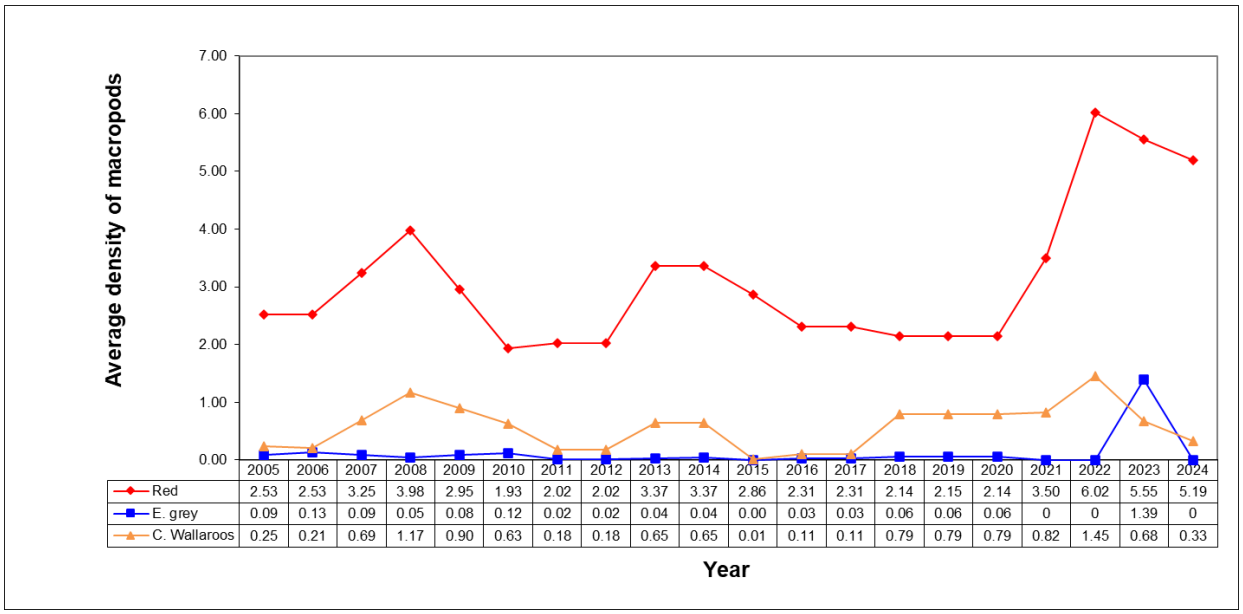
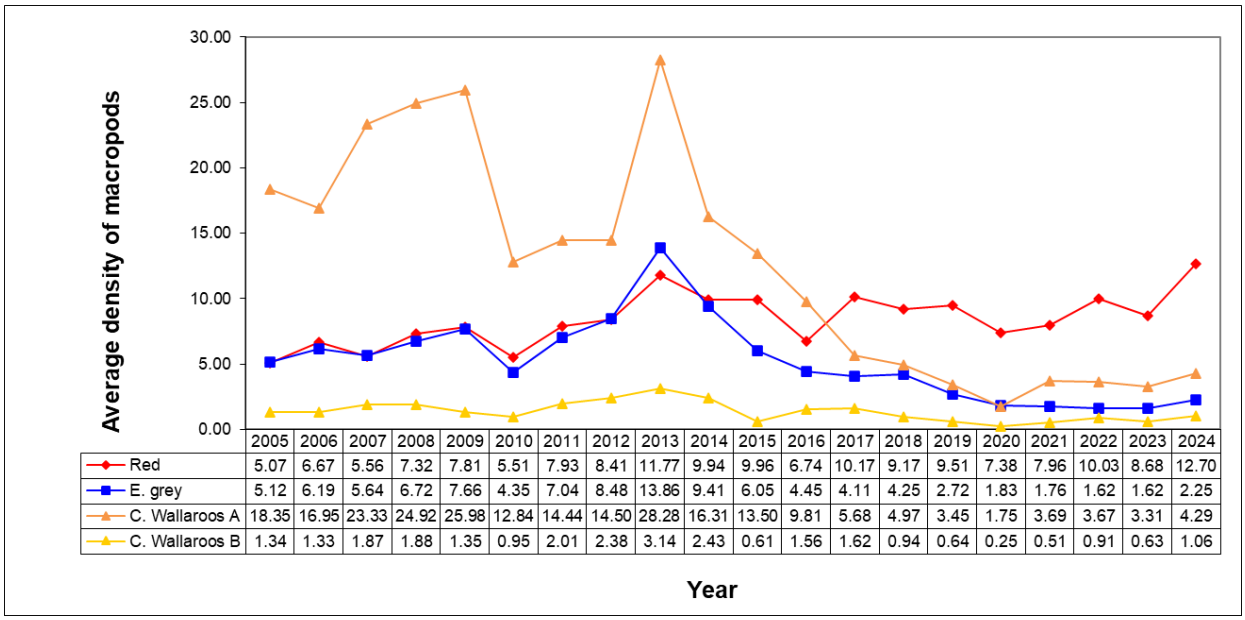


Figure 7. Average density per km² of commercially harvested macropods in Zone 1 population estimate region from 2005 to 2024



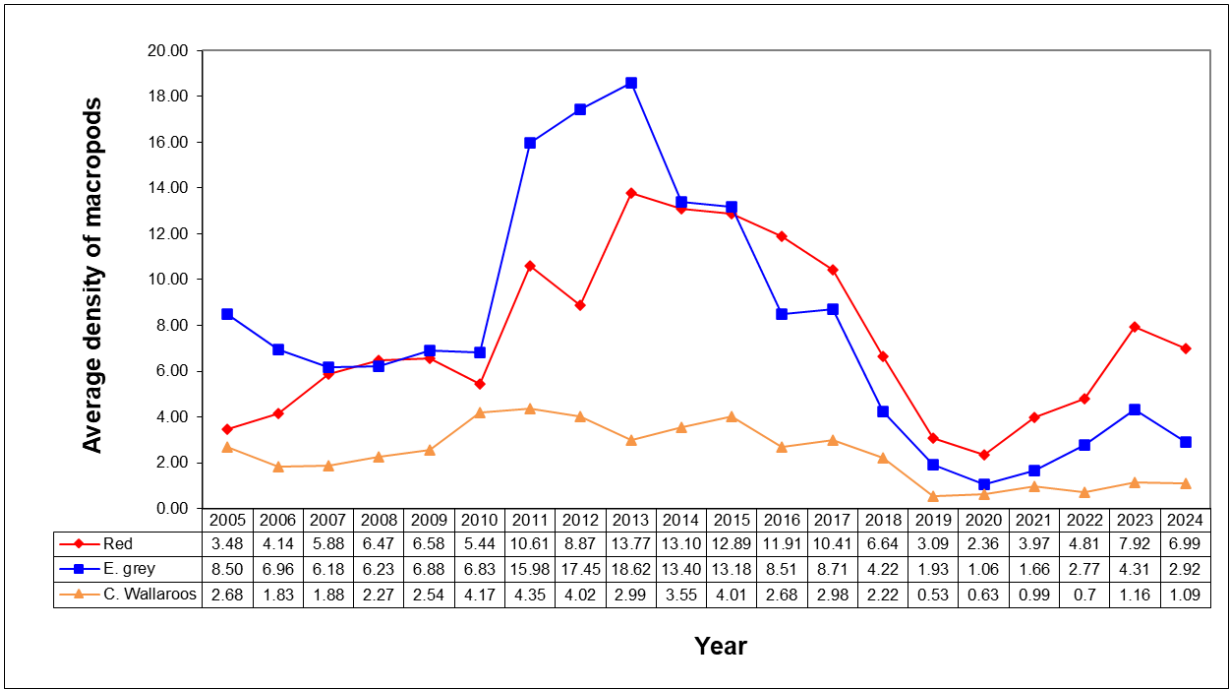
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Red	2.53	2.53	3.25	3.98	2.95	1.93	2.02	2.02	3.37	3.37	2.86	2.31	2.31	2.14	2.15	2.14	3.50	6.02	5.55	5.19
E. grey	0.09	0.13	0.09	0.05	0.08	0.12	0.02	0.02	0.04	0.04	0.00	0.03	0.03	0.06	0.06	0.06	0	0	1.39	0
C. Wallaroos	0.25	0.21	0.69	1.17	0.90	0.63	0.18	0.18	0.65	0.65	0.01	0.11	0.11	0.79	0.79	0.79	0.82	1.45	0.68	0.33

Figure 8. Average density per km² of commercially harvested macropods in Zone 2 population estimate region from 2005 to 2024 (common wallaroos are represented by two areas in Zone 2)



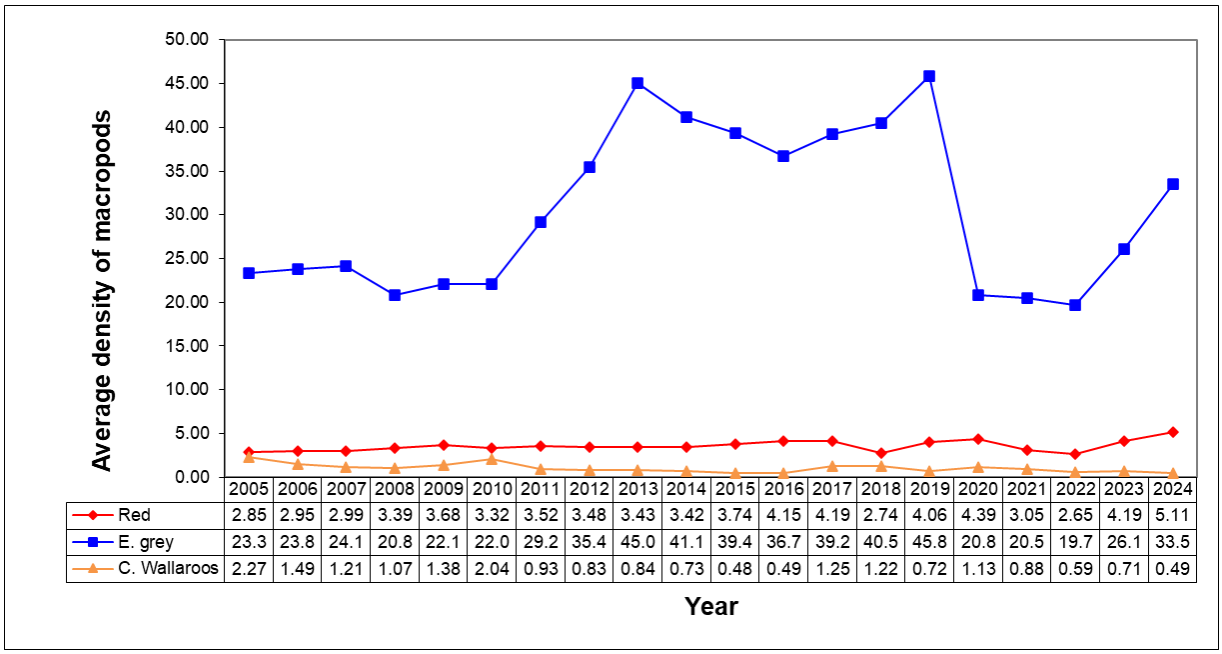
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Red	5.07	6.67	5.56	7.32	7.81	5.51	7.93	8.41	11.77	9.94	9.96	6.74	10.17	9.17	9.51	7.38	7.96	10.03	8.68	12.70
E. grey	5.12	6.19	5.64	6.72	7.66	4.35	7.04	8.48	13.86	9.41	6.05	4.45	4.11	4.25	2.72	1.83	1.76	1.62	1.62	2.25
C. Wallaroos A	18.35	16.95	23.33	24.92	25.98	12.84	14.44	14.50	28.28	16.31	13.50	9.81	5.68	4.97	3.45	1.75	3.69	3.67	3.31	4.29
C. Wallaroos B	1.34	1.33	1.87	1.88	1.35	0.95	2.01	2.38	3.14	2.43	0.61	1.56	1.62	0.94	0.64	0.25	0.51	0.91	0.63	1.06

Figure 9. Average density per km² of commercially harvested macropods in Zone 3 population estimate region from 2005 to 2024



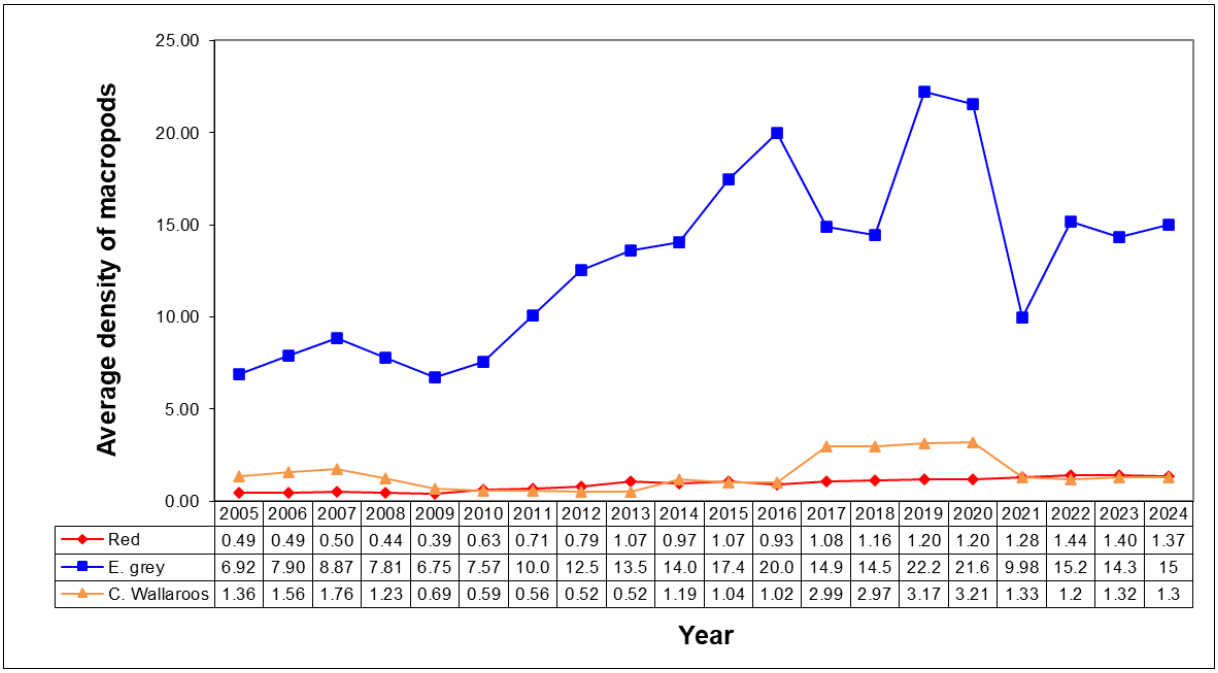
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Red	3.48	4.14	5.88	6.47	6.58	5.44	10.61	8.87	13.77	13.10	12.89	11.91	10.41	6.64	3.09	2.36	3.97	4.81	7.92	6.99
E. grey	8.50	6.96	6.18	6.23	6.88	6.83	15.98	17.45	18.62	13.40	13.18	8.51	8.71	4.22	1.93	1.06	1.66	2.77	4.31	2.92
C. Wallaroos	2.68	1.83	1.88	2.27	2.54	4.17	4.35	4.02	2.99	3.55	4.01	2.68	2.98	2.22	0.53	0.63	0.99	0.7	1.16	1.09

Figure 10. Average density per km² of commercially harvested macropods in Zone 4 population estimate region from 2005 to 2024



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Red	2.85	2.95	2.99	3.39	3.68	3.32	3.52	3.48	3.43	3.42	3.74	4.15	4.19	2.74	4.06	4.39	3.05	2.65	4.19	5.11
E. grey	23.3	23.8	24.1	20.8	22.1	22.0	29.2	35.4	45.0	41.1	39.4	36.7	39.2	40.5	45.8	20.8	20.5	19.7	26.1	33.5
C. Wallaroos	2.27	1.49	1.21	1.07	1.38	2.04	0.93	0.83	0.84	0.73	0.48	0.49	1.25	1.22	0.72	1.13	0.88	0.59	0.71	0.49

Figure 11. Average density per km^2 of commercially harvested macropods in Zone 5 population estimate region from 2005 to 2024



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Red	0.49	0.49	0.50	0.44	0.39	0.63	0.71	0.79	1.07	0.97	1.07	0.93	1.08	1.16	1.20	1.20	1.28	1.44	1.40	1.37
E. grey	6.92	7.90	8.87	7.81	6.75	7.57	10.0	12.5	13.5	14.0	17.4	20.0	14.9	14.5	22.2	21.6	9.98	15.2	14.3	15
C. Wallaroos	1.36	1.56	1.76	1.23	0.69	0.59	0.56	0.52	0.52	1.19	1.04	1.02	2.99	2.97	3.17	3.21	1.33	1.2	1.32	1.3

Trigger points

Pre-determined trigger points for each of the commercial harvest quotas were introduced to the Queensland Wildlife Trade Management Plan for Export (Commercially Harvested Macropods 2013–17) and are also incorporated in the Queensland Wildlife Trade Management Plan for Export (Commercially Harvested Macropods 2023–27). Each trigger point represents a threshold level based on analysis of the long-term population estimate for each harvested species in each population estimate region.

Where an estimated population for a region falls below a trigger point of 1.5 standard deviations (SD) below the long-term average for that region then the harvest quota will be halved for that zone in the next calendar year. If a population estimate falls below 2 SDs below the long-term average for that species in that zone, then there will be no quota for the following year.

Table 2 shows the calculated trigger points for the 2025 harvest period for each species in each zone compared with the 2024 population estimates for those zones.

The estimated populations for eastern grey kangaroos in zone 2 is below 1.5 SDs. Consistent with the Wildlife Trade Management Plan for Export—Commercially Harvested Macropods 2023–27 the quota will be reduced for this species in this region in 2025.

Table 2. Calculated trigger points for 2024 and the estimated populations of commercially harvested macropod species in each zone for 2024. Note estimates in red signify a trigger point has been reached.

Species	Population estimate zone	2024 estimated population	2024 1.5 SD trigger point	2024 2 SD trigger point
Red kangaroo	Zone 1	928,936	201,506	155,094
	Zone 2	4,344,178	1,894,863	1,678,700
	Zone 3	1,318,045	624,831	500,788
	Zone 4	645,141	105,320	79,049
	Zone 5	230,823	77,773	63,505
Eastern grey kangaroo	Zone 1	0	NA	NA
	Zone 2	637,828	703,680	516,006
	Zone 3	523,077	483,12	345,490
	Zone 4	5,110,725	2,469,652	2,090,319
	Zone 5	4,400,750	1,390,50	1,067,623
Common wallaroo	Zone 1	109,354	29,464	17,913
	Zone 2	785,557	514,096	358,913
	Zone 3	184,829	118,265	81,943
	Zone 4	31,110	31,027	24,212
	Zone 5	698,395	226,904	166,669

Note: There is no quota set for eastern grey kangaroos in zone 1.

Comparison between 2023 and 2024 population estimates

The total population estimates, combined across all three harvest zones, for all three harvest macropod species (red kangaroos, eastern grey kangaroos, and common wallaroos) have increased in 2024 compared to 2023 (figure 12). However, the total population estimates across all harvest zones does not reflect the regional variation that was pronounced in 2024 (table 3).

Since regionalisation of the Queensland commercial macropod harvest was introduced in 2003 an estimate of macropod population size in zone 1 and 5 (previously known as western and eastern zones, respectively) have been made. The model used to estimate these populations is based on a small sample area and the reduced sampling effort is reflected in a conservative quota (table 4). This model was updated in 2012 to incorporate almost a decade of survey data and to generate trigger points for the commercial quota allocation.

Red kangaroos increased in zones 2 and 4 but decreased in the other zones. Common wallaroos increased in zone 2, whilst they decreased in all other zones. Eastern grey kangaroos increased in all zones except zone 1 and 3 (table 3). Whilst eastern grey kangaroo population estimate for 2024 in zone 2 is below the 1.5 SDs trigger point, the estimate has increased and was previously below 2 SDs trigger point in 2023.

No quota will be proposed for eastern grey kangaroos in zone 1 because the population size in this harvest zone is small and at the geographic edge of this species distribution.

Figure 12. Comparison of overall macropod populations in the commercial harvest zones 2023 and 2024 (with one standard error)

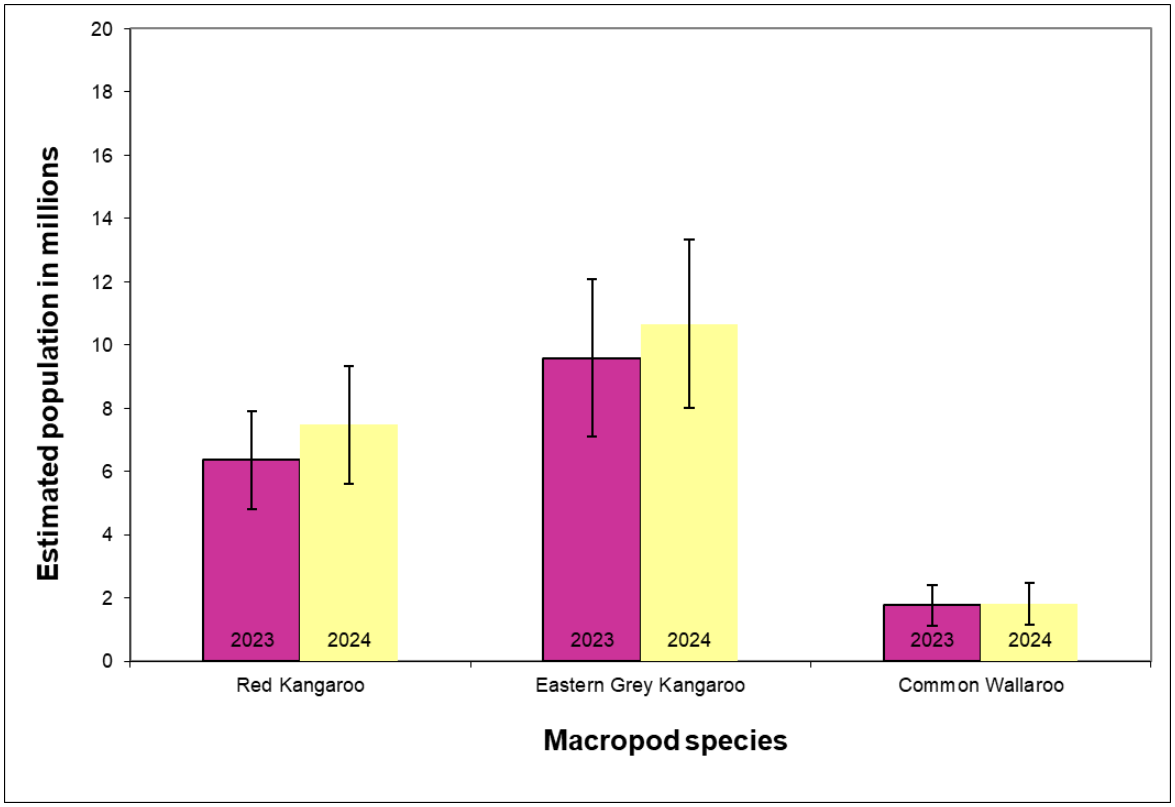


Table 3. Comparison between 2023 and 2024 macropod population estimates. Note estimates in red signify a trigger point has been reached.

Species	Harvest zone	2023 population estimate (rounded to the nearest 50)	2024 population estimate (rounded to the nearest 50)
Red kangaroo	Zone 1	992,700	928,950
	Zone 2	3,117,800	4,344,200
	Zone 3	1,494,750	1,318,050
	Zone 4	529,000	645,150
	Zone 5	237,500	230,800
	Combined	6,371,750	7,467,150
Eastern grey kangaroo	Zone 1	257,000	0
	Zone 2	490,450	637,850
	Zone 3	779,350	523,100
	Zone 4	3,871,650	5,110,700
	Zone 5	4,194,500	4,400,750
	Combined	9,592,950	10,672,400
Common wallaroo	Zone 1	222,450	109,350
	Zone 2	587,650	785,550
	Zone 3	194,850	184,850
	Zone 4	51,100	31,100
	Zone 5	706,950	698,400
	Combined	1,763,000	1,809,250

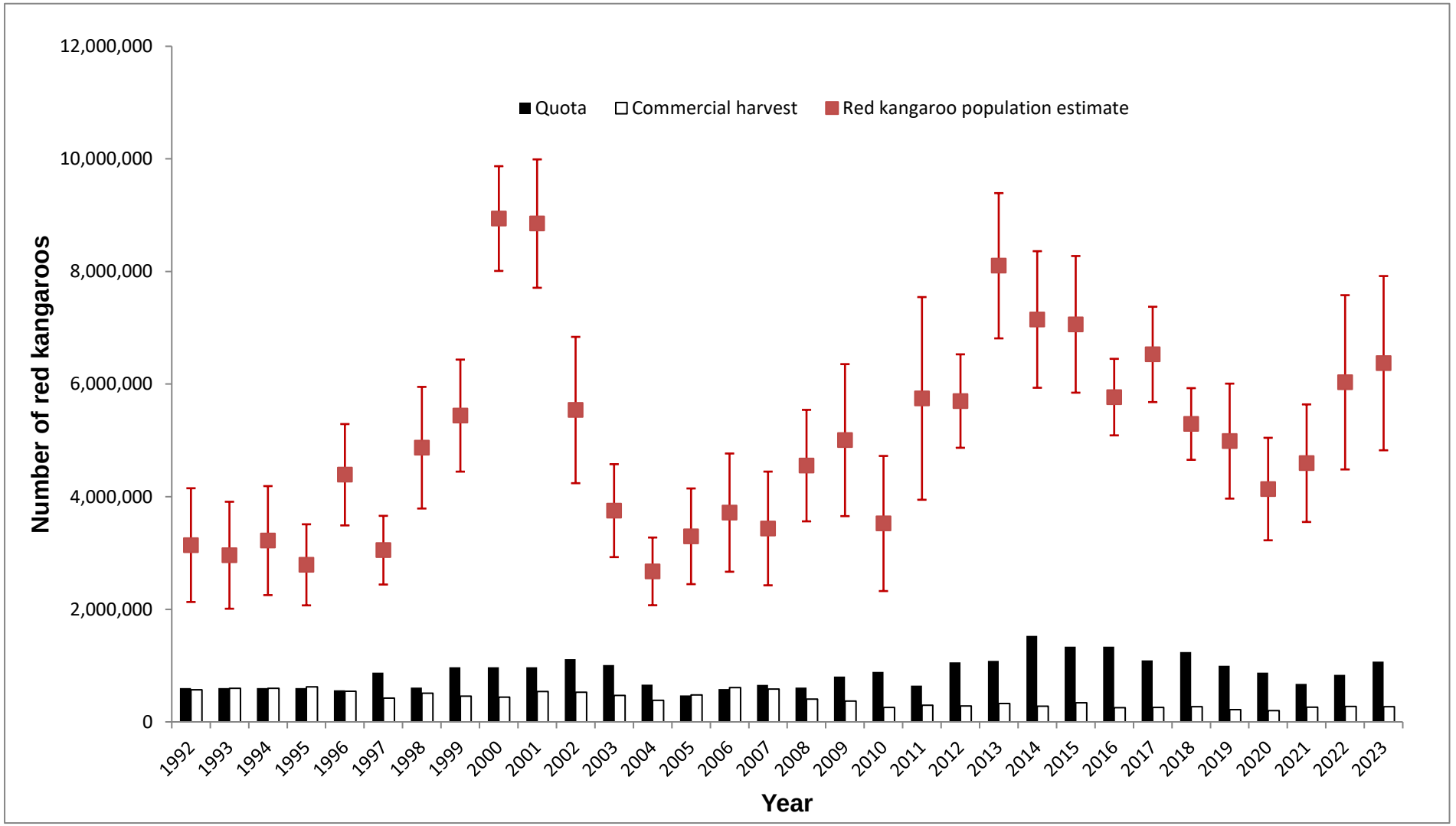
Table 4. Comparison between 2024 and 2025 macropod harvest quotas. Note estimates in red signify a trigger point has been reached.

Species	Harvest zone	2024 harvest quota	2025 harvest quota
Red kangaroo	Zone 1	99,250	92,900
	Zone 2	623,550	868,850
	Zone 3	298,950	263,600
	Zone 4	105,800	129,050
	Zone 5	23,750	23,100
	Combined	1,151,300	1,377,500
Eastern grey kangaroo	Zone 1	NA	NA
	Zone 2	0	47,850
	Zone 3	116,900	78,450
	Zone 4	580,750	766,600
	Zone 5	419,450	440,100
	Combined	1,117,100	1,333,000
Common wallaroo	Zone 1	22,250	10,950
	Zone 2	88,150	117,850
	Zone 3	29,250	27,750
	Zone 4	7,650	4,650
	Zone 5	70,700	69,850
	Combined	218,000	231,050

Long-term quota and harvest trends

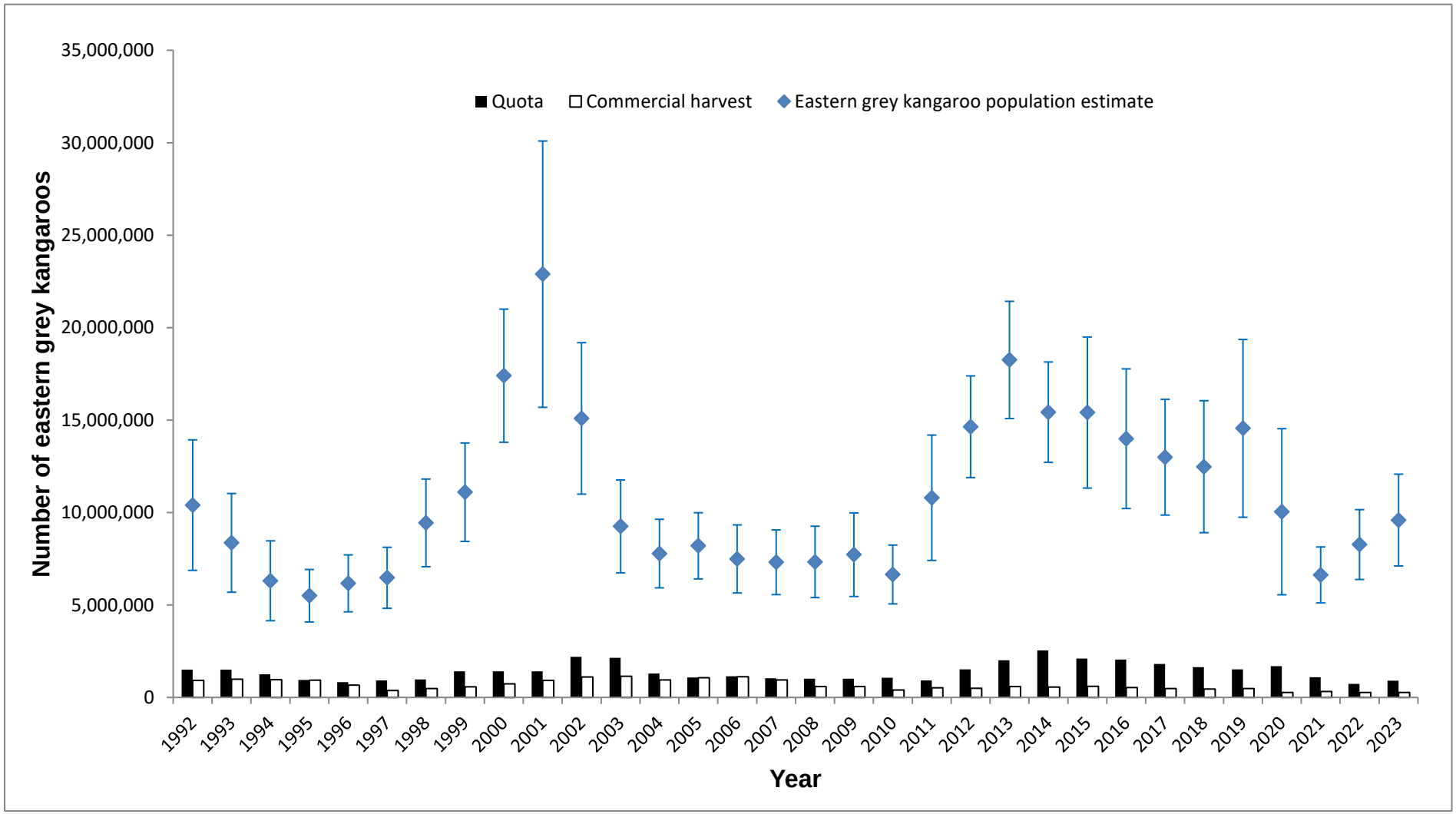
Figures 13 - 15 outline data on the three commercially harvested macropod species pertaining to estimated population, quota, and harvest for the years 1992 to 2023. Please note that population estimates are based on aerial surveys conducted in the previous year to the quota and harvest. Combined population estimates, quota and harvest data have been used for the period post-regionalisation in 2003, to enable comparison with data collated prior to this period.

Figure 13. Long-term population estimates (± 1 standard error), quota and harvest data for the red kangaroo in Queensland 1992 to 2023



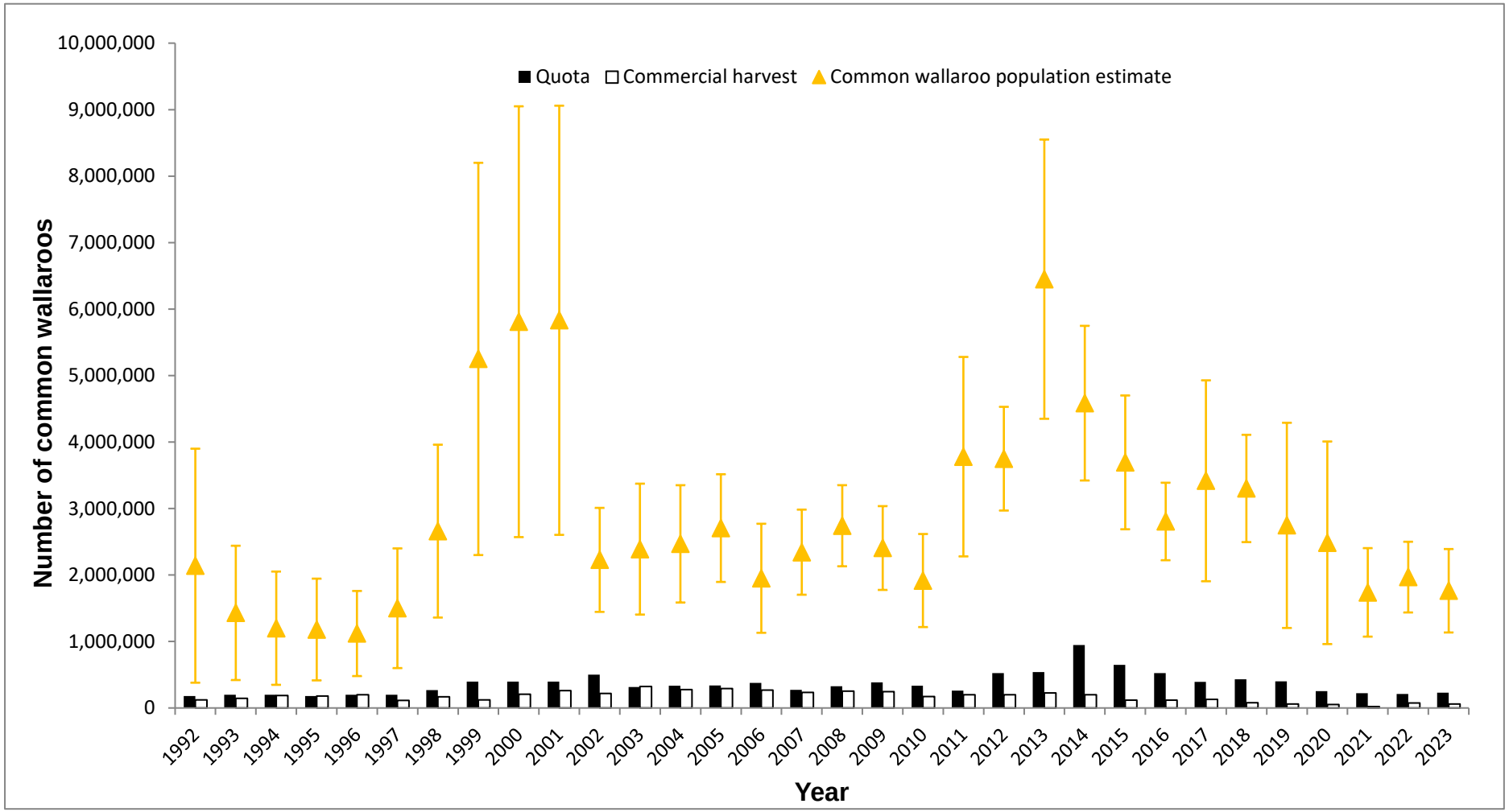
Note: population estimates are based on aerial surveys conducted the year before the harvest was taken.

Figure 14. Long-term population estimates (± 1 standard error), quota and harvest data for the eastern grey kangaroo in Queensland 1992 to 2023



Note: population estimates are based on aerial surveys conducted the year before the harvest was taken.

Figure 15. Long-term population estimates (± 1 standard error), quota and harvest data for the common wallaroo in Queensland 1992 to 2024



Note: population estimates are based on aerial surveys conducted the year before the harvest was taken.

As previously outlined, there has been no consistent decline in the populations of the three commercially harvested species since 1992 (figures 13 to 15). Of these species, the eastern grey kangaroo is consistently most abundant across the harvest zones, followed by the red kangaroo. Common wallaroos are the least numerous. Population estimates for all three species are in excess of one million across the harvest zones.

As quotas are set as a constant proportion of the populations, they fluctuate as population estimates fluctuate (figures 13 to 15). However, numerous factors influence harvest rates for commercial macropods. These include population levels, market forces, environmental conditions, and access by harvesters. As a consequence, there is no clear pattern or trend in the proportion of the quota harvested since 1992.

Review of the 2023 harvest

Dealer returns for the year 2023 (entered up to 5 February 2024) indicate that there were 597,750 macropods taken in Queensland, which represents 27.0% of the overall combined quota. Of the animals harvested, there were 270,801 red kangaroos, 268,140 eastern grey kangaroos and 58,809 common wallaroos harvested (table 5 to 8). Quotas for individual species in each harvest zone were not exceeded in 2023. The maximum commercial take as a percentage of the approved quotas was 71.9% for common wallaroos in the zone 4 (tables 5 to 8).

Table 5. Total harvest in 2023

Species	Population estimate 2022	Quota 2023	Harvest take 2023	% quota used 2023	% population harvested 2023
Red kangaroo	6,031,700	1,071,600	270,801	25.3%	4.5%
Eastern grey kangaroo	8,267,050	909,100	268,140	29.5%	3.2%
Common wallaroo	1,968,450	229,700	58,809	25.6%	3.0%
Total	16,267,200	2,210,400	597,750	27.0%	3.7%

Note: population estimates are based on aerial surveys conducted in 2022, which were used to set the 2023 quota.

Table 6. Harvest of red kangaroos in 2023

Zone	Population estimate 2022	Quota 2023	Harvest take 2023	% quota utilised 2023	% population harvested 2023
Zone 1	1,080,500	108,050	25,520	23.6%	2.4%
Zone 2	3,439,150	687,850	147,184	21.4%	4.3%
Zone 3	906,800	181,350	49,773	27.4%	5.5%
Zone 4	337,950	67,600	40,942	60.6%	12.1%
Zone 5	267,300	26,750	7,382	27.6%	2.8%
Total	6,031,700	1,071,600	270,801	25.3%	4.5%

Note: population estimates are based on aerial surveys conducted in 2022, which were used to set the 2023 quota.

Table 7. Harvest of eastern grey kangaroos in 2023

Zone	Population estimate 2022	Quota 2023	Harvest take 2023	% quota utilised 2023	% population harvested 2023
Zone 1	0	NA	NA	NA	NA
Zone 2	461,050	0	0	NA	NA
Zone 3	499,750	37,500	19,554	52.1%	3.9%
Zone 4	2,819,700	422,950	172,367	40.8%	6.1%
Zone 5	4,486,550	448,650	76,219	17.0%	1.7%
Total	8,267,050	909,100	268,140	29.5%	3.2%

Note: population estimates are based on aerial surveys conducted in 2022, which were used to set the 2023 quota.

Table 8. Harvest of common wallaroos in 2023

Zone	Population estimate 2022	Quota 2023	Harvest take 2023	% quota utilised 2023	% population harvested 2023
Zone 1	480,750	48,100	1,473	3.1%	0.3%
Zone 2	672,650	100,900	39,359	39.0%	5.9%
Zone 3	118,800	8,900	5,769	64.8%	4.9%
Zone 4	43,200	6,500	4,675	71.9%	10.8%
Zone 5	653,050	65,300	7,533	11.5%	1.2%
Total	1,968,450	229,700	58,809	25.6%	3.0%

Note: population estimates are based on aerial surveys conducted in 2022, which were used to set the 2023 quota.

Sex ratio by species and zone

The commercial harvest of macropods is typically biased towards males (figure 16) as they are usually larger and heavier than females. In 2023, the total harvest for each species was biased towards males by 81.7% or greater. Females composed less than 14% of the overall harvest (figure 17).

Figure 16. Overall sex ratio from 1997 to 2023

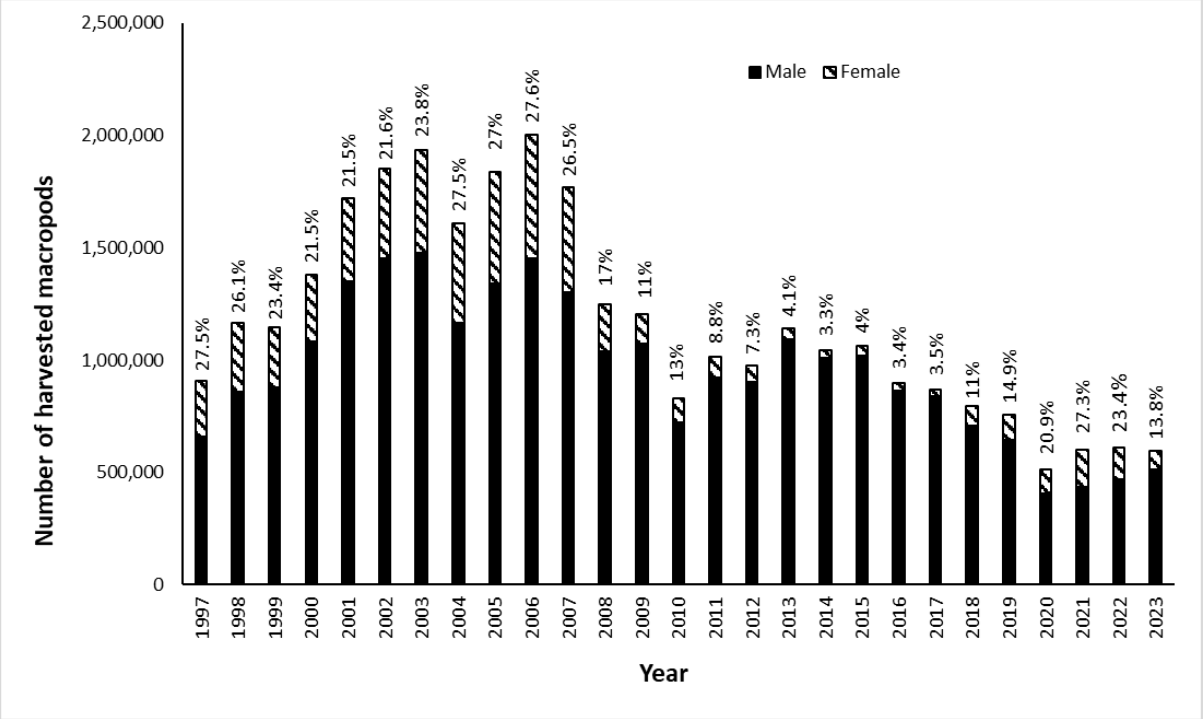
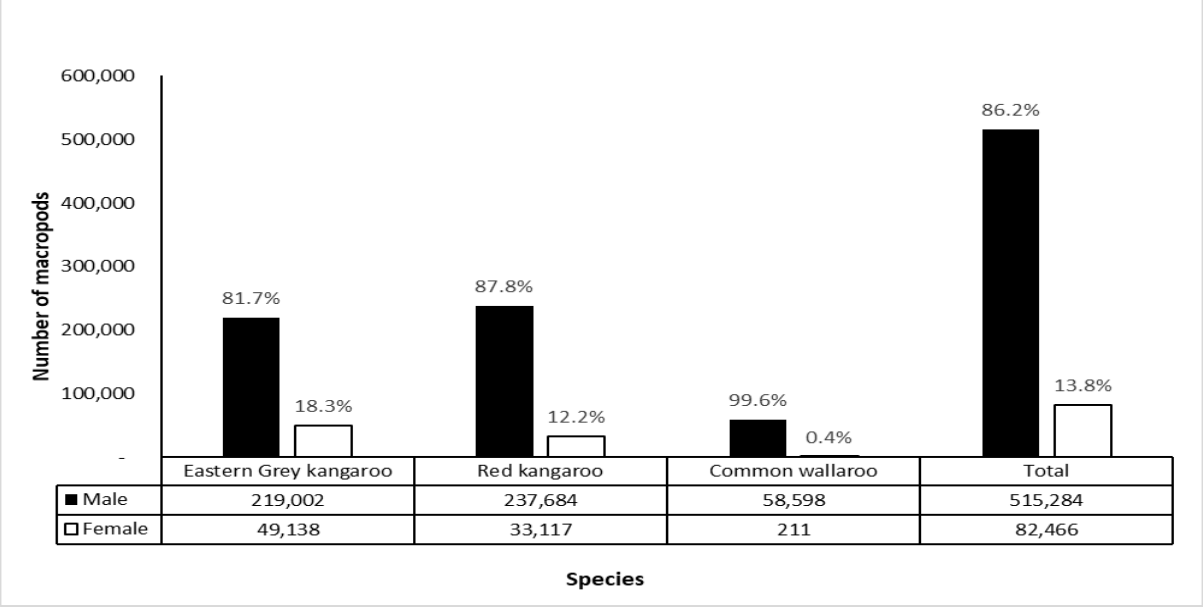


Figure 17. Proportion of 2023 harvest, male and female by species



Harvest update for 2024

The total number of tags issued as at 31 July 2024 was 436,500. A comparison of tag sales and harvest returns in relation to quotas in each zone is provided in table 9. Reported harvest is based on data from dealer returns, entered up to 31 July 2024. The number of tags sold does not exceed the maximum quota for each species in each zone therefore it is not possible for the commercial harvest

quotas to be over allocated. Tag sales are below quota for all species in all zones. The 2024 harvest will be comprehensively reported on in the Queensland Commercial Macropod Management Program Annual Report 2024, due for release in March 2025.

Table 9. Tags issued and reported harvest for 2024 at 31 July

Species	Harvest zone	2024 sustainable use quota (rounded to the nearest 50)	Tags issued to 31 July 2024	Reported harvest to 31 July 2023
Red kangaroo	1	99,250	15,200	9,498
	2	623,550	106,450	76,525
	3	298,950	39,950	28,504
	4	105,800	29,900	14,215
	5	23,750	10,500	4,803
Eastern grey kangaroo	1	NA	NA	NA
	2	NA	NA	NA
	3	116,900	14,700	7,870
	4	580,750	98,000	64,832
	5	419,450	58,500	35,230
Common wallaroo	1	22,250	1,550	356
	2	88,150	31,050	18,250
	3	29,250	11,650	4,308
	4	7,650	7,650	2,136
	5	70,700	11,400	3,666

The extent of non-commercial harvest mortality

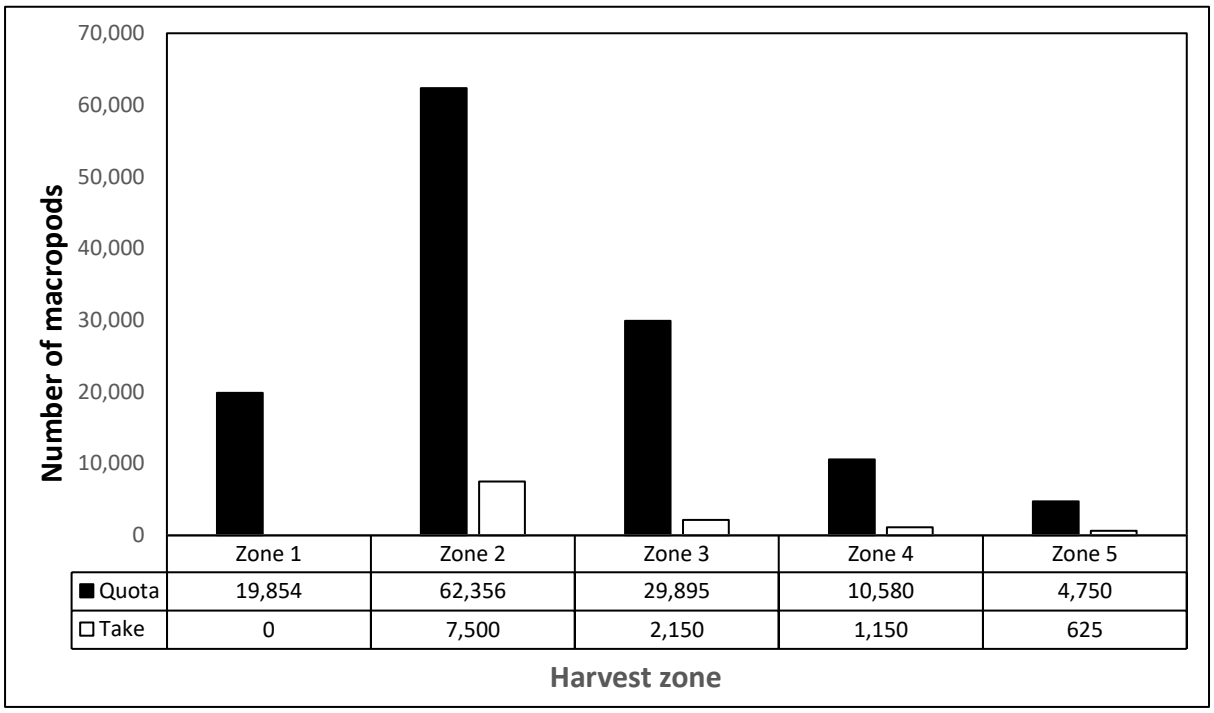
There are many forms of macropod mortality outside of the commercial harvest. It is possible for DESI to collect and report data on two forms of non-commercial harvest mortality which can be considered when determining commercial quotas. These include Damage Mitigation Permits (DMPs) and disease outbreak mortality.

Damage mitigation permits

A Damage Mitigation Permit (DMP) may be granted where a protected animal (including commercially harvested macropods) is causing, or may cause, damage or loss; or represents a threat to human health or wellbeing. The total number of harvest macropods allowed to be taken under these permits are limited to a maximum of 2% of the estimated population for each species. Restricting the granting of DMPs in this way provides a clear limit that ensures the lethal take of harvest macropods operates as a sustainable program. Further restrictions are also in place on the limit allocated to individuals in zones where the population estimated are below trigger points.

The new assessment guidelines are on the department website: (https://environment.des.qld.gov.au/licences-permits/plants-animals/damage-mitigation-permits). All DMPs state that macropods must be taken in a way specified in the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-commercial Purposes. Uptake of DMPs in 2024 is below the available quota (figures 18 to 20) and has fluctuated over the last 10 years (figure 21).

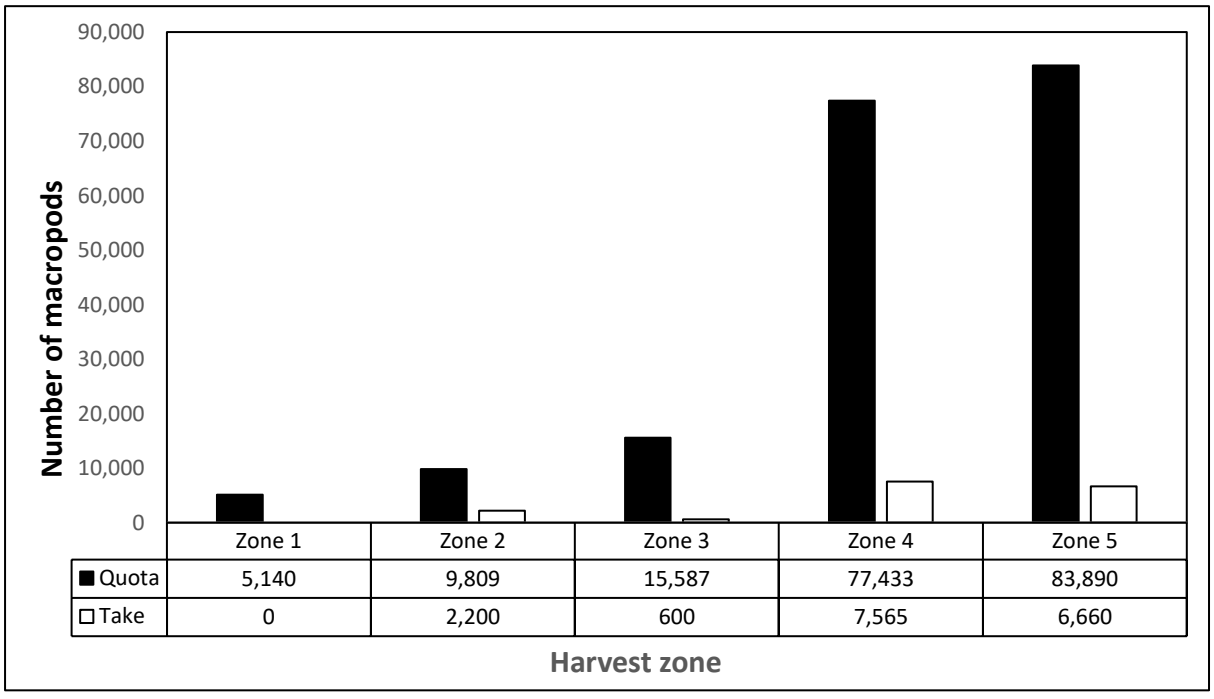
Figure 18. DMP macropod quota and take of red kangaroo for 2024 at 31 July



	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Quota	19,854	62,356	29,895	10,580	4,750
Take	0	7,500	2,150	1,150	625

Note: Figures are as recorded on 31 July 2024

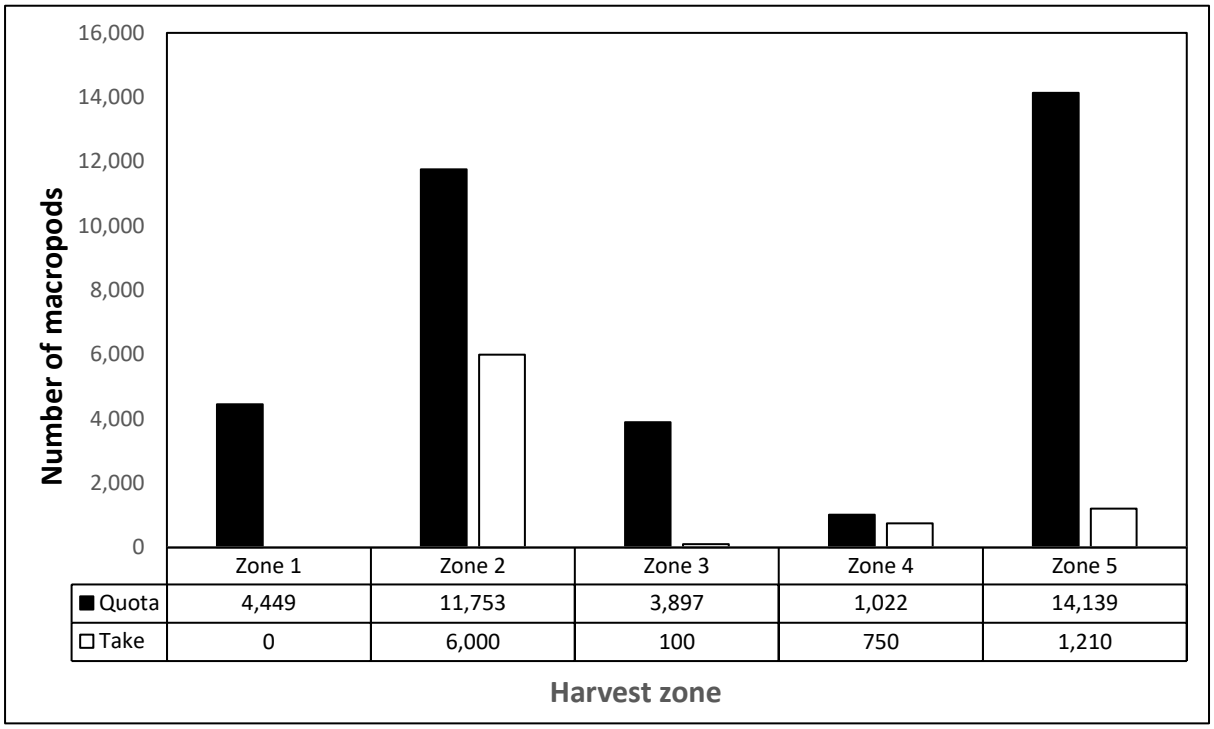
Figure 19. DMP macropod quota and take of eastern grey kangaroo for 2024 at 31 July



	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Quota	5,140	9,809	15,587	77,433	83,890
Take	0	2,200	600	7,565	6,660

Note: Figures are as recorded on 31 July 2024

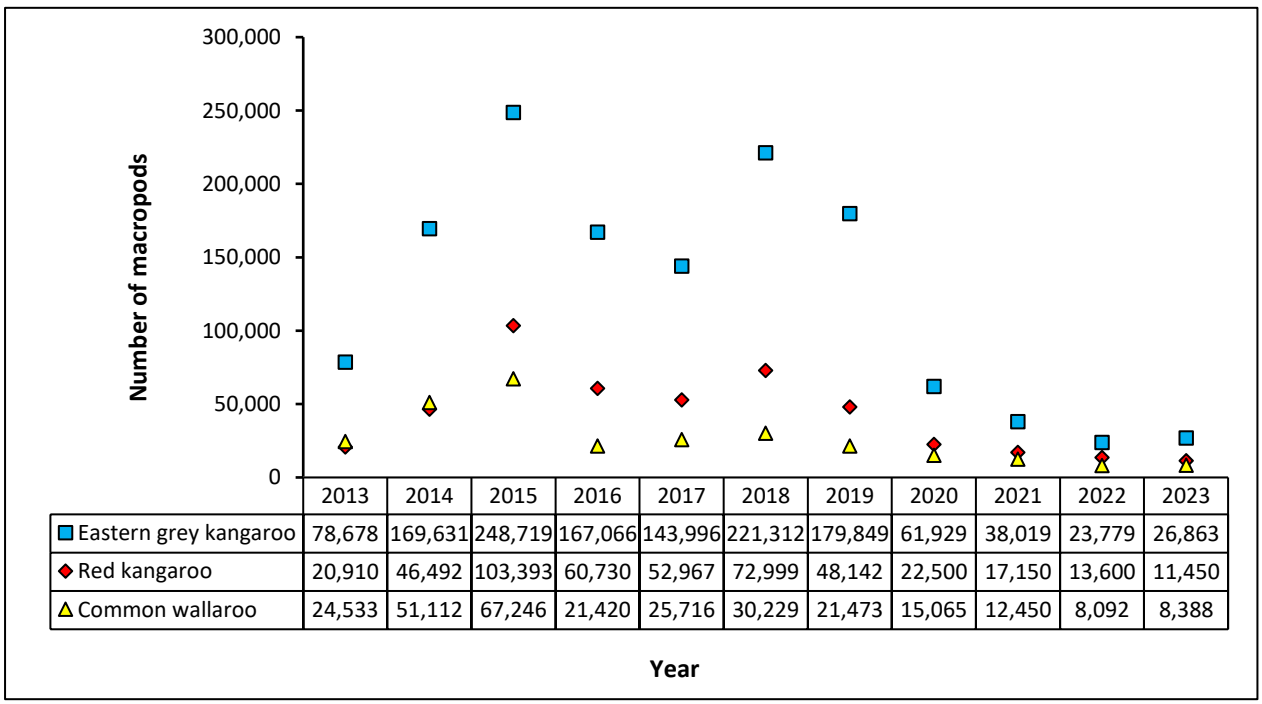
Figure 20. DMP macropod quota and take of common wallaroo for 2024 at 31 July



	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Quota	4,449	11,753	3,897	1,022	14,139
Take	0	6,000	100	750	1,210

Note: Figures are as recorded on 31 July 2024

Figure 21. Macropods approved to be taken under a DMP 2013–2023



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Eastern grey kangaroo	78,678	169,631	248,719	167,066	143,996	221,312	179,849	61,929	38,019	23,779	26,863
Red kangaroo	20,910	46,492	103,393	60,730	52,967	72,999	48,142	22,500	17,150	13,600	11,450
Common wallaroo	24,533	51,112	67,246	21,420	25,716	30,229	21,473	15,065	12,450	8,092	8,388

Disease outbreak mortality and its significance

No incidence of significant disease mortalities has been recorded for macropod populations in Queensland during 2023 or 2024. The department continues to liaise with Wildlife Health Australia and other Queensland government agencies to monitor any emerging health issues for commercially harvested macropods in Queensland.

Proportion of the population not subject to harvesting

Commercial harvesting of macropods only occurs in five harvest zones in Queensland. Cape York Peninsula and the southeast corner of Queensland are designated Non-harvest zones (figure 1). Within the five commercial harvest zones macropods cannot be harvested within National Parks, State Forests, Conservation Parks, Resources Reserves, Timber Reserves and Forest Reserves. Table 10 outlines the size of these land tenures within the commercial harvest zones.

Figures 22 to 24 show the general distribution of each of the commercially harvested macropods in relation to the population estimate regions. Red kangaroos are harvested in zone 1 to 4 and in the north of zone 5 (figure 22). Eastern grey kangaroos are only harvested in zone 2 to 5 (figure 23). Common wallaroos have the broadest distribution (figure 24) throughout Queensland and can be harvested in all zones.

Table 10. Area of land tenures within the Queensland commercial harvest zones where harvesting of macropods is not permitted (at 1 February 2023)

	Zone 1 km^2	Zone 2 km^2	Zone 3 km^2	Zone 4 km^2	Zone 5 km^2	Total km^2
National Park	20,629	4,239	5,657	1,925	17,018	93,294
State Forest	NA	NA	320	1,471	16,354	30,977
Conservation Park	79	14	3	13	459	859
Resources Reserves	965	129	NA	8	926	2,236
Forest Reserve	NA	NA	NA	NA	203	500
Timber Reserve	78	238	213	NA	121	663
Total km^2	21,751	4,620	6,193	12,418	35,081	128,529

Figure 22. Red kangaroo *(Osphranter rufus)* distribution

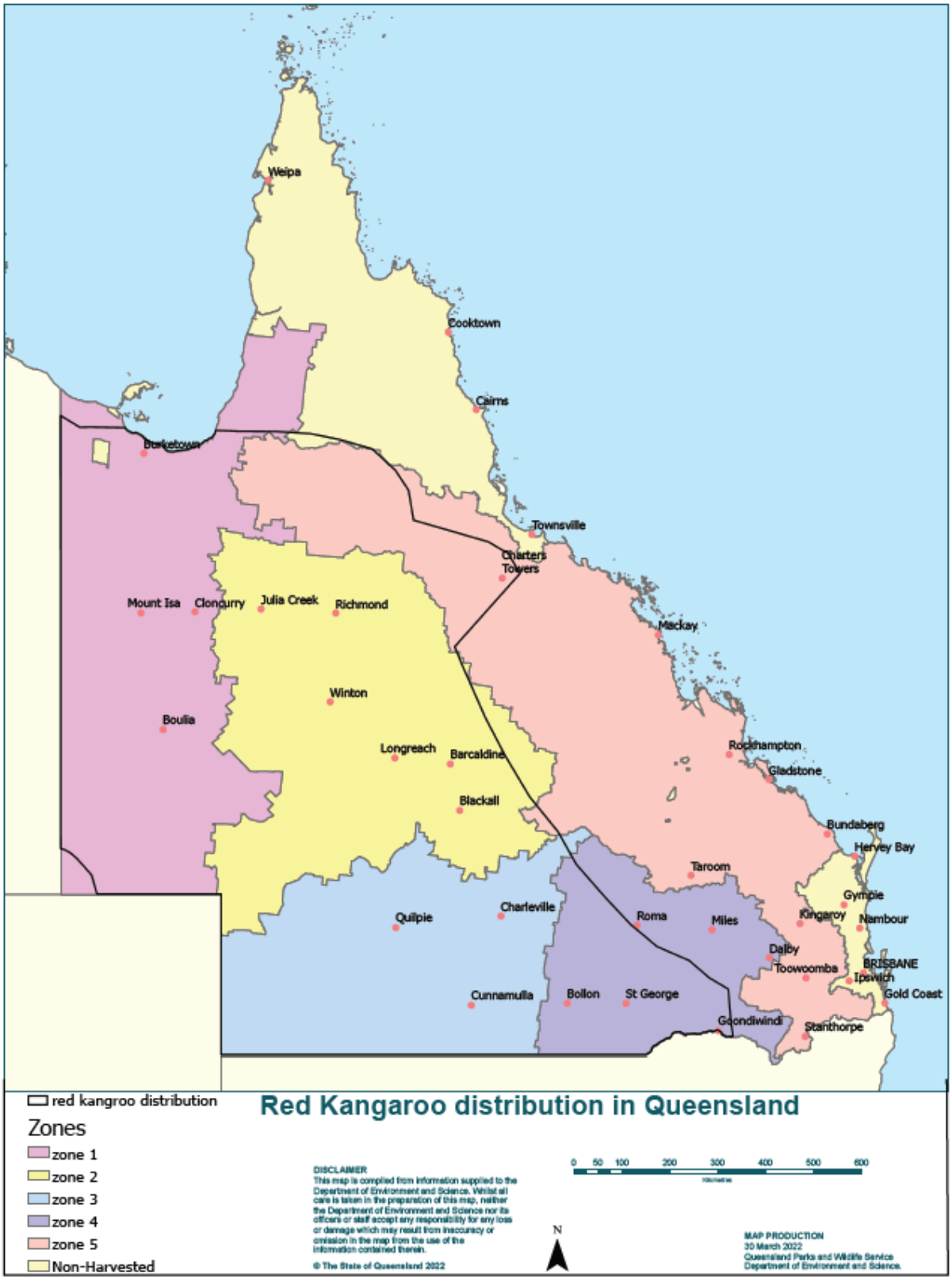


Figure 23. Eastern grey kangaroo (*Macropus giganteus)* distribution

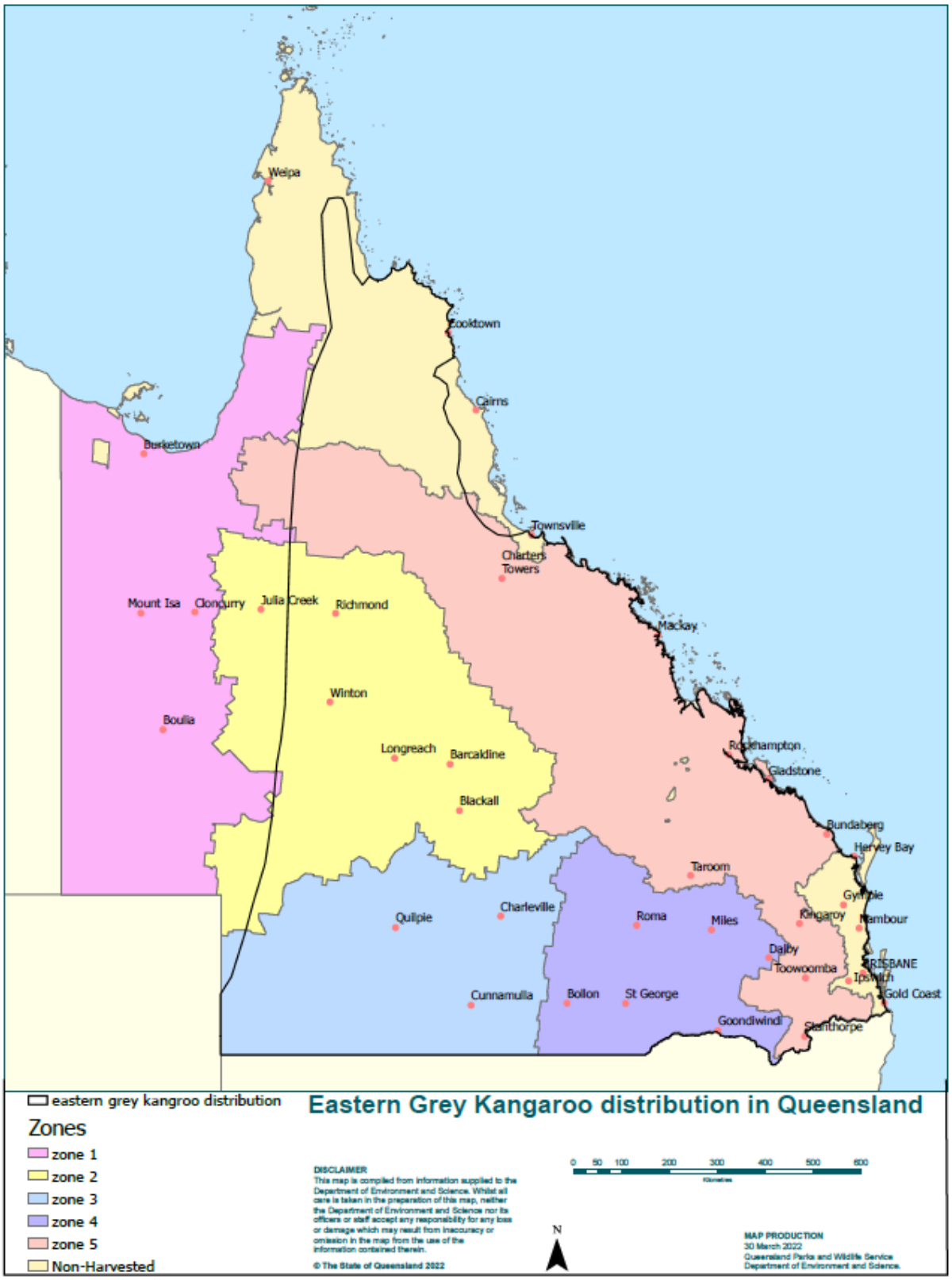
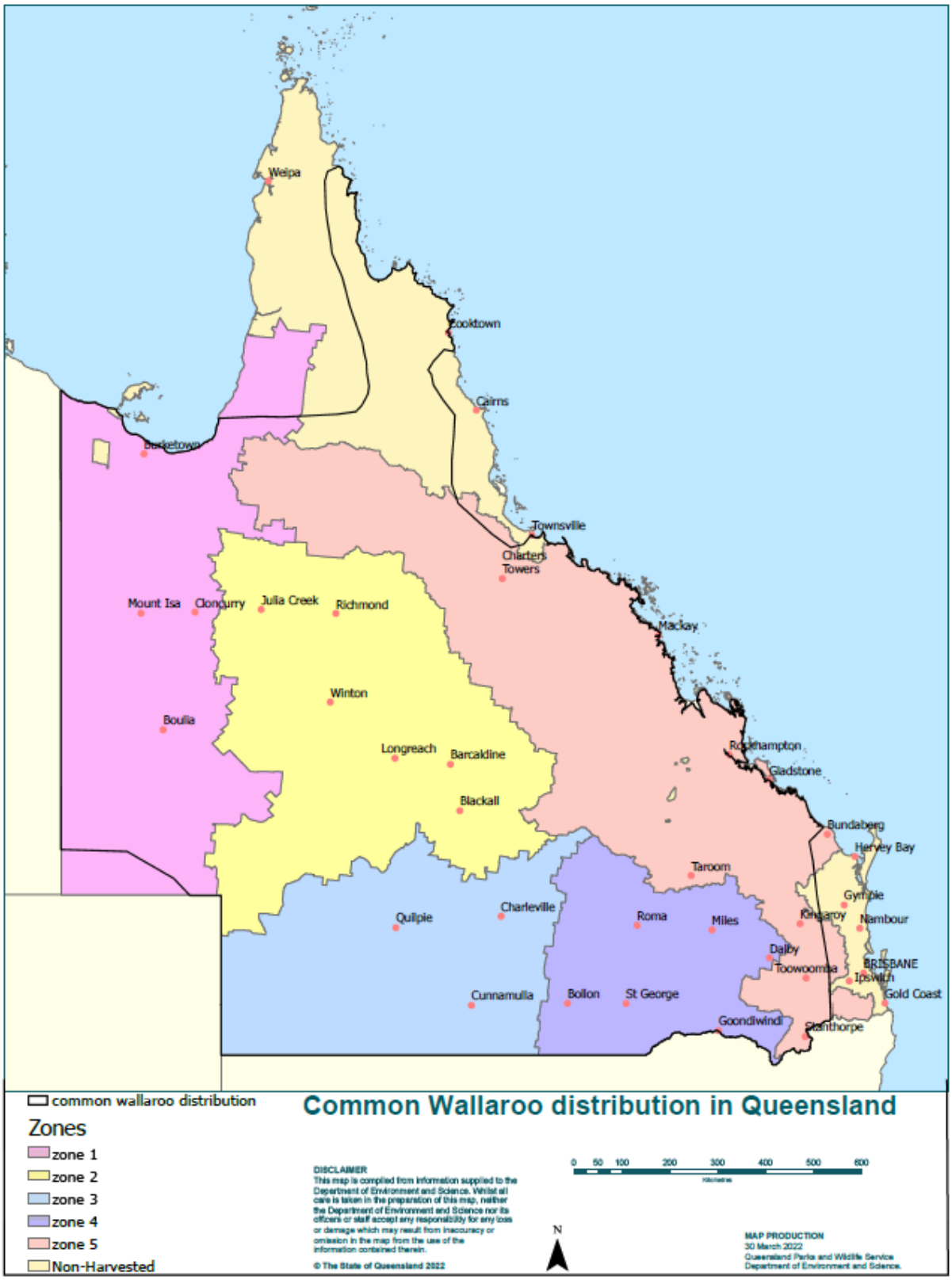


Figure 24. Common wallaroo *(Osphranter robustus)* distribution



Climate trends

Queensland's temperatures in 2023 were above the 1961-1990 average maximums and minimums. The recorded maximums were most prevalent in the areas with average, or below average, rainfall. Rainfall across the state was 11% higher than the 1961-1990 average. Rainfall was above average for northern Queensland and was below average for the southeast coast and inland towards Warrego. Figure 25 displays the total rainfall in Queensland for 2022. La Niña was the main climate driver through the first quarter of 2023, which was followed by a neutral El Niño–Southern Oscillation (ENSO) (neither La Niña nor El Niño) until September when El Niño became the main climate driver (Bureau of Meteorology 2023).

Due to the widespread rainfall to many areas, none of the Queensland harvest zones are no longer drought declared (see figure 26). Queensland has received above average rainfall in 2022 and 2023. An overall increase in the population of commercially harvest macropod species was observed in the 2023 and 2024 aerial surveys. Macropod population densities are unlikely to respond to the widespread rainfall in just 12 months, but small increases were observed in some areas during the 2024 aerial surveys. The majority of the macropod harvest zones were drought declared for an extended period with the recovery of natural habitats and wildlife populations expected to take time.

Figure 25. Queensland rainfall totals (mm) from 1 January to 31 December 2023

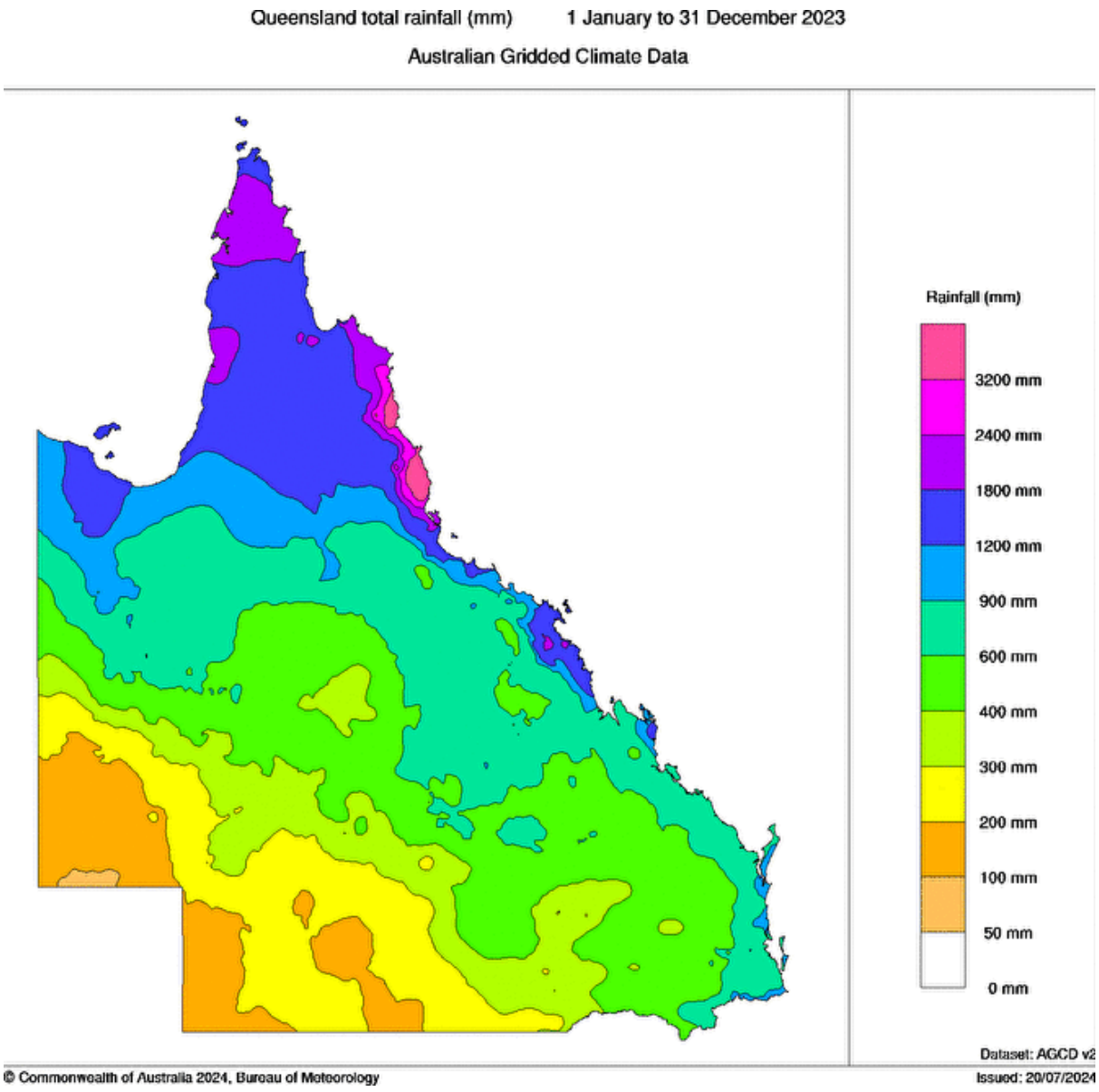
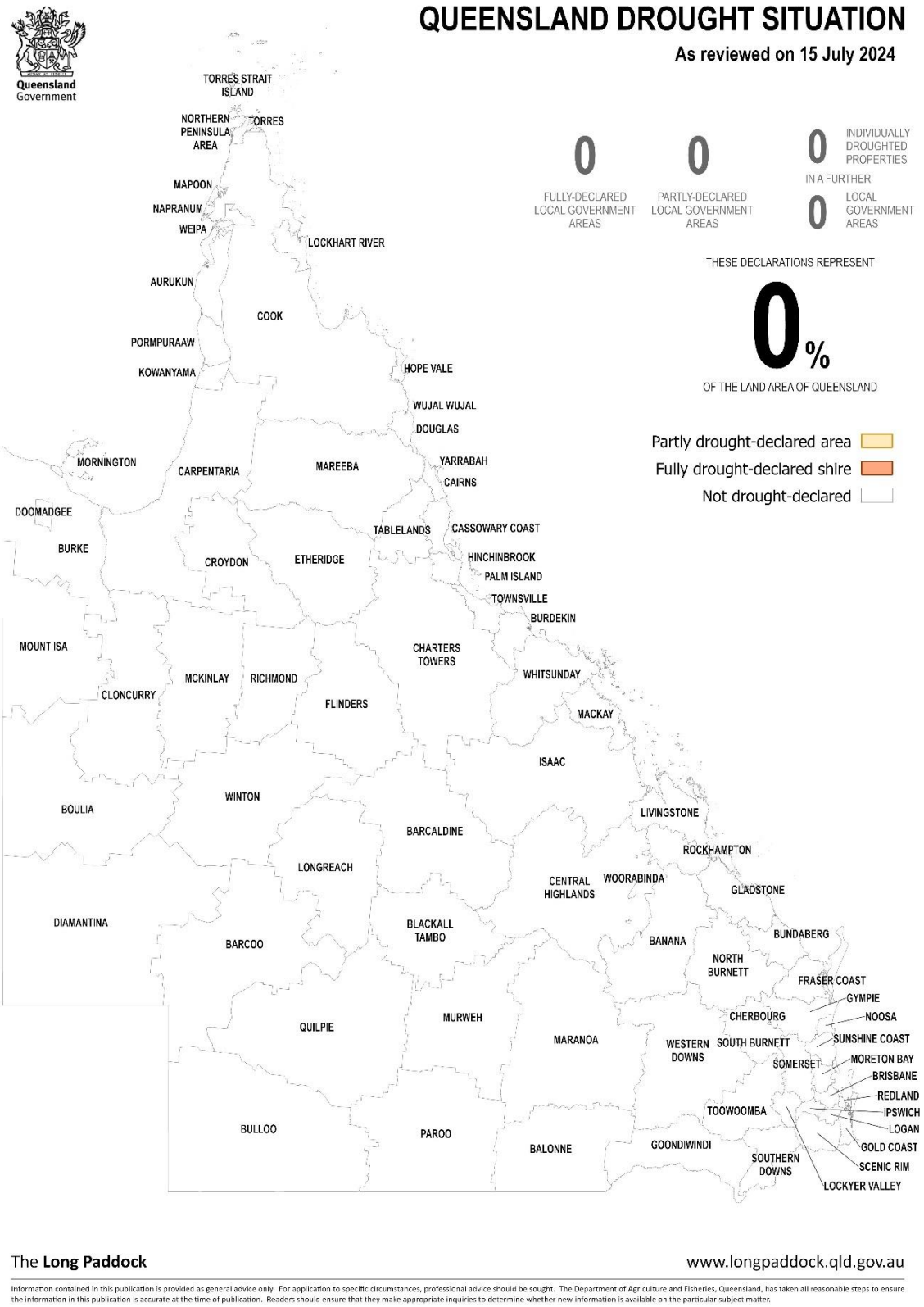


Figure 26. Queensland drought declarations at 15 July 2024



Summary and conclusion

The proposed quotas for the 2025 commercial macropod harvest in Queensland have been formulated by following an established methodology, which is largely based on constant proportions of population estimates and monitoring of long-term population trends. Population estimates are derived from representative aerial surveys across the harvest zones that are informed by the best available science.

Long-term trend data relating to population size since 1992, when Queensland began an annual program of helicopter surveys, demonstrates there has been no consistent increase or decline in the populations of red kangaroos, eastern grey kangaroos or common wallaroos in Queensland. However, populations do fluctuate over time. Population estimates indicate that more than 1 million macropods of each species occur in the harvest areas. Thus, current harvest rates can be viewed as not having a long-term detrimental impact on populations.

Since regionalisation of the Queensland commercial macropod harvest was introduced in 2003, an estimate of macropod population size in zones 1 and 2 has been made. The model used to estimate these populations is based on a small sample area and the reduced sampling effort is reflected in conservative quotas. This model was updated in 2012 to incorporate almost a decade of survey data and to generate trigger points for the commercial quota allocation. The population estimates in zones 1 and 5 (previously the western and eastern zones, respectively) are a function of both the new model and the survey data for 2023. Aerial surveys were conducted at 15 monitor blocks across Queensland in 2024.

Overall combined population estimate totals for all three species increased across the state.

Population estimates decreased marginally for eastern grey kangaroos in zone 1 and 3 and increased in all other zones in 2024. Whilst the population estimate increased for eastern grey kangaroos in zone 2 above the 2 standard deviation trigger point, the eastern grey population estimate is below the 1.5 standard deviation trigger point. The quota for this species in zone 2 will be halved for 2024.

The red kangaroo population estimate decreased in zones 1 and 3, decreased slightly in zone 5 and increased in zones 2 and 4. Despite the decreases observed no trigger points were reached for red kangaroos and harvest quotas have been set for all harvest zones.

Common wallaroo population estimates increased in zone 2, they decreased slightly in zones 3 and 5 and markedly in zones 1 and 4. No trigger points were reached for common wallaroos, and they can be harvested in all zones during the 2025 harvest period. Although overall combined population estimates for all three species increased across the state regional variations were observed for all three species.

For the 2023 commercial harvest period no quotas were exceeded, with the maximum percentage of quota utilised being 71.9% for common wallaroos in zone 4. Sex ratios from harvest data continue to be biased towards males with the overall percentage of females harvested below 14%. Thus, the last completed harvest period provides no indication of adverse pressure on populations that would influence proposed quotas. For the 2024 harvest period as at 31 July tag sales are below quota for all species in all zones.

Usage of DMPs in 2023 were below the 2% of the population estimate quota for all species for all zones. The current percentages for usage of DMP quotas for 2024 are also below the quota limit of 2% for all species in each region and zone.

The three commercially harvested macropod species are protected from harvesting within the harvest area through protected area. These ‘refuges’ occur in patches throughout the distributional ranges of all three species. Macropods are further protected from harvest in Queensland within the non-harvest zones.

The harvest zones are no longer drought declared, although the legacy of eight years drought is significant in terms of wildlife abundance. Queensland has received above average rainfall in 2022 and 2023. An overall increase in the population of commercially harvest macropod species was observed in the 2023 and 2024 aerial surveys. Macropod population densities are unlikely to respond to the widespread rainfall over the next 12 months but may continue to increase in the coming years if wetter than average conditions continue. The main climate influences active during 2023 was a neutral El Niño–Southern Oscillation (ENSO) (neither La Niña nor El Niño) (Bureau of Meteorology).2023).

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Appendixes

Appendix 1. Aerial Surveys of Commercially Harvested Macropods in Queensland

Since 1991 the Queensland Government has conducted an annual program of aerial surveys by helicopter to directly monitor populations of eastern grey kangaroos, red kangaroos and common wallaroos. This method employs line transect methodology (Buckland et al.1993). A detailed description of the methodology employed in these surveys is provided in Clancy et al. (1997). Annual aerial surveys are conducted over 22 fixed monitoring blocks, covering an area of 54,400km² or 2% of the population estimate area, which provides appropriate coverage over the core harvest area (Pople et al. 1998).

In each survey block, between two to eight transect lines are flown spaced 10km apart. No correction factors are applied to surveys of eastern grey kangaroos and red kangaroos as they are comparable with ground surveys. A correction factor of 1.85 is applied to wallaroo density estimates derived from helicopter surveys as they are known to be half that of ground surveys (Clancy et al. 1997).

Due to the costs associated with aerial surveys, not all monitor blocks are surveyed annually. The main feature of the current monitoring program is the establishment of pairs of closely correlated monitor blocks within each bioregion. Pairs are monitored on a rotating basis with each block surveyed every two years. Where there is only a single monitor block within a bioregion or where a monitor block samples a unique macropod community these blocks are sampled annually. All monitoring blocks are surveyed every five years.

Zones one and five, are not surveyed with the same intensity as the other harvest zones due to less harvesting in these zones. Population estimates are calculated by extrapolating the mean monitor block densities to 53% of the harvest zones.

Conservative harvest quotas are calculated using a fixed proportion of the estimated macropod populations within the harvest zones. The proportions used vary between species and are adjusted across each zone in relation to the margins of error present in population estimates. The maximum proportions used for each species are 15% of populations for eastern grey kangaroos and common wallaroos and 20% for red kangaroos. In zones one and five a more conservative harvest proportion of 10% for all three species is applied. These sustainable-use harvest quotas are based on research undertaken by Caughley et al. (1987) and Hacker et al. (2002) and account for a female harvest including the euthanasia of joeys. They are accepted by the scientific community, the Queensland Government and the Commonwealth Department of Climate Change, Energy the Environment and Water.

Appendix 2. Densities per km^2 of the commercially harvested macropod species 2004–2024

	Eastern grey kangaroo																				
Block	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**201**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Barcaldine	20.61	13.17	22.7	17.65	23.15	29.50	12.87	23.9	24.09	44.10	24.96	19.3	14.71	13.65	15.19	5.03	5.08	5.71	6.50	5.43	8.43
Blackall	7.57	7.10	6.22	7.51	8.28	11.19	7.08	6.08	9.87	19.41	10.59	8.75	5.29	4.97	3.16	1.64	2.07	0.38	0.98	2.32	1.58
Bollon	25.66	25.31		30.53		31.74	30.14		47.2		32.01	24.9		27.58		29.50		12.95	7.78	16.12	
Boulia																			0.00	0.00	0.00
Charleville	17.51	19.91	15.9	12.05	11.20	12.95	12.23	28.1	25.12	26.77	11.77	8.4	10.47	9.32	5.25	2.13	1.78	3.67	3.97	3.04	2.94
Charters		1.63		5.02		5.33	5.57		3.37		3.14	2.01		1.53		1.32		2.45	4.25	6.46	
Cloncurry	0.01		0.16		0.02		0.21	0.01		0.07		0.00	0.06		0.12			0.00	0.00	0.04	0.00
Cunnamulla	13.20		9.97		11.44		11.64	32.8		41.04		35.8	18.73		9.15	5.10	2.46	2.53	6.09		5.69
Emerald		3.95		3.41		4.05	5.04		2.75		7.01	5.29		7.88		7.67		3.94	6.25	4.15	
Hughenden	0.77	0.58		1.16		0.97	0.79		0.53		1.17	1.41		1.01		1.43		1.47	0.73	1.16	1.16
Hungerford	1.16	1.10		0.77		0.94	0.65		2.20		4.00	3.79		3.36		0.13		0.08	0.95	1.48	
Inglewood		8.72		18.62		9.75	12.33		29.10		32.73	49.8		42.02		66.87		23.77	28.21	37.58	
Julia Creek	1.08	0.87	1.05		0.76		0.28	0.28		0.84		0.84	0.2		0.49			0.06	0.00	0	0.06
Longreach	9.05	8.48		6.63		6.61	6.13		18.07		20.17	5.25		3.85		4.67		3.60	2.77	1.92	
Mt Isa																			0.00	0.00	0.00
Quilpie	1.86		0.97		1.42		2.79	1.57		3.61		4.65	2.66		0.87	0.34	0.00	0.37	0.05		0.40
Roma	25.05	24.98	25.4	25.12		23.43	19.30		27.16		40.56	32.2		31.74		39.34		23.10	22.62	30.46	
Taroom	8.12	13.37		8.44		7.87	7.36		14.98		13.24	12.6		8.19		13.00		9.74	22.03	9.16	11.91
Westmar	25.53		23.1		21.18		22.08	37.2		62.54		77.9	66.07		82.67		30.64	24.76	27.02		56.28
Windorah	1.58	2.69	1.14	1.39	2.39	1.26	0.86	2.68	1.24	1.80	0.79	1.02	2.13	1.34	0.29	0.10	0.06	0.07	0.03	0.31	0.33
Winton	4.86	2.98	3.74		4.78		2.43	3.57		6.61		5.79	4.46		5.11		1.50	1.02	0.32		1.19

	Red kangaroo																				
Block	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Barcaldine	6.07	4.07	11.07	6.72	9.03	9.83	7.58	10.05	7.83	12.30	9.2	16.24	8.54	8.25	7.49	5.52	3.86	5.90	11.33	8.51	18.85
Blackall	3.99	3.29	4.55	3.78	6.45	7.24	4.70	12.37	14.17	17.47	10.35	11.58	9.69	8.52	7.89	8.78	5.63	5.93	5.58	3.66	7.41
Bollon	4.13	8.87		8.35		11.16	9.90		7.78		7.27	9.83		8.87		7.18		6.68	5.02	8.98	
Boulia																			4.23	6.17	6.57
Charleville	4.55	5.48	7.36	9.57	7.58	8.47	6.46	14.69	5.53	7.03	4.97	5.06	6.32	3.75	4.06	3.72	1.44	3.68	1.79	1.58	1.54
Charters		0.02		0.05		0.00	0.70		0.24		0.21	0.62		0.59		0.28		0.20	0.00	0.53	
Cloncurry	2.14		4.18		6.17		3.01	3.34		5.91		4.06	3.45		2.97			2.86	7.82	6.35	4.25
Cunnamulla	3.54		4.59		9.02		10.65	18.27		28.76		27.29	16.54		6.94	5.56	5.75	7.01	9.34		16.30
Emerald		0.00		0.00		0.00	0.02		0.05		0.00	0.00		0.00		0.00		0.00	0.00	0.00	
Hughenden	1.97	1.59		1.59		1.29	0.92		2.22		2.67	1.52		2.62		3.54		3.92	4.79	3.79	3.67
Hungerford	1.04	2.57		3.90		4.41	2.60		7.01		8.75	9.7		9.83		0.65		2.94	3.74	6.19	
Inglewood		0.00		0.00		0.00	0.50		0.00		0.00	0.00		0.00		0.00		0.00	0.00	0.00	
Julia Creek	4.08	5.13	4.91		5.39		3.16	3.30		8.10		5.6	4.58		5.54			1.73	2.34	2.26	2.19
Longreach	9.53	11.86		11.33		14.71	12.24		14.43		19.26	4.79		15.90		25.72		25.75	35.21	32.54	
Mt Isa																			6.21	4.12	4.76
Quilpie	2.19		1.39		5.13		2.06	4.70		9.80		9.51	12.27		7.87	2.41	1.76	2.25	4.37		4.12
Roma	2.19	1.62	2.54	2.66		2.37	2.26		3.47		5.02	2.83		2.96		4.96		2.98	4.29	5.87	
Taroom	0.02	0.37		0.00		0.00	0.00		0.00		0.00	0.00		0.00		0.00		0.00	0.00	0.00	0.00
Westmar	0.97		0.59		0.55		1.14	1.49		1.14		2.28	4.69		3.27		4.42	2.48	1.24		1.83
Windorah	4.42	4.52	7.32	4.48	9.85	12.62	6.67	10.47	10.77	11.84	8.11	12.29	12.16	16.95	11.80	3.22	2.41	2.80	4.32	3.85	5.00
Winton	3.69	5.02	5.62		6.05		3.32	4.44		9.73		16.98	8.57		10.86		8.00	9.72	6.62		11.06

	Common wallaroo																				
Block	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Barcaldine	6.59	12.3	8.63	16.4	19.98	16.2	5.52	8.30	5.53	9.02	4.69	6.79	4.89	3.57	3.57	0.87	1.63	1.90	2.09	2.27	1.59
Blackall	18.0	21.1	22.1	34.9	39.14	49.0	23.8	21.5	20.2	54.4	28.5	24.8	11.2	9.32	6.89	3.44	1.60	0.78	1.04	0.87	3.01
Bollon	4.72	2.64		1.55		1.67	0.36		2.44		0.7	0.31		2.38		1.01		1.42	0.60	0.73	
Boulia																			0	1.07	0.02
Charleville	7.21	6.20	5.79	4.66	4.70	5.36	11.8	13.4	10.6	5.09	4.47	4.07	3.81	1.24	0.60	0.60	0.64	1.44	0.82	0.86	0.80
Charters		0.30		2.84		0.61	1.07		0.51		1.03	0.22		0.23		0.63		0.41	1.35	0.41	
Cloncurry	0.00		0.30		0.64		0.51	0.26		0.14		0.02	0.21		1.32			0.73	2.93	0.97	0.97
Cunnamulla	1.68		0.45		0.64		1.95	0.61		0.70		2.53	2.60		2.10	0.99	0.87	1.08	1.09		1.47
Emerald		0.02		0.00		0.78	0.02		0.33		0.19	0.32		0.25		0.25		0.32	0.15	0.31	
Hughenden	1.65	1.28		2.28		0.24	0.41		0.94		0.93	0.22		1.59		0.55		1.21	1.65	0.72	0.72
Hungerford	1.19	0.36		0.24		0.48	0.25		0.47		1.27	1.93		2.33		0.08		0.28	0.24	0.66	
Inglewood		3.08		4.03		0.34	1.01		1.22		3.18	3.42		11.1		11.6		4.47	3.12	4.37	
Julia Creek	2.74	0.00	0.04		0.11		0.01	0.00		0.00		0.00	0.03		0.00			0.00		0.00	0.00
Longreach	17.9	21.5		18.5		12.6	9.18		17.7		15.6	8.84		4.17		6.05		8.40	7.89	6.78	
Mt Isa																			0.00	0.00	0.00
Quilpie	5.41		0.78		3.36		2.69	3.00		5.58		7.51	3.42		3.76	0.45	0.87	1.17	0.64		1.22
Roma	1.35	3.74	2.49	2.08		1.16	3.45		0.87		1.01	0.75		1.45		1.15		0.45	0.66	0.72	
Taroom	0.22	2.04		0.17		1.05	0.25		0.02		0.38	0.18		0.35		0.20		0.10	0.17	0.17	0.11
Westmar	0.74		0.02		0.13		0.30	0.00		0.01		0.00	0.28		0.54		0.38	0.75	0.21		0.00
Windorah	2.14	2.30	1.81	2.72	3.03	3.07	2.42	3.18	3.32	5.29	2.82	1.46	4.86	4.12	2.47	0.46	0.20	0.02	0.18	0.22	0.66
Winton	1.73	1.78	1.70		3.14		0.96	4.19		6.35		0.76	1.14		1.30		0.26	0.82	1.82		2.85