

Department of Environment
and Heritage Protection

Queensland Commercial Macropod Management Program

Annual Report 2011



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Department of Environment and Heritage Protection

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June 2012

Preface

In 2011, the then Department of Environment and Resource Management administered the commercial harvest of macropods in Queensland. The commercial harvest of macropods in Queensland will be administered by the new Department of Environment and Heritage Protection (EHP) from 2012 onwards.

This annual report summarises the activities of the Commercial Macropod Management Program for the period 1 January 2011 to 31 December 2011. In accordance with the Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008–2012, the report addresses:

- actual harvest by zone and species compared to quota
- harvest sex ratio, average carcass weights and skin take
- any special quota utilised
- non-commercial harvest mortality
- compliance statistics
- unusual circumstances
- research and experiments
- program improvements.

For the 2011 harvest period, 1455 commercial wildlife harvesting licences for macropods, commonly known as harvester licences, and 125 commercial wildlife licences for dead macropods, commonly known as dealer's licences, were issued. Data from dealer returns, entered up to 20 February 2012, indicates that there were 1 013 330 macropods commercially harvested, representing 55.5 per cent of the overall quota. The harvest was predominantly for carcasses used for both human consumption and pet food.

No quota was exceeded for any species in any zone in 2011. The highest percentage use of quota was for common wallaroos in the central zone at 89 per cent. In all harvest zones the percentage of the population utilised for each species was below 11.

The commercial harvest is typically biased towards males due to their generally larger size and weight when compared to females. For 2011, the harvest for each species was biased towards males by 86.8 per cent or greater.

During the 2011 harvest period, there was one collaborative compliance operation carried out in conjunction with the Queensland Police Service, 21 infringement notices issued and 46 warning notices issued.

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1. Background

The department administers the harvest in accordance with the following overarching goal: 'to provide sustainable use, conservation of the species and their habitats in accordance with the principles of ecologically sustainable development' (Anon 2008).

There are three main aspects to the program:

- monitoring populations
- setting quota
- managing the harvest.

Three species can be commercially harvested in Queensland:

- red kangaroo (*Macropus rufus*)
- eastern grey kangaroo (*Macropus giganteus*)
- common wallaroo (*Macropus robustus*).

These commercially harvested species are abundant over a broad area of Queensland and Australia. None of these species are listed as threatened under state or Commonwealth legislation; all are listed as 'least concern' wildlife under the Nature Conservation (Wildlife) Regulation 2006.

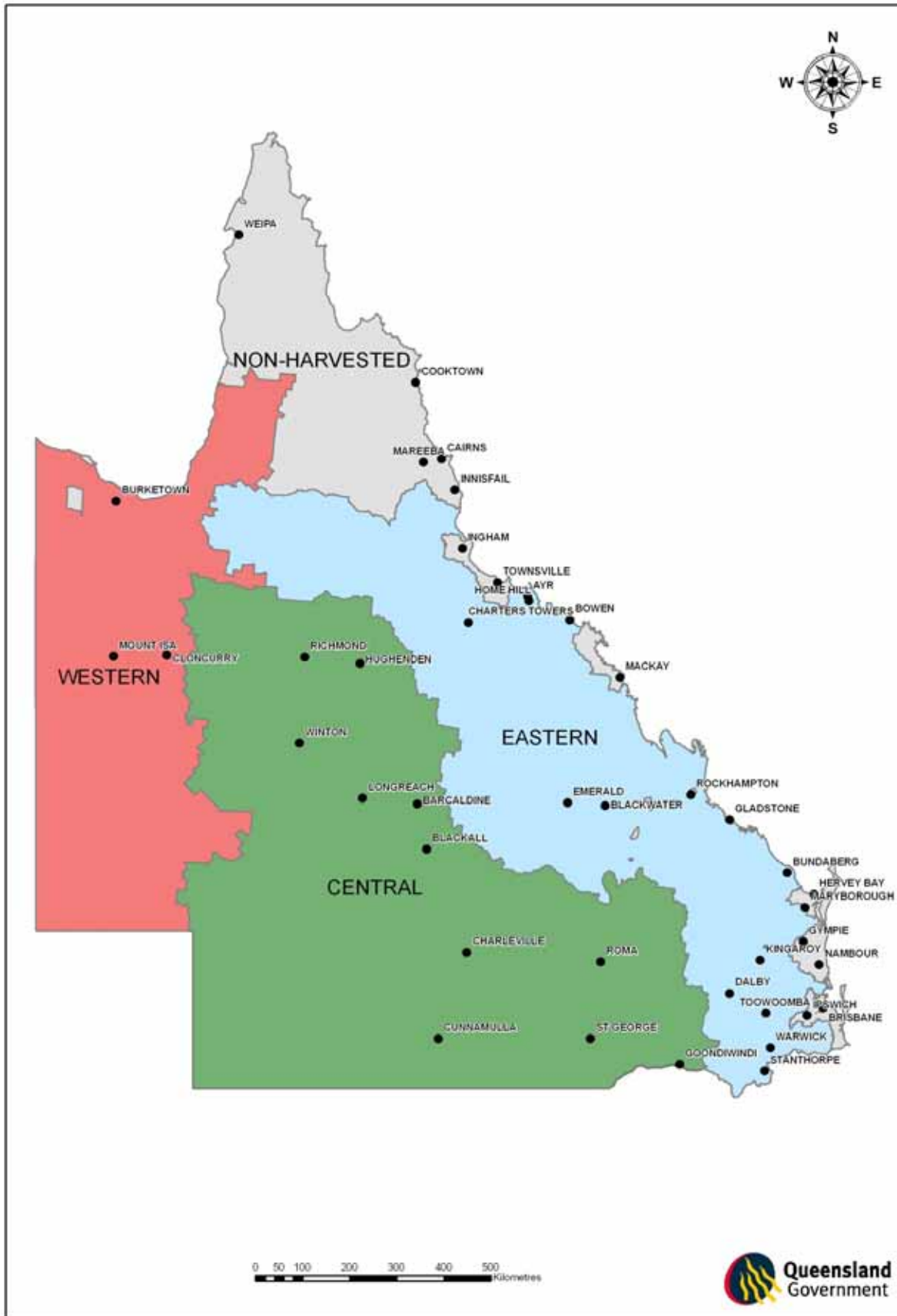
The harvesting of these macropods is regulated through the:

- *Nature Conservation Act 1992*
 - Nature Conservation (Administration) Regulation 2006
 - Nature Conservation (Wildlife Management) Regulation 2006
 - Nature Conservation (Wildlife) Regulation 2006
 - Nature Conservation (Macropod) Conservation Plan 2005
- *Environment Protection and Biodiversity Conservation Act 1999*
- Queensland Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008-2012
- *Animal Care and Protection Act 2001*
- *Food Production (Safety) Act 2000*.

Management of the harvest is facilitated via quotas that set the number of animals that can be taken. Quotas are determined largely based on population estimates derived from annual aerial surveys of the commercially harvested species. In the past, the quotas for each species were that for the whole state of Queensland. Under this system, the harvest was sustainable on a statewide basis but it was possible harvesting pressure was focussed on particular regions of the state. To address this issue, since 2003 quotas have been set for each species for four harvest zones (Figure 1):

- non-harvest zone (quota zero)
- eastern harvest zone
- central harvest zone
- western harvest zone.

Figure 1 – Queensland harvest zones in 2011



Quotas are calculated using a fixed proportion of the estimated macropod populations within the harvest areas. Proportions are adjusted for each species across the harvest zones in relation to the margins of error present in population estimates derived from the aerial surveys. The maximum proportions used for each species are 15 per cent of the populations for eastern grey kangaroos and common wallaroos and 20 per cent of the population for red kangaroos for the central zone. For the eastern and western zones, where survey effort is less extensive when compared to the central zone, the more conservative maximum proportion of 10 per cent is 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, and the state and Commonwealth governments, for determining state quota limits.

In Queensland in 2011, the Minister for Environment and Resource Management set quotas annually and provided them to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (SEWPC) for endorsement. Following this endorsement, the Director-General of the Department Environment and Resource Management declared a harvest period open annually via a harvest period notice. From 2012, these functions will be delivered by the Department of Environment and Heritage Protection (the department).

This annual report summarises the activities of the Commercial Macropod Management Program for the period 1 January 2011 to 31 December 2011. In accordance with the Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008-2012, the report will address:

- actual harvest by zone and species compared to quota
- harvest sex ratio, average carcass weights and skin take
- any special quota utilised
- non-commercial harvest mortality
- compliance statistics
- unusual circumstances
- research and experiments
- program improvements.

All macropod species are 'protected animals' in Queensland under the Nature Conservation (Wildlife) Regulation 2006. The Nature Conservation (Administration) Regulation 2006 provides for the licensing of a range of activities in relation to the commercial harvesting of macropods in Queensland.

Macropods can only be taken in accordance with the Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008–2012 and the Nature Conservation (Macropod) Conservation Plan 2005 under a licence issued by the department.

The harvest is controlled by the use of self-locking numbered plastic tags with a unique colour code for each species and year. The following applies to the use of tags:

- Tags are issued to a specific harvester and are not transferable to any other harvester.
- Tags must be securely attached to the skin of every macropod commercially harvested.
- A tag can only be removed from the macropod skin during the skin tanning process at a licensed tannery.
- The tags are self-locking and tamper-evident.
- The tags are individually numbered and of a different colour for each consecutive year and species.
- A fee (fixed by regulation) is charged for the sale tags.

Record and return of operations are submitted to the department by harvesters and dealers at regular periods. Harvest statistics from returns are used to monitor and manage the harvest.

2. Harvest management

The department issued 1455 harvester's licences and 125 dealer's licences for the 2011 harvest period. One hundred per cent of licences were issued in accordance with legislative requirements and within regulatory timeframes.

Tags were limited to the quota amount for each species in each zone to ensure no over-harvest occurred. Tags for 100 per cent of an individual species' quota were sold in three individual quota areas, but the maximum harvest for those quotas was 89 per cent. Statistics on the harvest and tag sales are updated monthly and made available to the public via the department website. This assists the industry to monitor the harvest and tag availability.

Table 1 – Tag sales and harvest

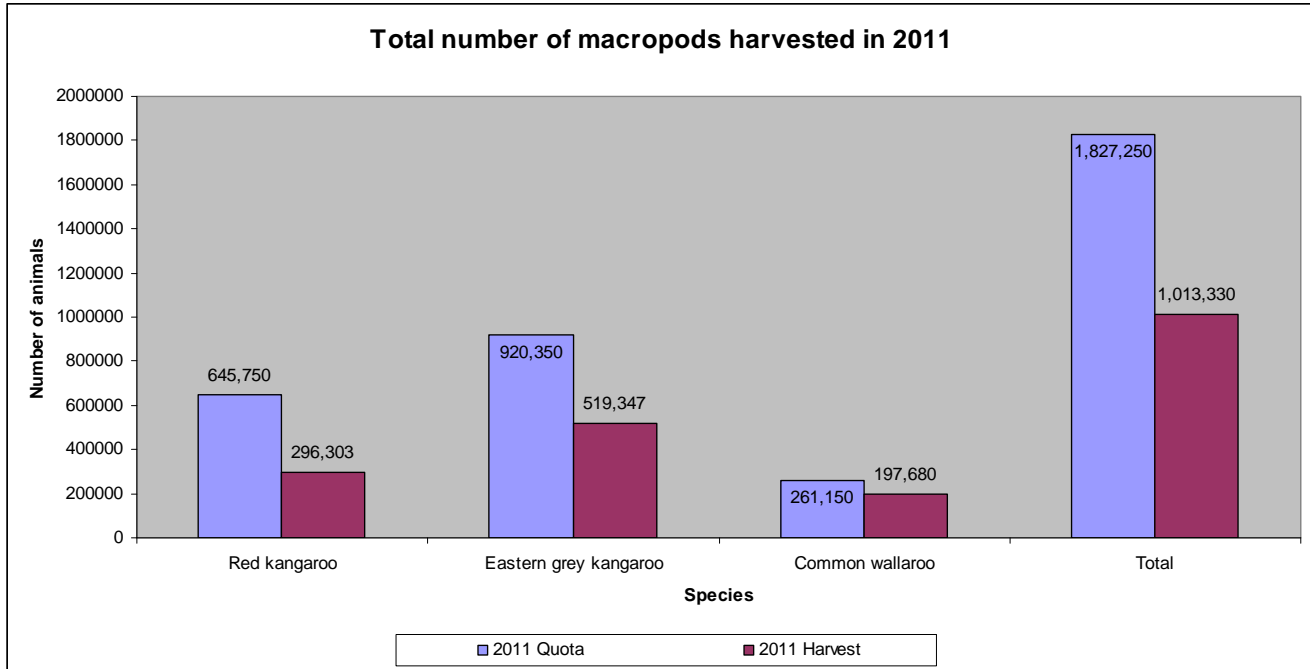
Tag categories by zone	2011 quotas	Tags sold		Reported harvest	
		Number of tags	% of quota	Number of macropods	% of quota
CENTRAL ZONE					
Eastern grey kangaroo	772 000	536 650	70	468 981	61
Red kangaroo	620 700	338 250	54	277 980	45
Common wallaroo	212 850	212 850	100	188 832	89
EASTERN ZONE					
Eastern grey kangaroo	148 350	69 100	47	50 366	34
Red kangaroo	8550	8550	100	4811	56
Common wallaroo	35 850	15 300	43	8025	22
WESTERN ZONE					
Red kangaroo	16 500	16 500	100	13 512	82
Common wallaroo	12 450	1650	13	823	7

To ensure harvesters have fair and equitable access to the finite number of tags available, the program regulates the distribution of tags. This is done by establishing a tag allowance for each harvester and ensuring the tags are being used before further tags are ordered. This tag application process was improved for the 2011 harvest period.

3. Harvest

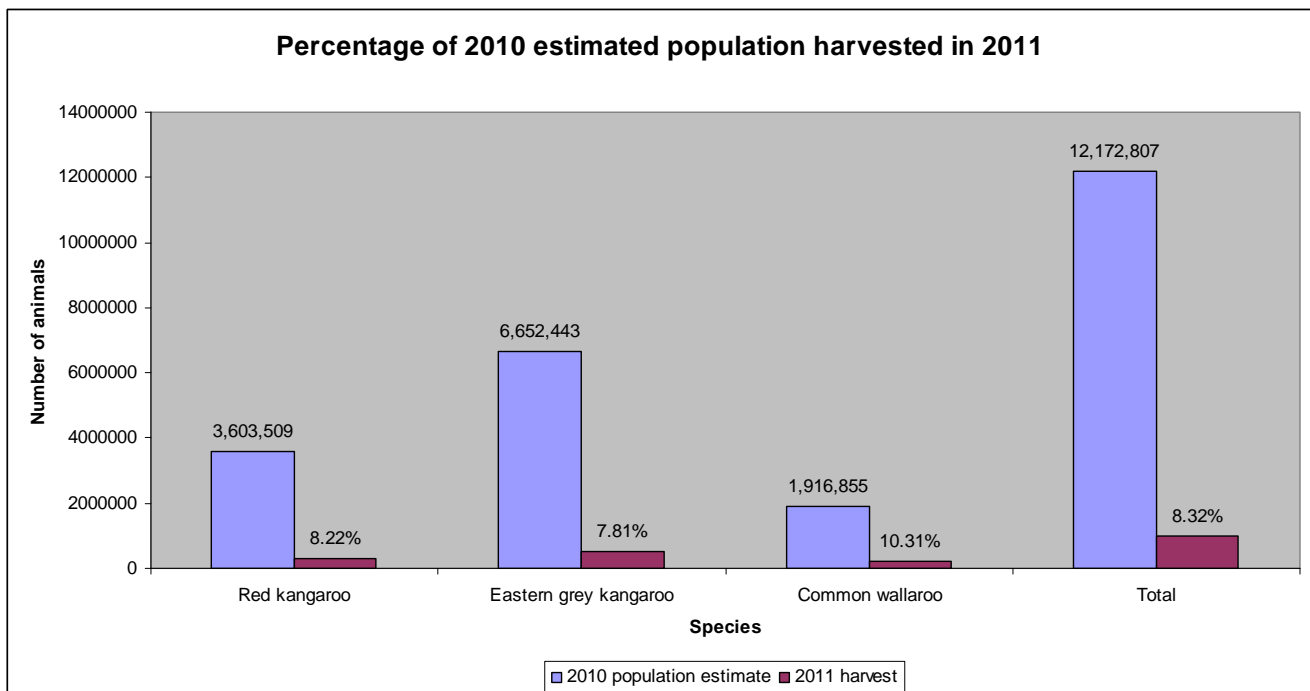
The data from dealer returns, entered up to 20 February 2012, indicates that there were 1 013 330 macropods commercially harvested, representing 55.5 per cent of the overall quota. Of the 1 013 330 animals harvested, there were 296 303 red kangaroos, 519 347 eastern grey kangaroos and 197 680 common wallaroos (Figure 2).

Figure 2 – Total macropods harvest for 2011



For all three commercially harvested species the percentage of the population harvested in 2011 was under 11 per cent of the 2010 estimated population (Figure 3). For common wallaroos, just over 10 per cent of the estimated population in the harvest area was harvested, while just over eight per cent of the estimated population of red kangaroos was harvested and just under eight per cent of the estimated populations of eastern grey kangaroos were harvested.

Figure 3 – Percentage of the 2010 estimated population harvested in 2011



Tables 2–5 contain detailed summaries of the commercial harvest in 2011. Quotas for each species in each zone were not exceeded in 2011. The highest percentage of quota utilised was for common wallaroos in the central zone at 88.7 per cent. In all harvest zones the percentage of the population harvested for each species was below 14 per cent

Table 2 – Total harvest in 2011

Species	Population estimate 2010	Quota 2011	Harvest take 2011	% quota utilised 2011	% population harvested 2011
Red kangaroo	3 603 509	645 750	296 303	45.88	8.22
Eastern grey kangaroo	6 652 443	920 350	519 347	56.43	7.81
Common wallaroo	1 916 855	261 150	197 680	75.69	10.31
Total	12 172 807	1 827 250	1 013 330	55.46	8.32

Note: population estimates are based on aerial surveys conducted in 2010, which were used to set the 2011 quota. Figures are based on data available 20 February 2012.

Table 3 – Harvest of red kangaroos in 2011

Zone	Population estimate 2010	Quota 2011	Harvest take 2011	% quota utilised 2011	% population harvested 2011
Central	3 352 823	620 700	277 980	44.78	8.29
Eastern	85 548	8 550	4 811	56.27	5.62
Western	165 138	16 500	13 512	81.89	8.18
Total	3 603 509	645 750	296 303	45.88	8.22

Note: population estimates are based on aerial surveys conducted in 2010, which were used to set the 2011 quota. Figures are based on dealer returns as entered on 20 February 2012.

Table 4 – Harvest of eastern grey kangaroos in 2011

Zone	Population estimate 2010	Quota 2011	Harvest take 2011	% quota utilised 2011	% population harvested 2011
Central	5 160 736	772 000	468 981	60.74	9.08
Eastern	1 483 247	148 350	50 366	33.95	3.39
Western	8 460	0	0	Na	Na
Total	6 652 443	920 350	519 347	56.43	7.81

Note: population estimates are based on aerial surveys conducted in 2010, which were used to set the 2011 quota. Figures are based on dealer returns as entered on 20 February 2012.

Table 5 – Harvest of common wallaroos in 2011

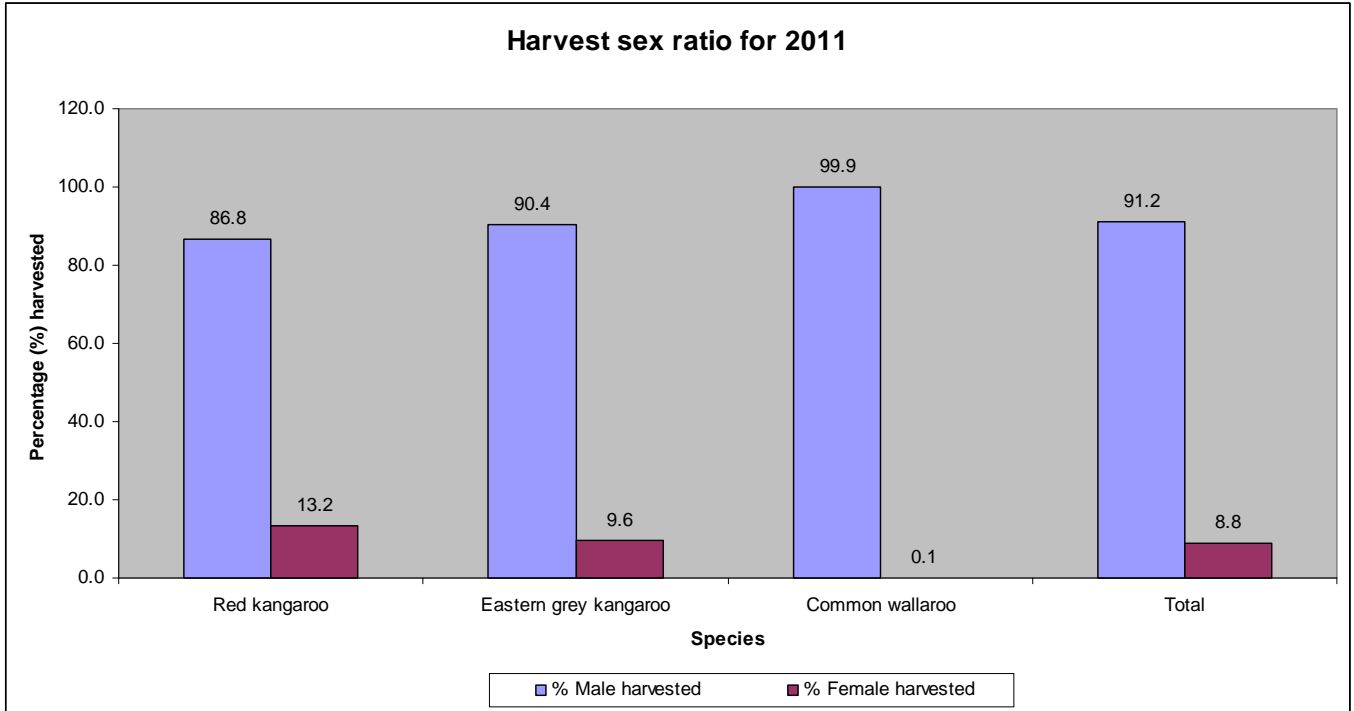
Zone	Population Estimate 2010	Quota 2011	Harvest Take 2011	% Quota Utilised 2011	% Population Harvested 2011
Central	1 433 632	212 850	188 832	88.71	13.17
Eastern	358 640	35 850	8 025	22.38	2.23
Western	124 582	12 450	823	6.61	0.66
Total	1 916 855	261 150	197 680	75.69	10.31

Note: population estimates are based on aerial surveys conducted in 2010, which were used to set the 2011 quota. Figures are based on dealer returns as entered on 20 February 2012.

3.1 Harvest sex ratio

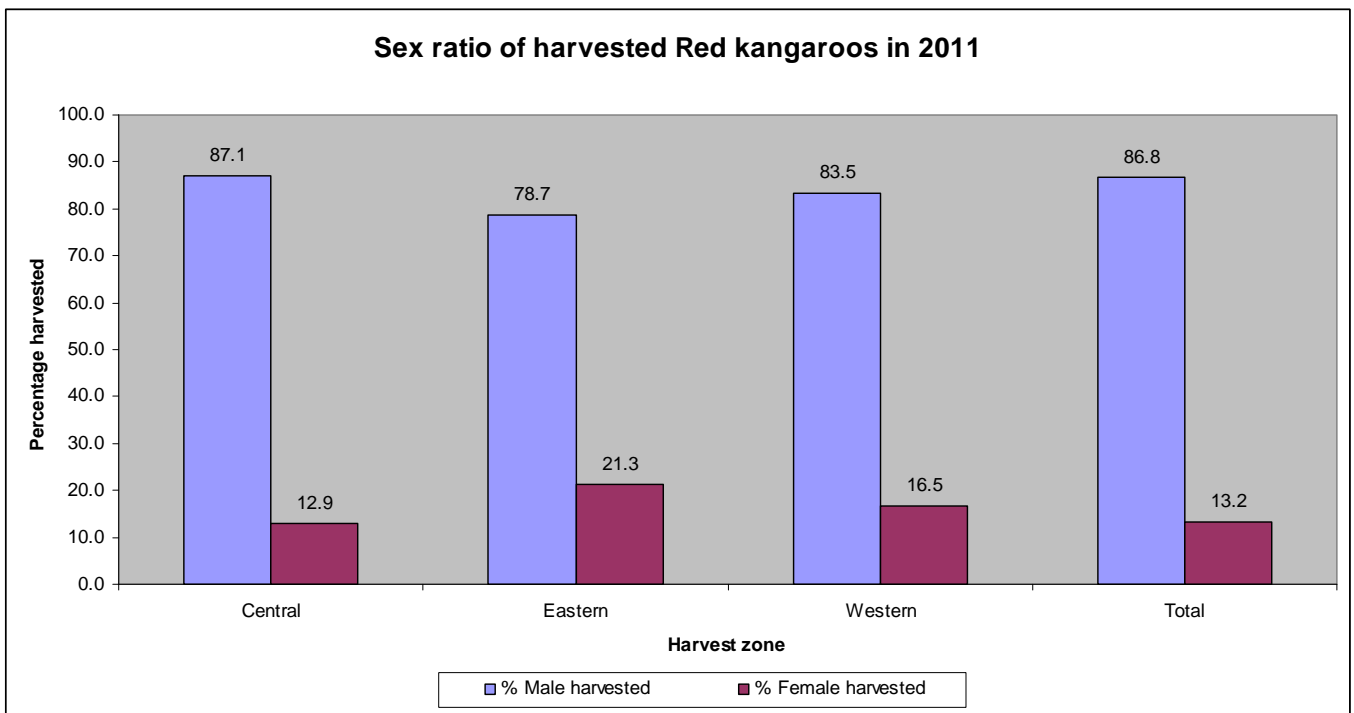
The commercial harvest is typically biased towards males due to their generally larger size and weight when compared to females. For 2011, the harvest for each species was biased towards males by 86.8 per cent or greater (Figure 4). Females composed less than nine per cent of the overall harvest.

Figure 4 Sex ratio of harvested macropods in 2011



For red kangaroos, the highest percentage of females harvested was in the eastern zone at 21.3 per cent. However, the overall take of females for this species was 13.2 per cent of the harvest (Figure 5).

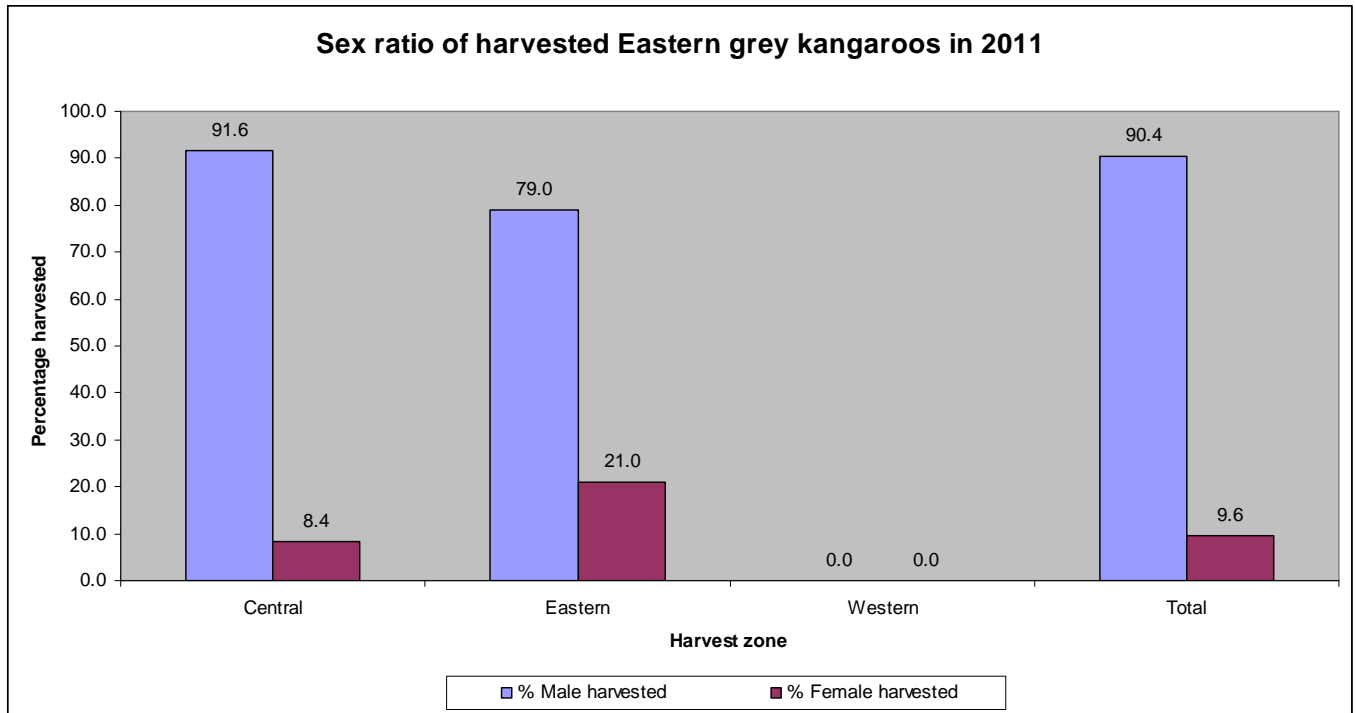
Figure 5 – Sex ratio of harvested red kangaroos in 2011



For eastern grey kangaroos the greatest percentage take of females was 21 per cent in the eastern zone. Overall

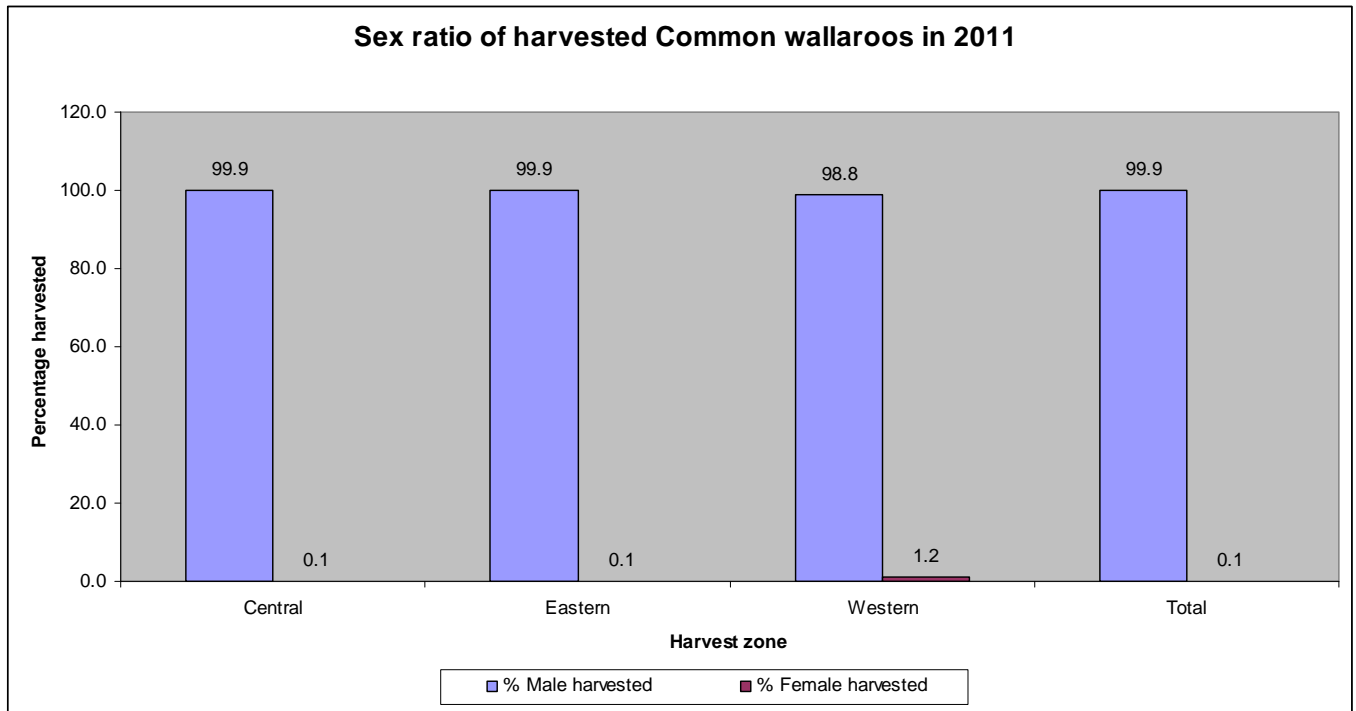
for this species, females comprised 9.6 per cent of the harvest (Figure 6).

Figure 6 – Sex ratio of harvested eastern grey kangaroos in 2011



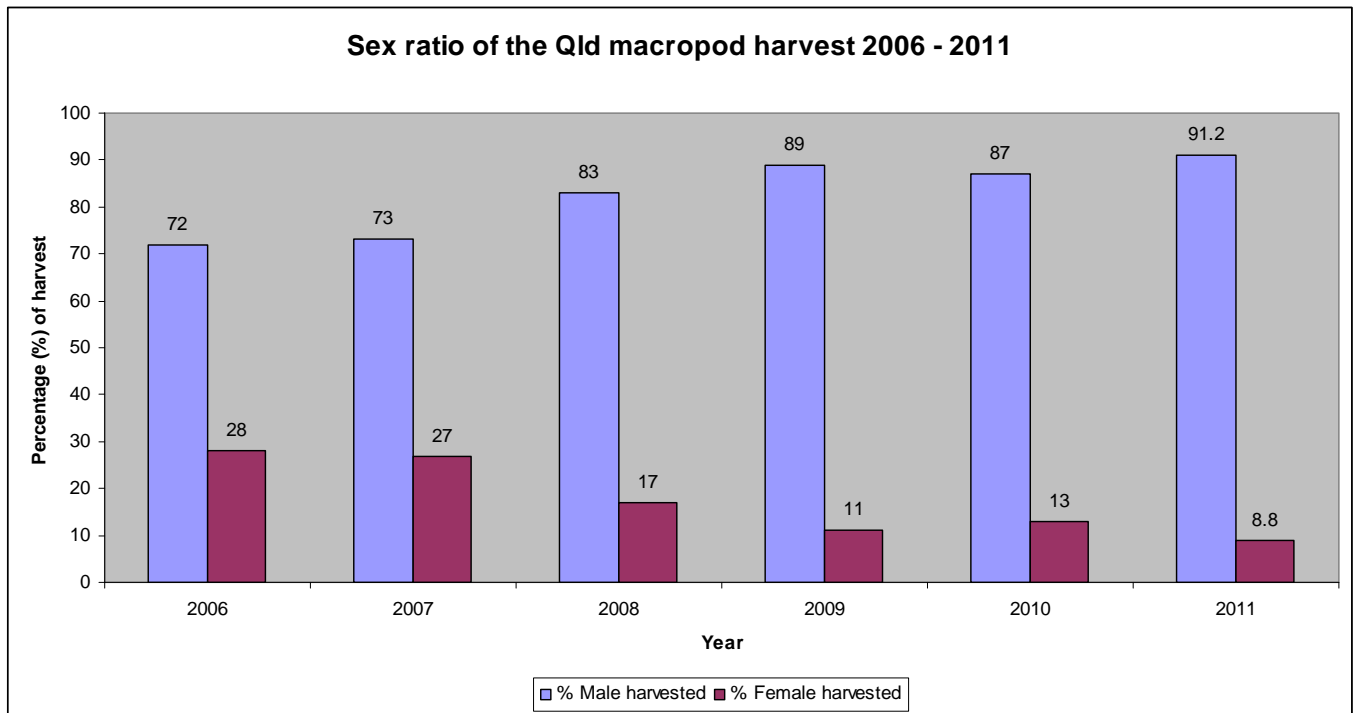
For common wallaroos the percentage of the harvest containing females was the lowest amongst the three commercially harvested species at an overall total of 0.1 per cent. The highest take for females was 114 in the central zone.

Figure 7 – Sex ratio of harvested common wallaroos in 2011



As with previous years, the overall harvest take in 2011 was predominantly male, with only 8.8 per cent of the harvest comprising females (Figure 8).

Figure 8 – Harvest sex ratio trends



3.2 Carcass and skin harvest

The commercial harvest of macropods in Queensland is predominantly for meat products used for human consumption and pet food. Less than three per cent overall are taken for skin only and used for skin and leather products. (Figures 9-12)

For each harvested species in each zone the harvest take was composed predominantly of carcass take. The largest skin take in 2011 was for eastern grey kangaroos in the central zone at 14 531, followed by red kangaroos in the central zone at 13 547.

Figure 9 – Queensland skin and carcass take for macropods in 2011

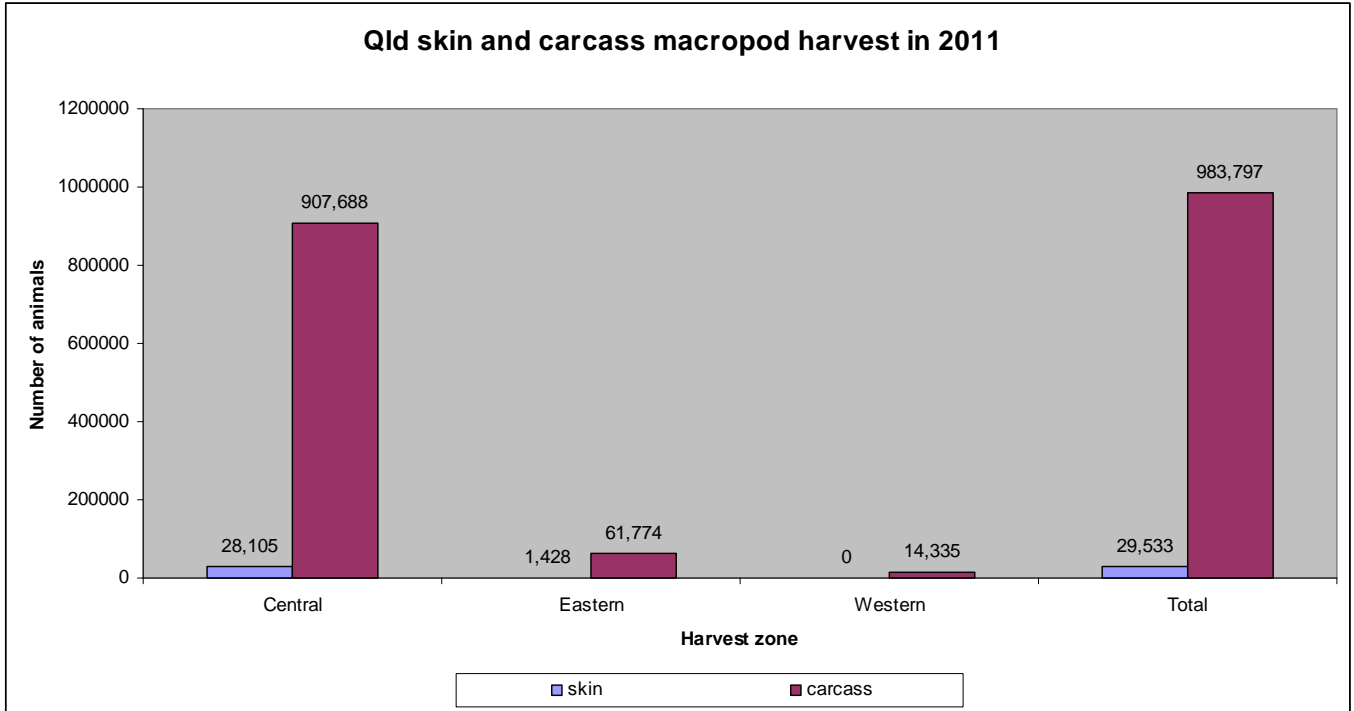


Figure 10 – Skin and carcass harvest of red kangaroos 2011

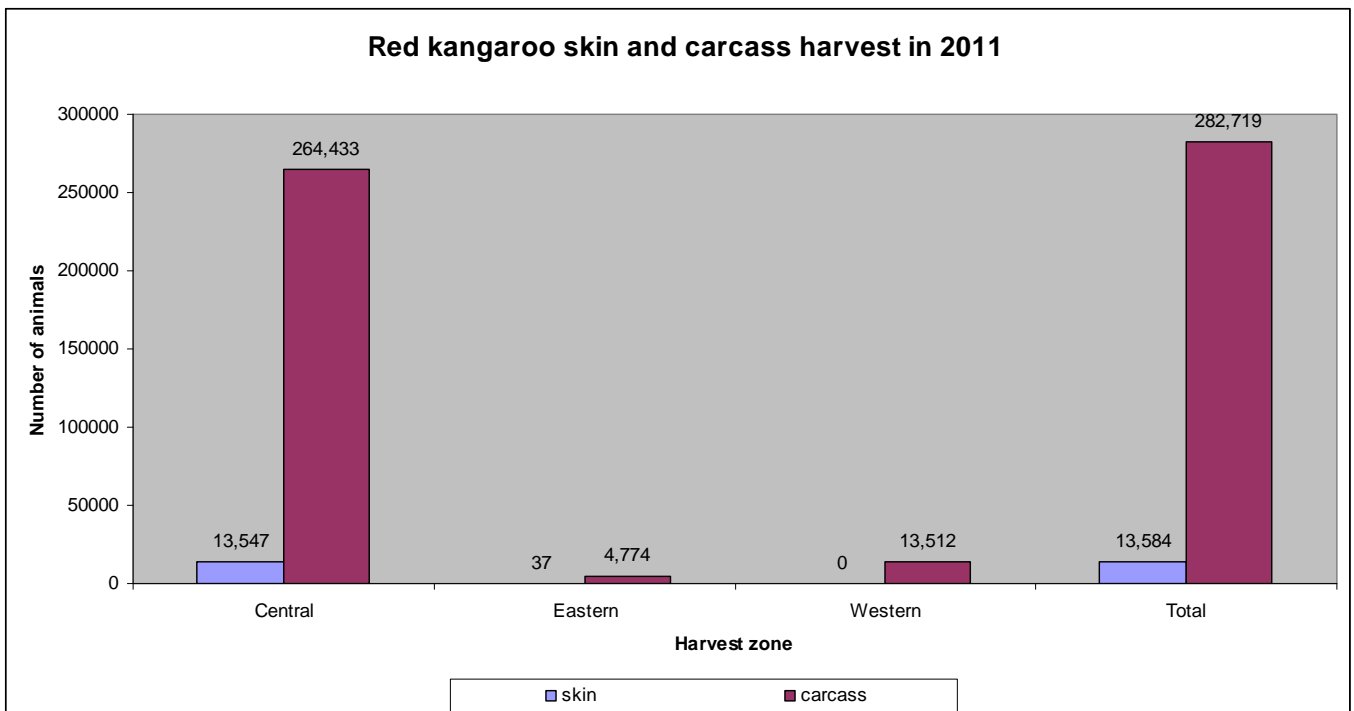


Figure 11 – Skin and carcass harvest for eastern grey kangaroos 2011

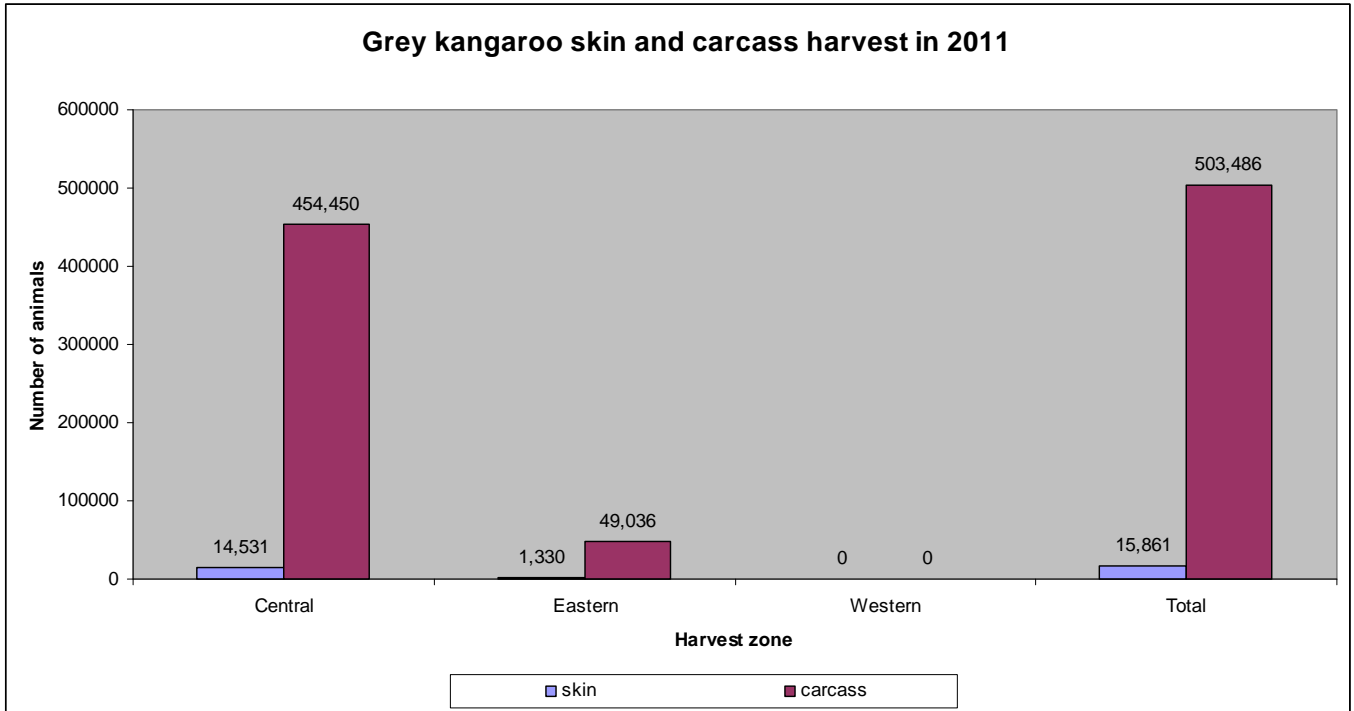
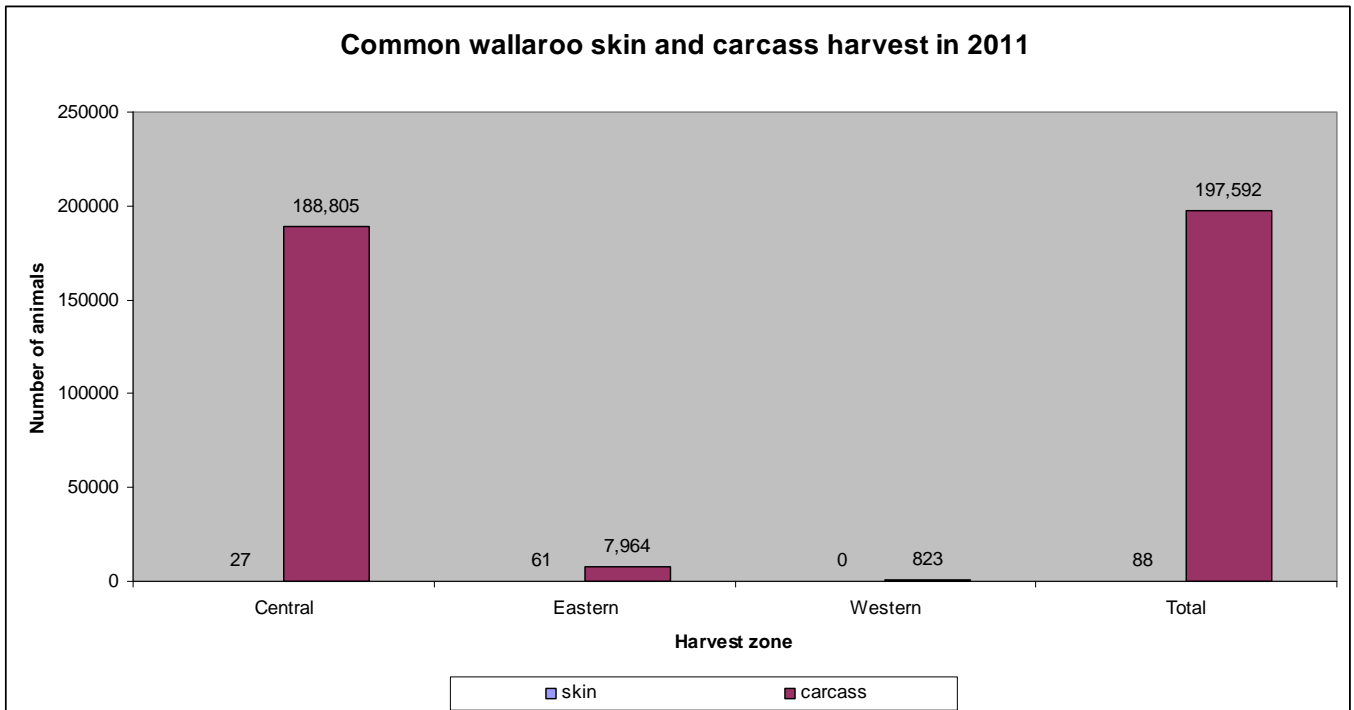


Figure 12 – Skin and carcass harvest for common wallaroos 2011



3.3 Average weight

The average carcass weights per harvest zone and species are shown in figures 13 to 15. Carcass weights have fluctuated slightly in the past four years in each harvest zone. Weights are consistently lowest in the central zone. No significant increases or decreases have occurred in the last five years. The minimum weight of a fully dressed carcass as defined in the harvest period notice was 13 kilograms (kg) during the 2011 harvest period.

A number of dealer sites established a minimum weight requirement between 16 kg and 18 kg. This was driven by economic reasons with efficiencies gained with heavier carcasses.

Regular inspections of dealer sites and monitoring minimum carcass weights ensure the minimum weight requirement is met. Where carcasses are found that breach the minimum weight requirements, both the harvester and dealer may be issued warning or infringement notices and fined.

Figure 13 – Average weight of Queensland macropod carcasses 2007–2011

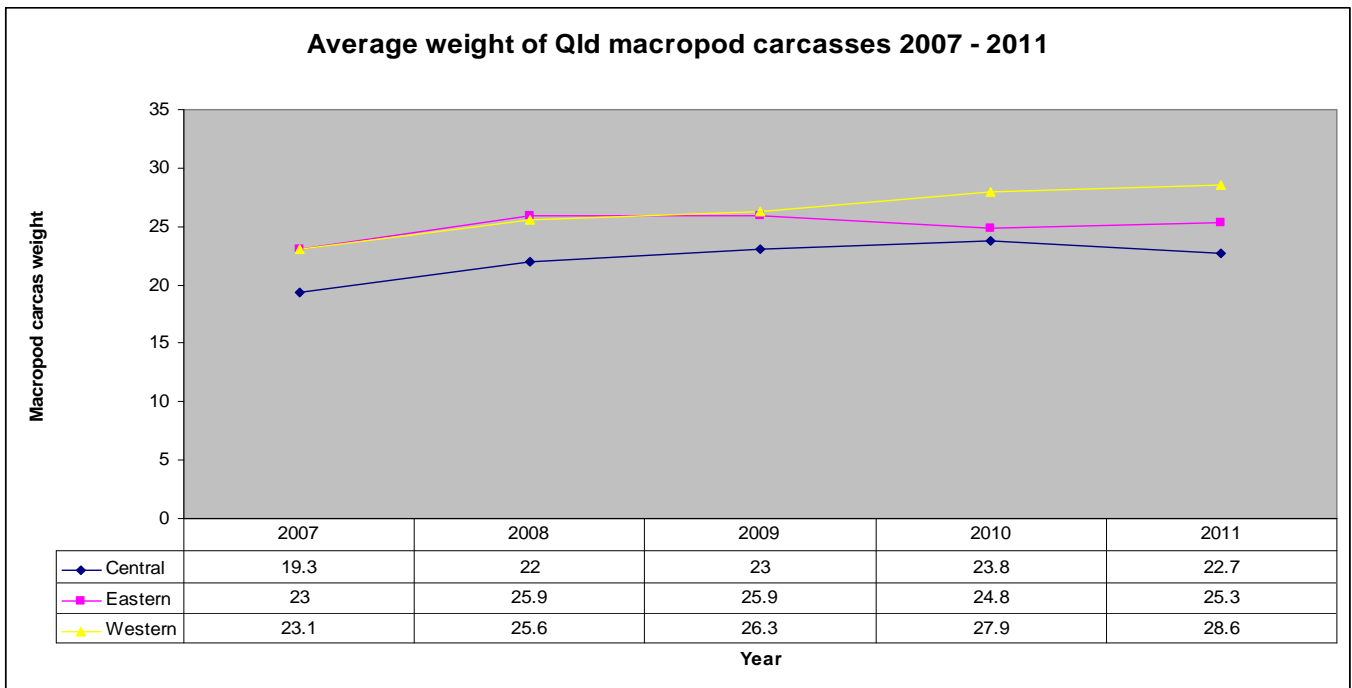
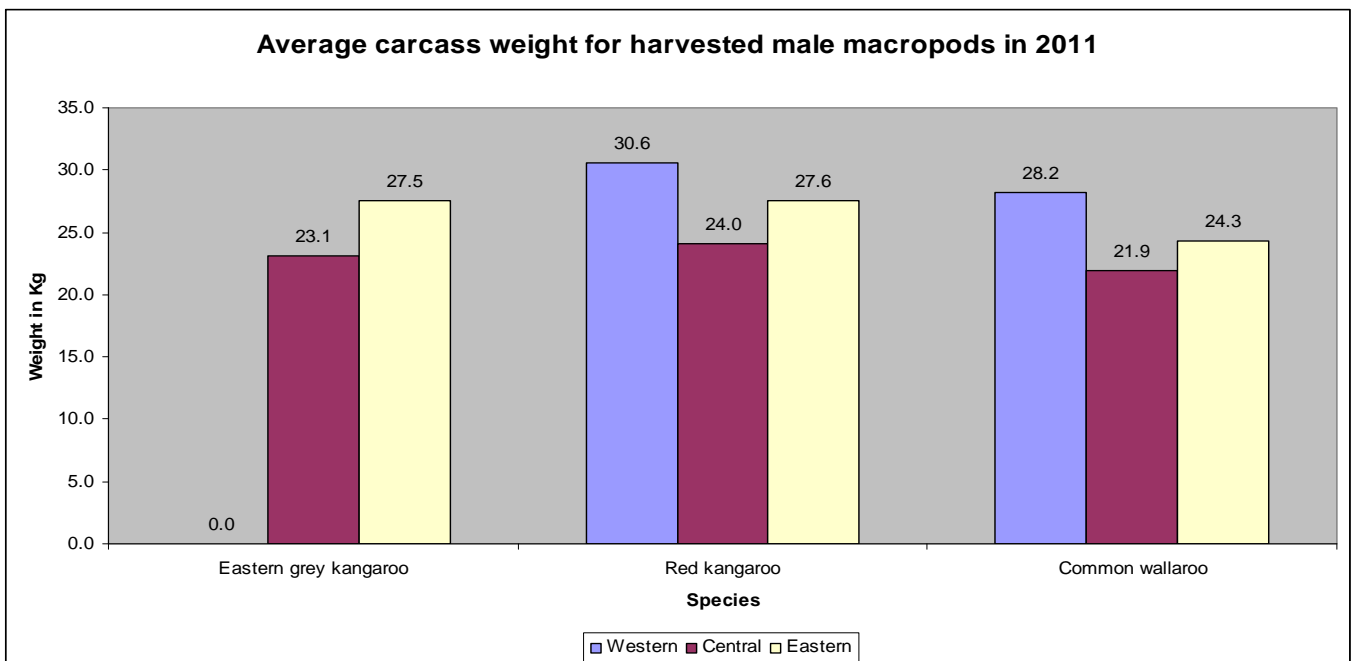
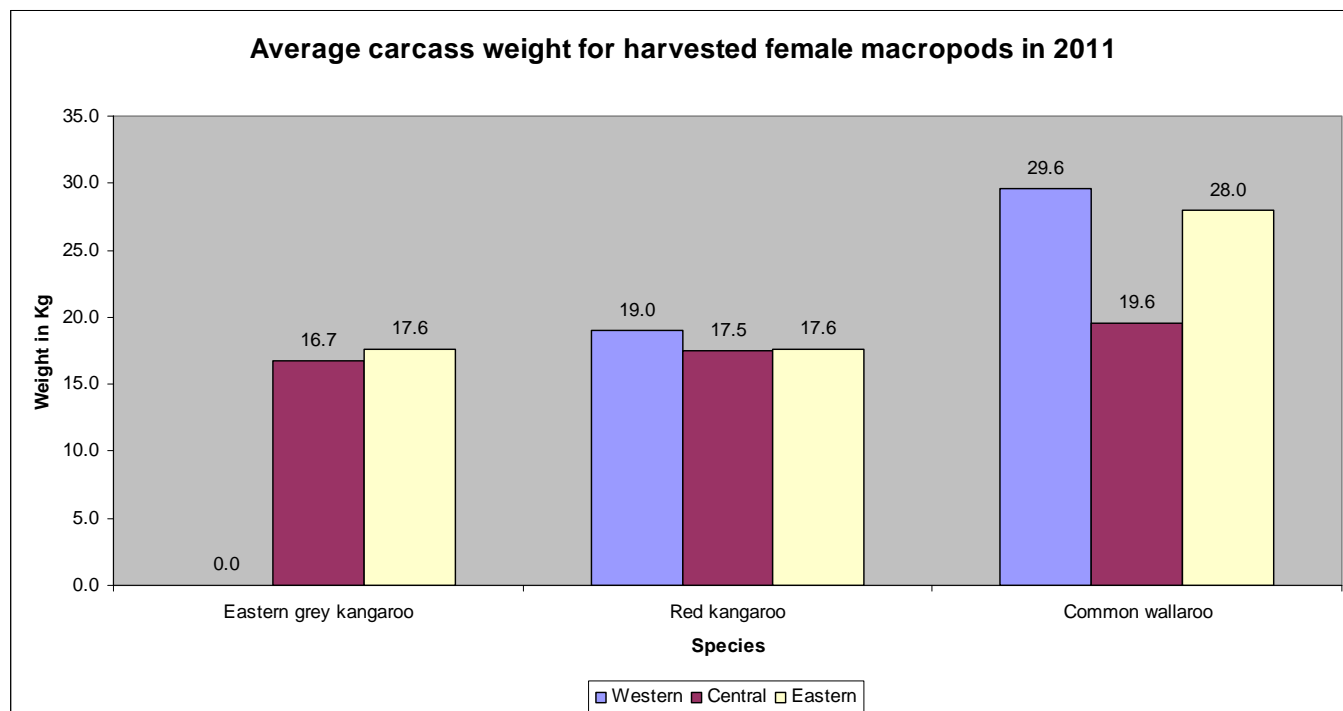


Figure 14 – Average carcass weight for male macropods harvested in 2011



Average carcass weights for female common wallaroos are influenced by the very low number of harvested animals (133 across all three zones) Figure 15.

Figure 15 – Average carcass weight for female macropods harvested in 2011



4. Special quotas

A special quota can only be considered once the commercial harvest quota for a particular species has been reached in a harvest zone. Situations where a special quota may be considered include where there is a high macropod population density in a particular area or where adverse weather conditions such as prolonged drought are having a detrimental affect on macropod health. No special quotas were set in 2011.

5. The extent of non-commercial harvest mortality

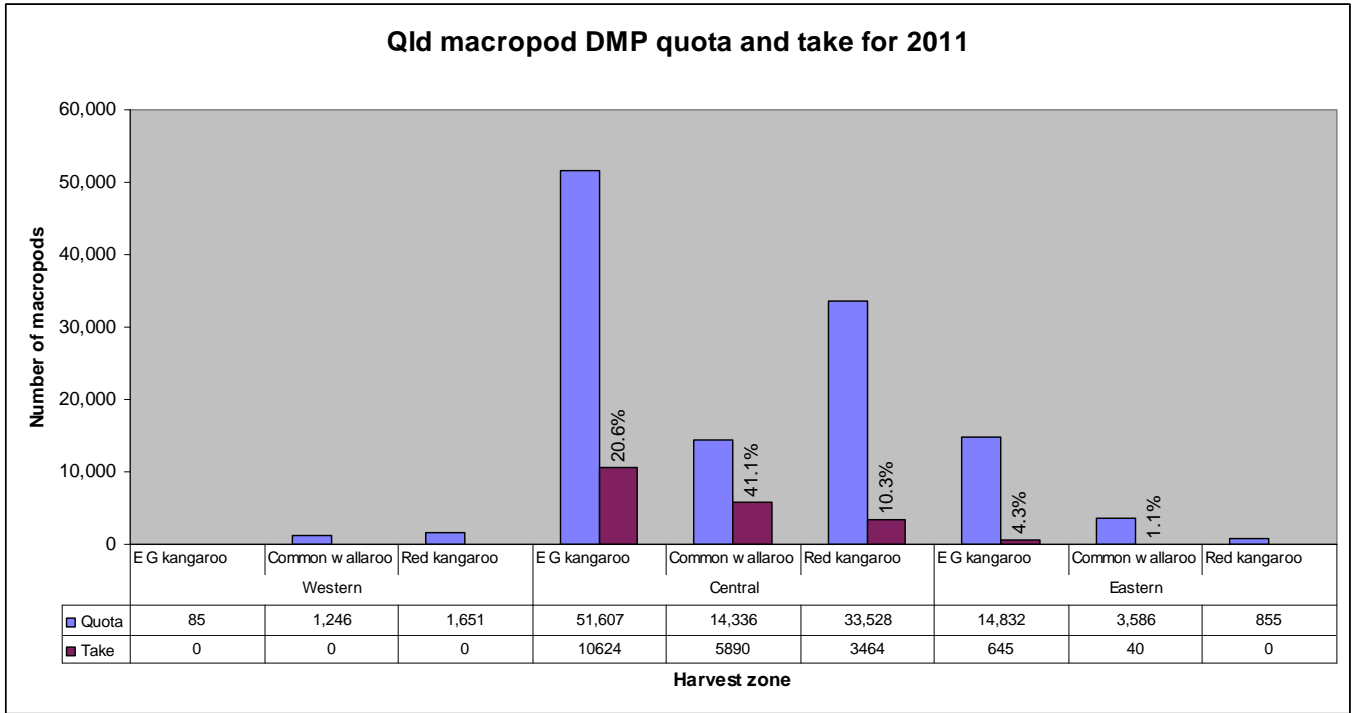
There are many forms of macropod mortality outside of the commercial harvest. It is possible for the department to collect and report data on three forms of non-commercial harvest mortality which can be considered when determining commercial quotas. These are damage mitigation permits (DMPs), licensed recreational harvest and disease outbreak mortality.

6. Damage mitigation permits

DMPs are issued by the department where macropods are causing demonstrable damage to primary production. The issuing of these permits is limited to a maximum of one per cent of the population estimate for each species. It is a condition of the permit that macropods are taken in accordance with the requirements of the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Non-commercial Purposes.

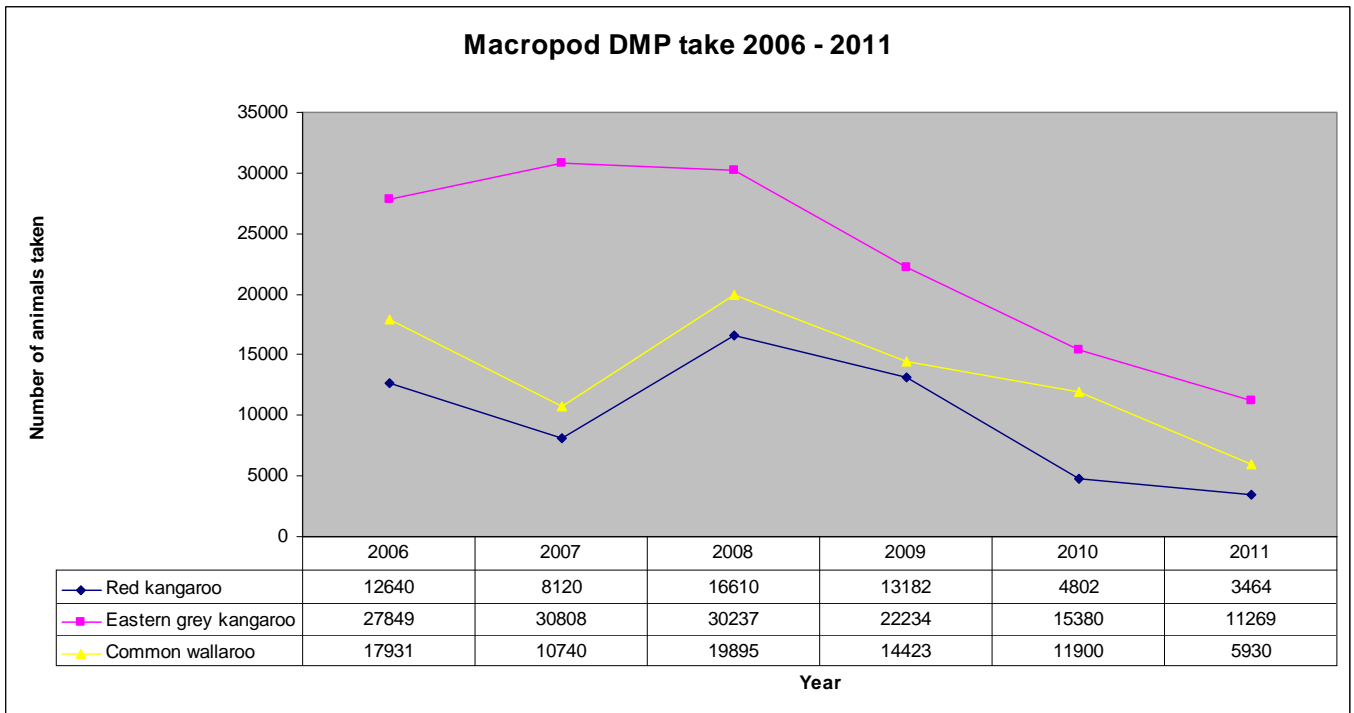
A total of 99 DMPs were issued for macropods in Queensland in 2011. The number of animals taken for each harvest zone and species was below the quota. The highest percentage of quota used was for the common wallaroos in the central zone at 41.1 per cent. A summary of the macropods taken under DMPs in 2011 compared to the DMP quota is given in Figure 18.

Figure 18 – Macropods taken under damage mitigation permits 2006–2010



For comparative purposes, a summary of the macropods taken under DMPs for each species for 2006–2011 is outlined in Figure 19. There has been a consistent decrease in the number of animals taken under DMPs since 2008.

Figure 19 – Macropod quota and take for damage mitigation permits 2006–2011



7. Disease outbreak mortality

There has been no incidence of significant mortalities related to disease outbreaks recorded in macropod populations in Queensland during the past 12 months.

Extremely high rainfall totals were recorded across Queensland during spring and summer 2010 and the summer of 2011. This resulted in widespread flooding in many areas. Whilst these conditions almost certainly had some impact on local kangaroo populations there were no reports of either significant direct mortalities or any increased incidence of disease related deaths in kangaroo populations from these regions. The annual Queensland aerial survey program took place between May and July 2011 and hence would reflect any changes in the populations in these areas as a result of the flooding.

8. Long-term population, quota and harvest trends

Since 1991, the Queensland Government has conducted an annual program of aerial surveys by helicopter to directly monitor populations of the three macropod species covered by the Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008–2012. These surveys occur over 22 representative monitor blocks across the state and are utilised to obtain population estimates that inform the quota.

2011 marked the first year that a correction factor of 1.85 was applied to population estimates for common wallaroos in Queensland. Prior to 2011 a conservative correction factor of 1.2 was used for common wallaroos. Detail of this change in correction factor is provided in Appendix 1.

Current harvesting rates (quotas ranging from 10 to 20 per cent of population estimates) are considered sustainable. None of the three commercially harvested species has shown a consistent decline in abundance since 1992 (Figure 20) 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. Of these species, the eastern grey kangaroo is consistently most abundant across the harvest zones, followed by the red kangaroo. Common wallaroos are the lowest even after the new correction factor was introduced in 2011. All three species occur in numbers of over 1 000 000 across the harvest zones.

Macropod population estimates increased in 2011 compared with 2010. This increase was predicted in the 2011 quota submission and is consistent with historic increases related to rainfall and feed availability (Figure 21). It is possible that the macropod populations recorded in 2011 will continue to increase as they did in the years 1998–2001 (Figure 20).

Figure 20 – Estimated macropod populations 1992 to 2011 (2011 population estimate for common wallaroo is based on 1.85 correction factor)

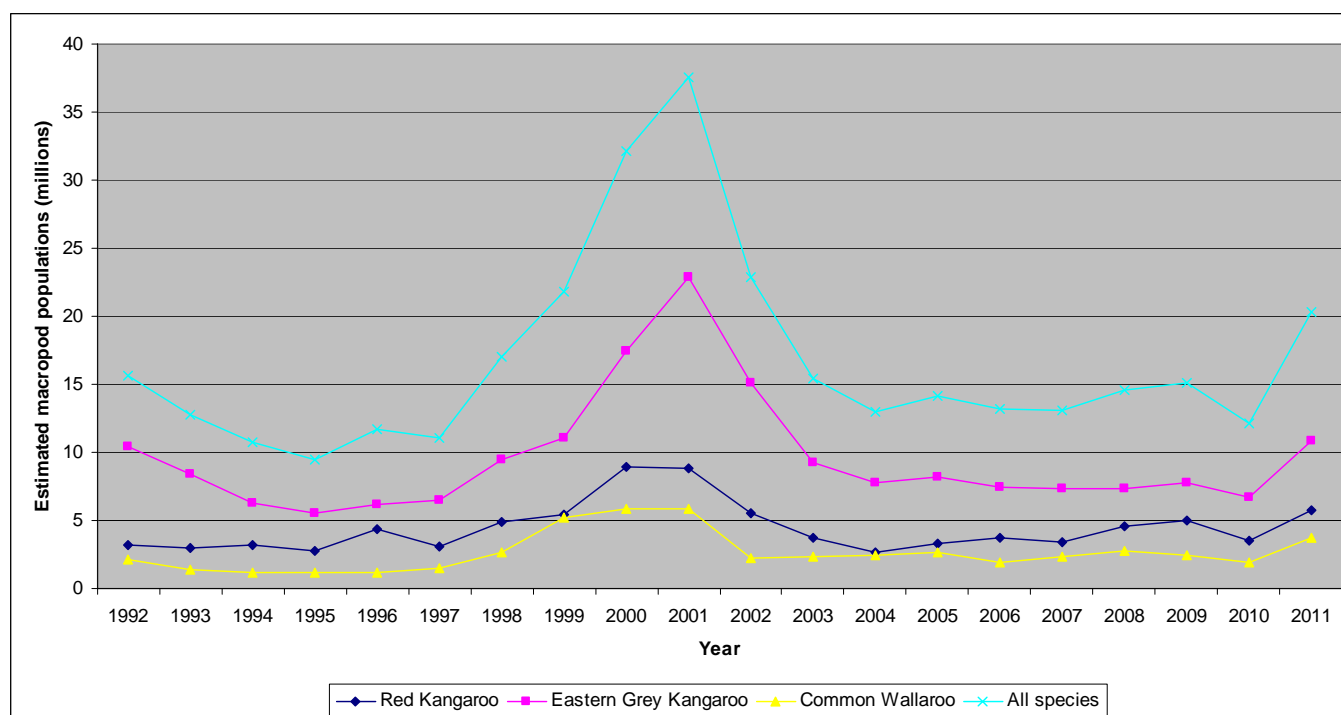
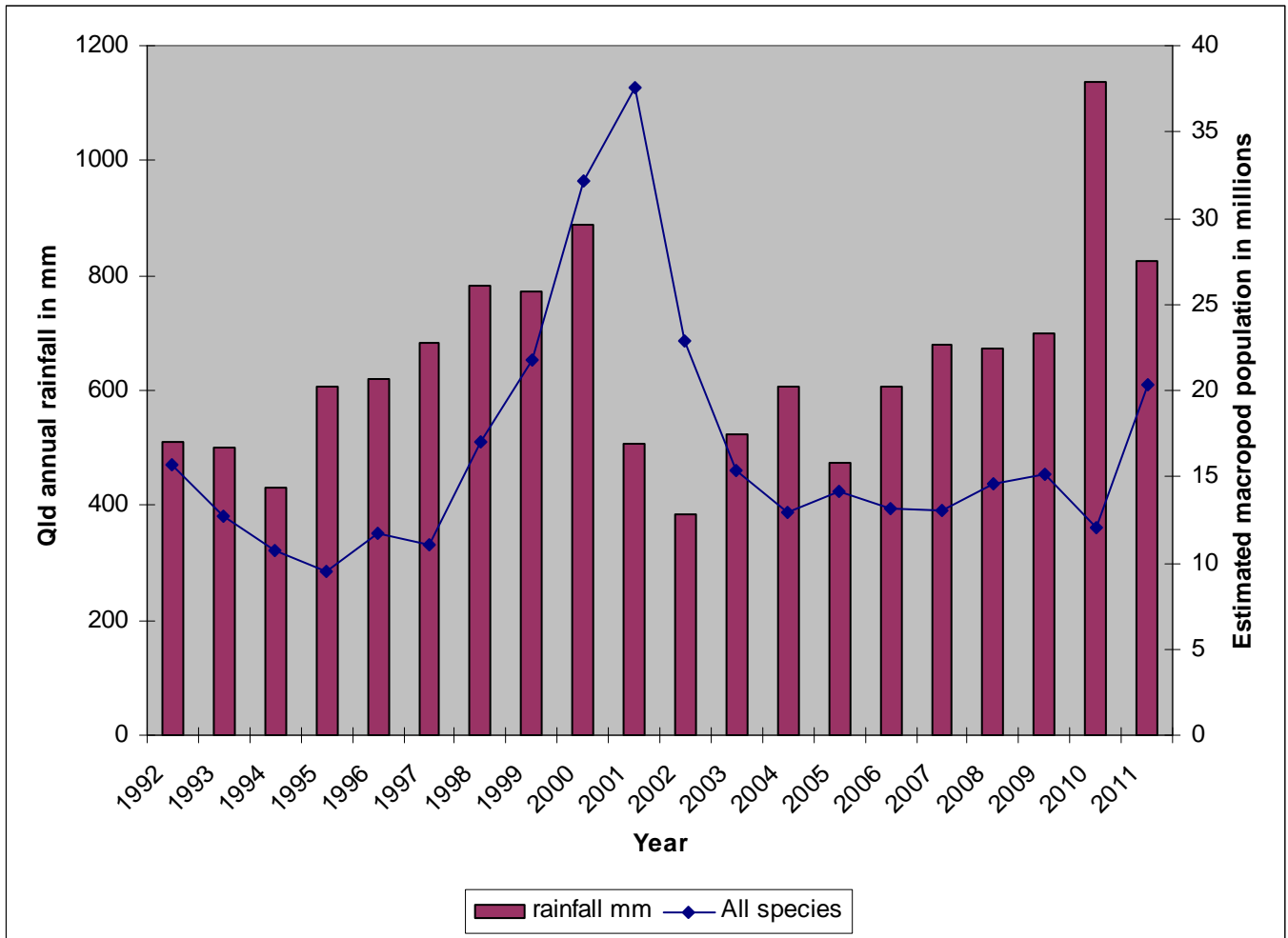


Figure 21 – Estimated macropod populations plotted with annual rainfall totals from Queensland 1992–2011



Figures 22–24 below outline data on the three commercially harvested macropod species pertaining to population, quota and harvest for the years 1993–2011. Harvest data in these graphs is the combined commercial harvest and damage mitigation take. It should be noted that population estimates in these graphs 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 to enable comparison with data collated prior to this period.

As quotas are set as a constant proportion of the populations, they fluctuate as populations fluctuate, 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 1993.

Figure 22 – Long-term population, quota and combined harvest data (commercial harvest + DMPs) for the red kangaroo. Note: population estimates are based on aerial surveys conducted the year before the harvest was taken

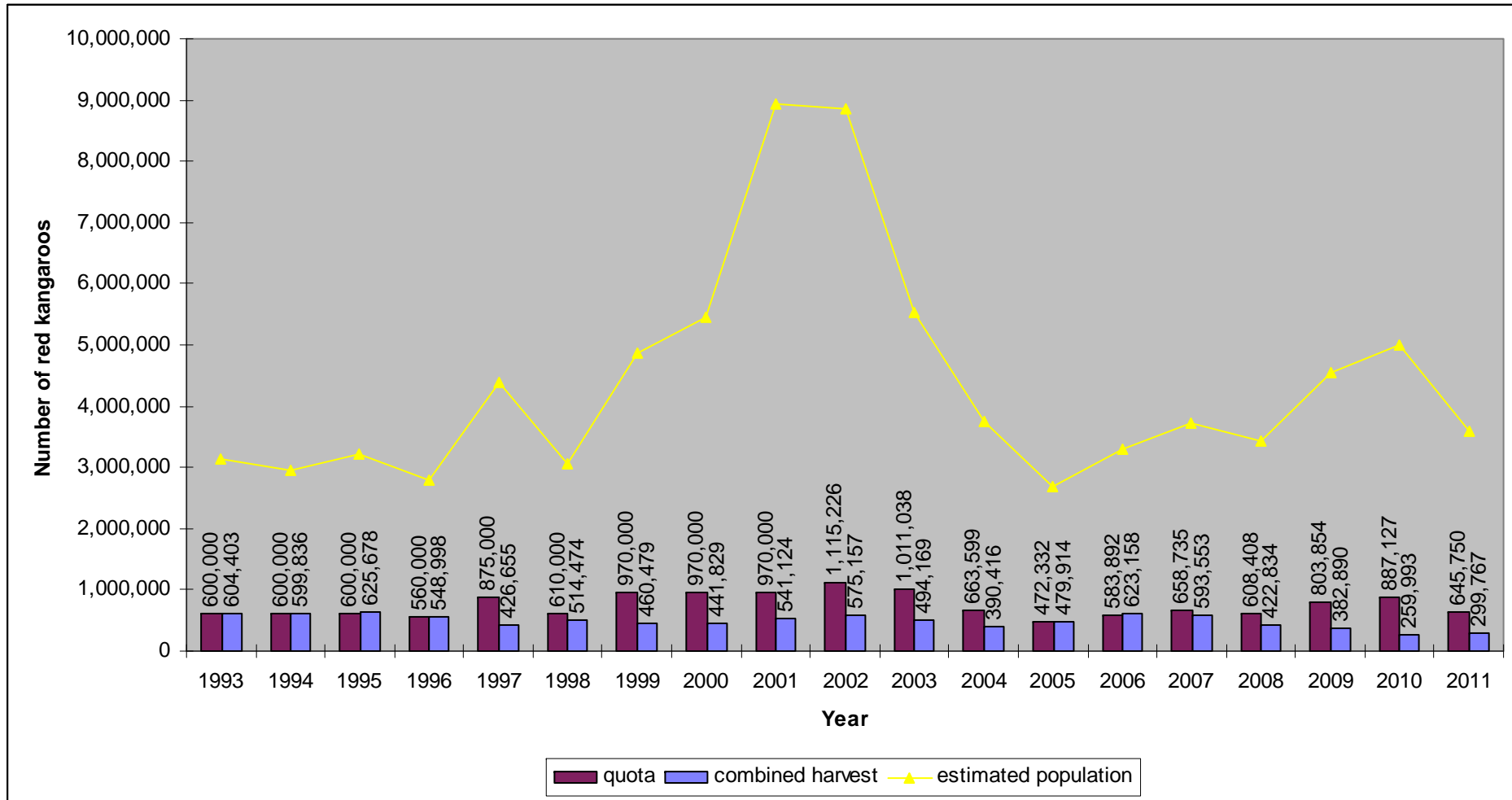


Figure 23 – Long-term population, quota and combined harvest data (commercial harvest + DMPs) for the eastern grey kangaroo. Note: population estimates are based on aerial surveys conducted the year before the harvest was taken

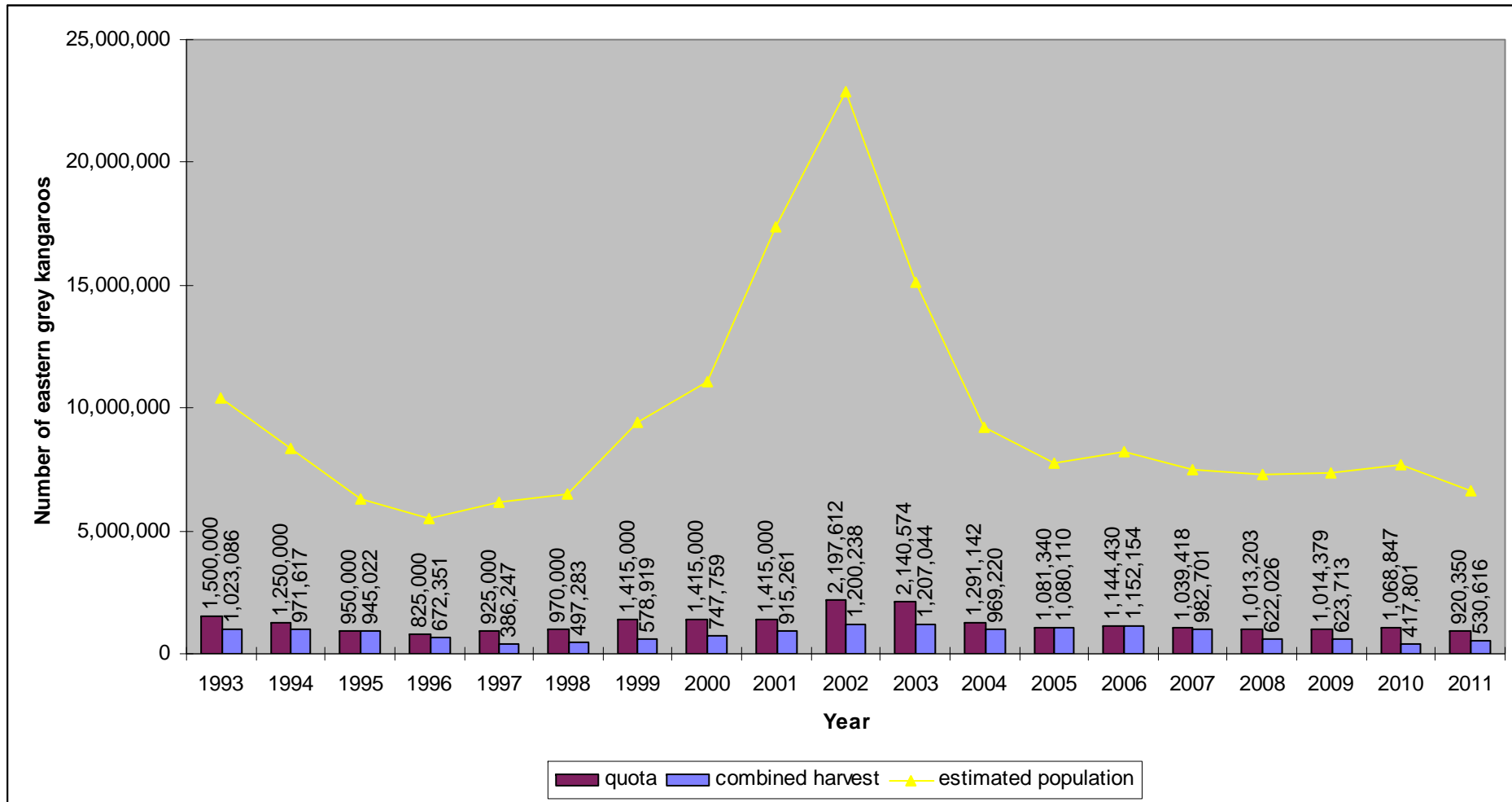
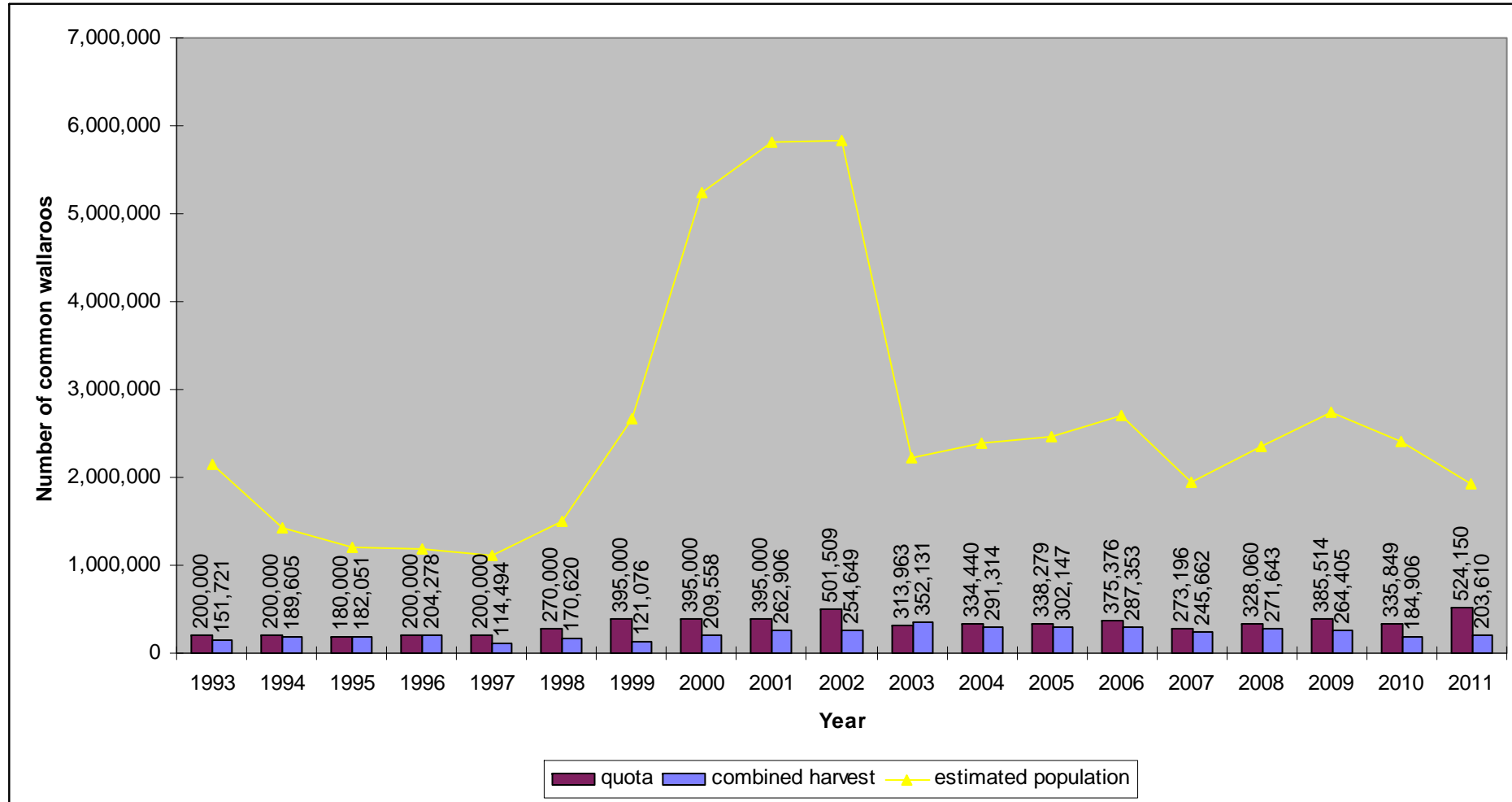


Figure 24 – Long-term population, quota and combined harvest data (commercial harvest + DMPs) for the common wallaroo. Note: population estimates are based on aerial surveys conducted the year before the harvest was taken



9. Compliance

The commercial harvest of macropods in Queensland requires compliance, investigation and enforcement resources. There are two Conservation Officers authorised under the *Nature Conservation Act 1992* within the Macropod Management Unit. The majority of commercial macropod harvest compliance activities are undertaken by the Conservation Officers, however the department undertakes collaborative compliance work with national park rangers, the Queensland Police Service, and Safe Food Production Queensland (SFPQ).

Compliance resources have the flexibility to be directed to identified and/or developing priority areas.

Compliance priorities for the 2011 harvest period were:

- Macropods are correctly tagged with 2011 harvest period tag.
- Macropods are tagged with the correct species tag.
- Macropods are tagged with the correct zone tag.
- Ensure non-head-shot macropods are not traded.
- Compliance with the *National Code of Practise for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes 2008*.
- Harvesters produce/carry valid written landholder consent as per licence conditions.
- Ensure timely, complete and accurate harvest returns from dealers.

The integrity of a quota relies upon the premise that tags are not reused or applied to the wrong species or used in the wrong harvest zone. This provides the focus for effective field compliance inspections and monitoring as opposed to the traditional high volume returns-based administrative compliance. To objectively and adequately demonstrate effective compliance levels, an inspection target of one per cent of the overall harvest; with 10 per cent of the sample inspected at a detailed level has been established.

Desktop audits and administration checks form part of routine compliance activities. Weapons licence audits are conducted throughout the year, as well as licence application checks and regular investigation of return irregularities.

9.1 Inspections

The department conducted both programmed and unannounced inspections of harvesters, dealers and processors. 103 licensed dealer sites were inspected along with nine licensed processor sites during the 2011 harvest period. Other complaints and evidence of non-compliance were also investigated.

One collaborative compliance operation was carried out in conjunction with the Queensland Police Service.

Throughout the harvest period, inspection targets were a minimum of 1 per cent of the harvest being visually inspected and of this sample a further 10 per cent being inspected in detail. The inspection targets of one per cent and 10 per cent were met, with 2.2 per cent of the harvest visually inspected and 17.7 per cent of the sample target inspected in detail.

Table 6 – Inspection targets

	Inspection target	Inspections conducted
Visual inspection—1% of overall harvest	10 133 – (1%)	21 899 (2.2% of harvest)
Detailed inspection of 10% of sample	1 013 – (10%)	1 793 (17.7% of target sample)

9.2 Compliance and enforcement measures

Breaches of legislation are subject to enforcement action such as warning notices, fines, licence cancellation and prosecution.

During the 2011, harvest period a total of 21 infringement notices and 46 warning notices were issued. A total of 177 compliance letters were sent to dealers and an additional 443 licence/tag application letters requesting further information were sent to harvesters and dealers (Table 7).

There were no prosecutions or licences cancelled during the 2011 harvest period. One investigation is ongoing.

Table 7 – Enforcement measures used

Compliance letter		Warning notice		Infringement notice		Prosecution	
Harvester	Dealer	Harvester	Dealer	Harvester	Dealer	Harvester	Dealer
0	177	30	16	18	3	0	0

The 21 Infringement notices were:

- 10—Fail to comply with conditions of harvest period notice. (Sale of carcass with body shot wound).
- 4—Fail to properly attach a tag immediately after macropod is dressed.
- 2—Fail to give return for each period/by prescribed time.
- 2—Fail to comply with conditions of authority (incorrect harvest zone tag used).
- 1—Attach a tag to wildlife of a species other than the species for which the tag is supplied or approved.
- 1—Buy or accept macropods tagged in contravention of Act.
- 1—Keep/use lawfully taken protected wildlife without lawful authority.

10. Unusual circumstances

In 2010 and 2011, Queensland suffered severe flooding as a result of the La Niña effect¹. A large number of harvesters were unable to harvest during 2011 due to the ongoing rain and flooding and have suffered loss of income as a consequence. The industry had access to its major meat export market in Russia temporarily suspended in 2009. The industry is still affected by this suspension and it is highly probable that the commercial harvest of macropods is still depressed as a consequence.

The department is not required by legislation to provide a refund to licence holders for unused tags. However a macropod tag refund was offered to harvesters by the Queensland Government following the natural disasters experienced in late 2010 and early 2011.

11. Research and experiments

The Macropod Management Program did not undertake any new research programs or experiments during 2011. The results for the Longreach ground surveys conducted in 2010 are available on the department's website.

The department continues to respond to requests for data from researchers and other stakeholders as they arise.

¹ Bureau of Meteorology *La Niña*: <www.bom.gov.au/watl/about-weather-and-climate/australian-climate-influences.shtml?bookmark=lanina>

12. Program improvements

Ongoing improvements are being made to the program. These include:

- the introduction of tags with a flat surface so barcodes are more easily read
- the use of colour-coded tags for each species to aid correct application
- the revision and streamlining of the process for people to apply for and buy tags
- wider range of information being made available online, including monthly tag sales and harvest statistics, forms and general information regarding the harvest.
- the development of a system to identify errors in returns and to improve the identification of discrepancies in returns.

13. References

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Appendixes

Appendix 1 – Wildlife Trade Management Plan for Export – Commercially Harvested Macropods – 2008–2012, performance indicators

Aim	Action	Performance indicator	Progress in 2011
Aim 1. Manage and administer commercial operators via licensing.	Action 1. All relevant activities are licensed in accordance with the applicable Queensland legislation and department policy.	1.1 All licences across Queensland are assessed, processed and issued in accordance with Queensland legislation and department policy.	Achieved. 1580 licences were issued in accordance with the Queensland legislation
Aim 2. Ensure humane treatment of kangaroos.	Action 2. The department will work with the Queensland Institute of TAFE or other accredited provider to ensure that all harvesters are competent to achieve the standards set out in the Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes.	2.1 All successful applicants for harvester's licences have completed the approved accreditation and their accreditation is current.	Achieved. All successful applicants had completed the approved course of training through TAFE. Proof of accreditation is part of the licence assessment process. All new applicants or those who have not held a harvesting licence for greater than 12 months are required to provide firearms competency certification, which is designed to ensure that all harvesters are capable of shooting humanely, in accordance with this code.
	Action 3. Department staff will monitor compliance with the Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes by commercial macropod industry operators.	3.1 All licensees who are found to have breached licence conditions in relation to animal welfare are issued with, warning notices, penalty infringement notices or are prosecuted as appropriate.	Achieved.
	Action 4. The department will contribute to nationally focused research in improving animal welfare outcomes.	Not applicable.	No proposals received in 2011.

Aim	Action	Performance indicator	Progress in 2011
<p>Aim 3. Monitor industry compliance.</p>	<p>Action 5. The department and Safe Food Production Qld (SFPQ) staff will undertake both regular and opportunistic monitoring of compliance by commercial kangaroo industry operators.</p>	<p>5.1 On receipt of harvesters licence applications, the authorised department officer assessing the applications will ensure that applicants have both a valid and current Queensland accreditation and a current firearms licence.</p>	<p>Achieved. Accreditation checks conducted for processing licences at time of application through SFPQ. Firearms licence checks conducted at time of application and throughout the year in 2011 with the Queensland Police Service.</p>
		<p>5.2 All chiller premises are inspected, on average, every three months during the life of this plan by department staff and/or staff of the SFPQ to ensure compliance with Queensland legislation and licence conditions.</p>	<p>Focus of the compliance strategy has changed to a volume of harvest performance indicator (one per cent). This was achieved. Any evident issues of a food safety nature are brought to SFPQ attention.</p>
		<p>5.3 All macropod processing works in Queensland are inspected by department staff and/or staff of SFPQ to ensure compliance with Queensland legislation and licence conditions. This will be contingent on the memorandum of understanding being signed and agreed to by both parties.</p>	<p>Nine processing plants were inspected in 2010. Partnership between SFPQ and the department continues as licensing information and compliance intelligence is shared across agencies.</p>
		<p>5.4 During the life of this plan harvester's vehicles loaded with macropod carcasses are inspected opportunistically to ensure compliance with Queensland legislation and licence conditions and the results of these inspections are documented.</p>	<p>Achieved. Harvester inspections are conducted in collaboration with the Queensland Police Service at roadblocks throughout the state. Other harvester inspections are conducted routinely during dealer site inspections.</p>

Aim	Action	Performance indicator	Progress in 2011
	Action 6. Activities not in accordance with the Queensland legislation and the management plan will be investigated and where an offence has been committed, and it is appropriate, prosecute.	6.1 Reports of unlicensed activities and activities in breach of legislation are investigated to the fullest extent possible, and where sufficient evidence is available offenders are issued with warning notices, penalty infringement notices or prosecuted as appropriate.	Achieved. Refer to compliance section of annual report for details.
	Action 7. The accuracy of industry returns will be continually monitored during the life of the management plan.	7.1 During the life of the management plan, incoming industry returns are scrutinised and discrepancies are investigated and resolved.	Achieved. System development to identify return errors and return validation improves identification of return discrepancies.
	Action 8. A compliance database will be maintained to support investigations, inspections and audits.	8.1 A compliance database is maintained.	Achieved. Compliance database is maintained and incidents recorded in the licensing system.
Aim 4. Monitor macropod populations.	Action 9. Population surveys will be conducted for each of the zones using the transect survey method.	9.1 Macropod population estimates are obtained using standard transect survey method throughout the life of this plan.	Achieved.
	Action 10. Commercial macropod harvest quotas will be set in accordance with the provisions of the management plan.	10.1 All commercial macropod harvest quotas are set in accordance with the provisions of the management plan throughout the life of the plan.	Achieved.
		10.2 The Commonwealth Government is advised of commercial harvest quotas for the following calendar year by 31 October.	Achieved by 30 November 2010.

Aim	Action	Performance indicator	Progress in 2011
		10.3 If Commonwealth approval is required for quotas, the rates specified in the plan as part of an adaptive management experiment, such approval is obtained before the additional quota is implemented.	Not required.
		10.4 The quota report is made available to the public via the department's website.	Achieved.
	Action 11. Special kangaroo harvest quotas will be set in accordance with the provisions of the management plan.	11.1 Special macropod harvest quotas are set and utilised in accordance with the provisions of the management plan.	Not required.
	Action 12. Macropod populations will continually be monitored indirectly throughout the life of the management plan.	12.1 Where a region showed greater than 40 per cent female take, and then it was investigated through the analysing and monitoring of returns, then appropriate action would be taken.	Not required.
Aim 5. Facilitate adaptive management and research.	Action 13. Historical data relating to the commercial macropod harvest in Queensland will be analysed during the life of the management plan to identify trends; this analysis will be considered in future macropod management programs.	13.1 Analysis of historical macropod harvest and management data is undertaken during the life of the management plan.	Achieved.
		13.2 The results of analysis and research using historical macropod harvest and management data are published in an appropriate forum.	Achieved.
	Action 14, Where practicable, experiments will be performed to test deliberate management interventions during the life of this plan.	14.1 All proposals to undertake active adaptive management experiments are reviewed and assessed by the department in accordance with the criteria outlined in this plan.	None received.

Aim	Action	Performance indicator	Progress in 2011
		14.2 All necessary approvals are obtained prior to experiments testing deliberate management interventions commence.	Not required.
		14.3 All adaptive management experiments are continuously monitored and conducted according to approval conditions.	Not required.
		14.4 Results of all experiments testing deliberate management interventions are published in an appropriate forum.	Not required.
	Action 15. The department will facilitate research into the ecology and harvest management of kangaroos and wallaroos.	15.1 Issues associated with the ecology of harvested species and the management of the commercial harvest are identified and a research prospectus is prepared and distributed to universities and other research institutions during the life of this plan.	Focus of the department's current research strategy has changed to a facilitative role. All requests for data on the commercial harvest of macropods in Queensland were assessed and facilitated during 2011.
Aim 6. Undertake program reporting and review.	Action 16. An annual report on the management plan will be prepared and submitted to the Commonwealth.	16.1 An annual report on the operation of the management plan for the previous calendar year is submitted to the Commonwealth by the end of March of the following year.	Achieved.
		16.2 All annual reports prepared during the life of this plan are on the department's website.	Achieved Annual reports from 2008–2010 are available on the department's website.
	Action 17. The review of the management plan will commence no later than 12 months prior to the expiry of this plan.	17.1 The schedule of the management plan review activities initiated no later than 12 months prior to the expiry date of this plan.	In progress.

Aim	Action	Performance indicator	Progress in 2011
		17.2 The success of the current plan in achieving its goal is assessed by measuring performance indicators.	To commence.
		17.3 The results of the plan review are presented to the Commonwealth and available on Macropod Management Program web page.	Achieved.
Aim 7. Promote community awareness and participation.	Action 18. Relevant public documents will be made available on the department's website.	18.1 Throughout the life of the management plan information is available on the department's website.	Achieved.
	Action 19. Publicly available information will be provided to interested parties on request.	19.1 Publicly available macropod management information is distributed to interested parties as soon as practicable after such a request.	Achieved.
	Action 20. Where appropriate relevant department Macropod Management Program staff will participate in media interviews and prepare media releases.	20.1 Department staff participate in interviews with the media where appropriate.	Achieved.
		20.2 Media releases are prepared when appropriate for community issues of interest, such as population surveys and the release of quota for the next calendar year.	Achieved.
	Action 21. Relevant information regarding licensing arrangements will be developed as required and distributed to all licensees.	21.1 A copy of the current Harvest Period Notice and current Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes is issued with every harvesters and dealers licence throughout the life of this plan to ensure that licensees are apprised of relevant licensing requirements and responsibilities.	The current harvest period notice and code of practice are available on the department's website, and the code of practice is issued to all new licence holders The current Harvest Period Notice and Code of Practice are provided to all people who complete the approved training course through TAFE.

Appendix 2 – A comparison of aerial and ground surveys of macropods in the Longreach area (Queensland) in 2010

Introduction

The commercial macropod harvest in Queensland encompasses three species:

- red kangaroo *Macropus rufus*.
- eastern grey kangaroo *Macropus giganteus*.
- common wallaroo *Macropus robustus*.

These commercially harvested species are abundant over a broad area of Queensland and Australia and are listed as 'least concern' wildlife under the Nature Conservation (Wildlife) Regulation 2006.

The Department of Environment and Heritage Protection (formerly the Department of Environment and Resource Management) monitors populations of these commercially harvested macropods, sets commercial quotas and manages the harvest in Queensland. The commercial harvest of macropods is subject to a number of measures that ensures that the harvest is sustainable, including annual aerial surveys to estimate population size.

Since 1991, the Queensland Government aerial surveys have been conducted by helicopter. This method employs line transect methodology (Buckland et al. 1993), which is relatively robust to variations in the probability of detection of macropods from the air and provides accurate and repeatable estimates of population density (Clancy et al. 1997). A detailed description of the methodology employed in these surveys is provided in Clancy et al. (1997).

Surveys are conducted over 22 fixed monitor blocks, covering an area of 136 000 square kilometres (Figure 1). In each helicopter survey block, between two to eight east-west running 50–90 kilometre transect lines have been placed systematically ten kilometres apart. Sampling intensity within each block is approximately 2.5 per cent.

It is widely accepted that aerial surveys may not pick up all animals present. Correction factors are sometimes used to adjust raw data to better represent the actual numbers present (Caughley et al. 1976). Line transect methods calculate survey-specific correction to raw counts by modelling the decline in detection probability of animals with distance from the transect line. Comparisons of ground and aerial surveys conducted by Clancy et al. (1997) concluded that the helicopter line transect technique accurately determines population densities for both red and eastern grey kangaroos over a range of habitats, seasons and densities. No correction factors are therefore applied to surveys of eastern grey and red kangaroos.

Whilst the method is less accurate for common wallaroos, there is still a close correlation between the results of helicopter surveys and those of ground counts. In other words, the aerial survey estimates were repeatable. Estimates derived from ground surveys for common wallaroo density are approximately two to three times that recorded for helicopter surveys. Accordingly, between 1998 and 2010 the Queensland Government has applied a conservative correction factor of 1.2 to the common wallaroo density estimates derived from helicopter surveys.

The Barcaldine/Longreach Community Cabinet meeting was held 1–2 November 2009. A major issue raised at the meeting was an increase in macropod numbers. This increased the total grazing pressure in the area, compromising the ability of graziers to manage the condition of their land (e.g. ground cover, annual vs perennial grasses).

In response to these concerns, the department committed to undertaking a ground survey of macropod populations in the local area. This survey was designed to complement the aerial survey program currently used to monitor populations in Queensland. A workshop was held with key researchers on 14 January 2010 to design an appropriate methodology for the ground surveys. The results presented in this report are from ground surveys implemented based on those recommendations.

Methods

Aerial surveys of macropods are conducted in the Longreach monitoring block three in every five years. The same four transects, each 90 kilometres long and oriented east west, are used every time (Figure 2). A Robinson R44 helicopter is used for the surveys and is flown at 61 metres (200 ft) above ground and at 93 kilometres per hour (50 kn) with the rear doors removed. Two rear-seat observers count out either side of the helicopter, each surveying one side of a transect line. Sightings of all large animals are recorded in distance classes up to 150 metres perpendicular to the transect line. Distance classes are delineated with tape on an aluminum boom that is placed underneath the observers and that extends out from the helicopter (photos 1 and 2). All data are recorded into digital data recorders. The start, finish positions and flight directions for all transects are determined during surveys from GPS operated by the pilot. Height above the ground is checked regularly using a laser range finder. Transects are flown within two hours of sunrise or two hours of sunset.

In July 2010, ground surveys were conducted along subsections of the transects used in the Longreach aerial surveys, and these were undertaken two weeks prior to the aerial surveys. The two observers, who also undertook the aerial survey, walked a total of 64.75 kilometres of the transects counting the number of each species along the transect line. The distance and angle of each animal from the transect line was recorded. Ground surveys were conducted within two hours of sunrise and two to four hours of sunset.

All data recorded from aerial and ground surveys was analysed using Distance 6.0 release 2 (Thomas et al. 2010). Density estimates presented here were calculated for both aerial and ground surveys from the same 64.75 kilometre sections of the transects.

Figure 1 – Annual helicopter survey blocks for commercially harvested macropods in Queensland

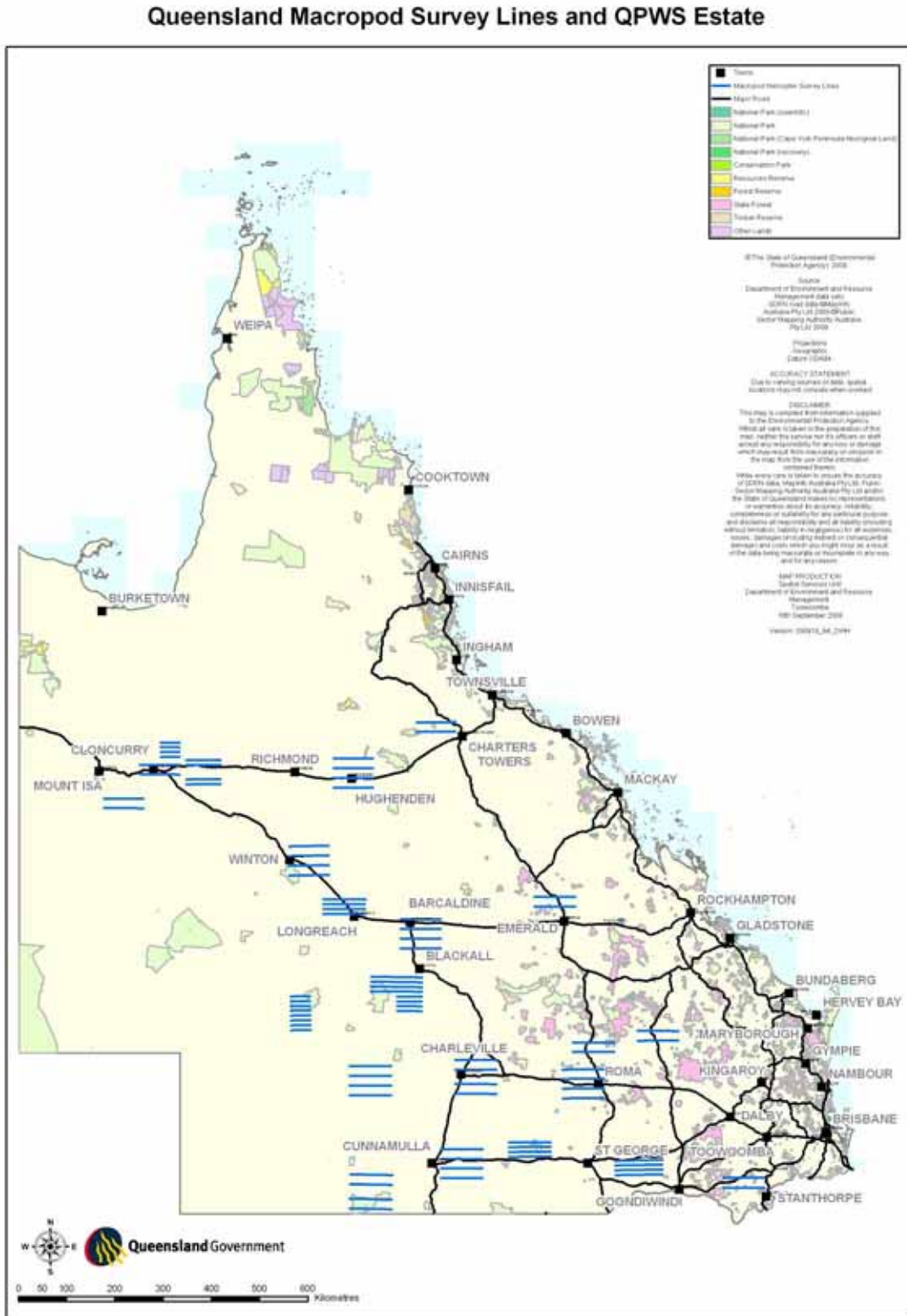


Figure 2 – Transect lines used in annual helicopter surveys for commercially harvested macropods near Longreach

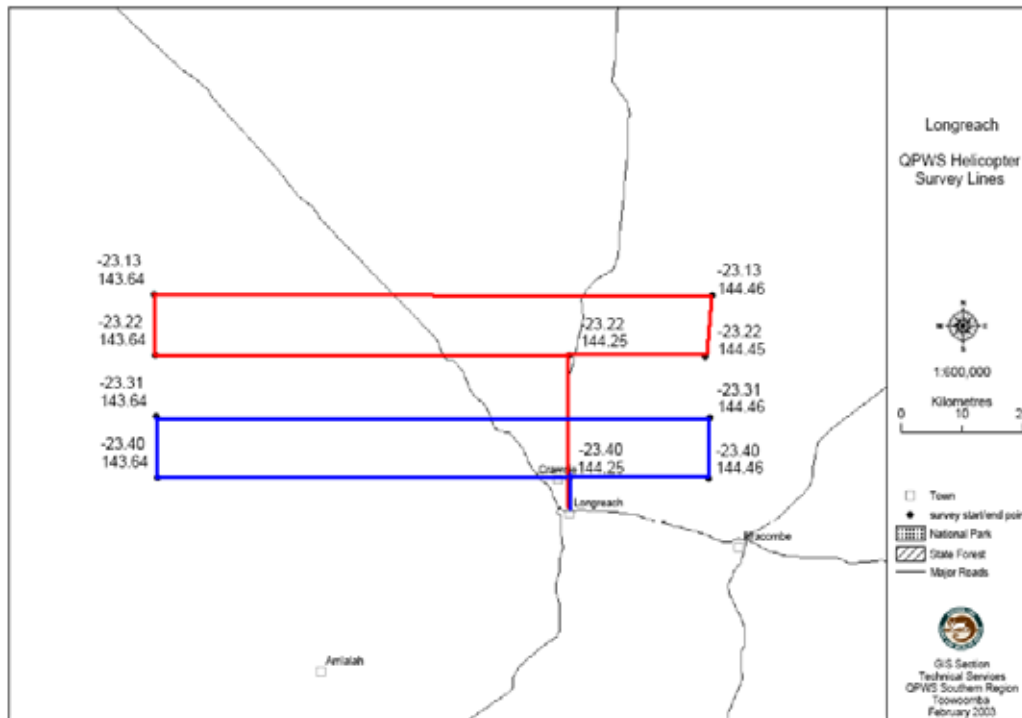


Photo 1 – Distance classes marked on aluminium boom attached to the helicopter for macropod surveys



Photo 2 – Robinson 44 helicopter fitted with aluminium booms and rear doors removed

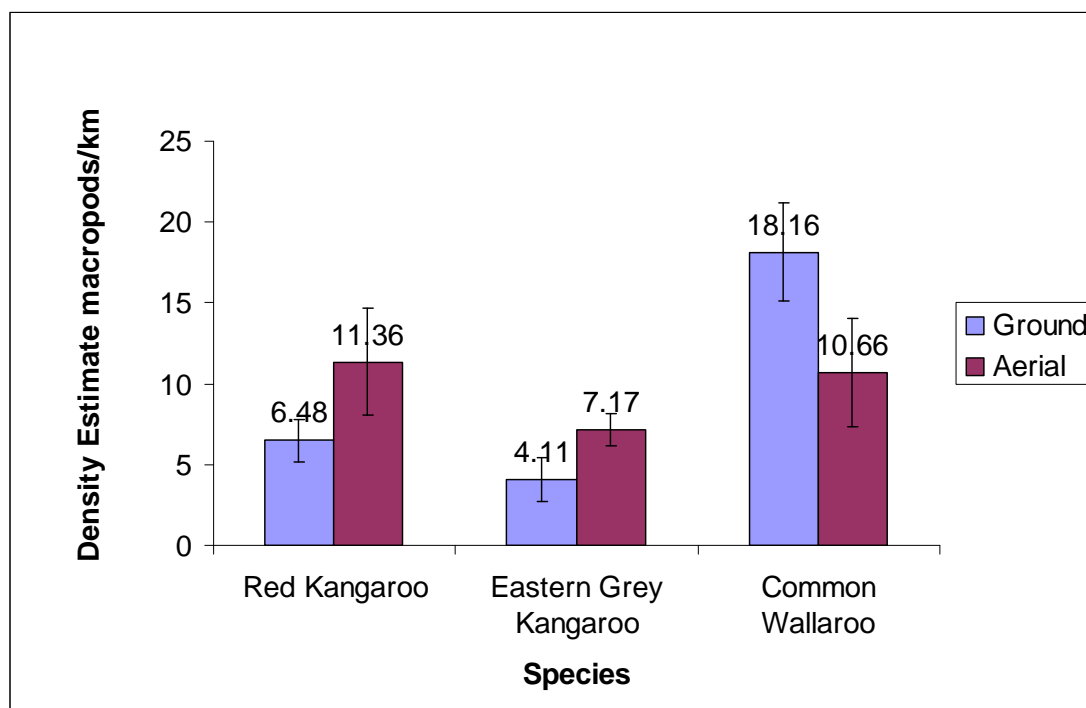


Results

Aerial survey density estimates were higher for red kangaroos and eastern grey kangaroos than ground survey density estimates in each of the transect subsections analysed in this study (Figure 3). Previous research has shown that movement of macropods away from a transect line in response to presence of walking observers can occur and reduce resulting density estimate (Southwell 1994). This problem can be reduced by increasing the speed of observer, such as by using an aircraft. Observers on ground surveys also reported reactive movement by red kangaroos and eastern grey kangaroos, which were often encountered in open habitat types where observers would have been conspicuous.

Ground survey density estimates were higher for common wallaroos than those estimated from aerial surveys. This species is usually encountered in thicker vegetation and hilly areas compared with the other two macropod species. Under these circumstances reactive movement away from an observer is less likely. This result is consistent with previous research comparing ground surveys to helicopter surveys conducted in western Queensland. Clancy et al. (1997) found density estimates generated from ground surveys for common wallaroos can be two to three times higher than those generated from helicopter surveys. They attributed this difference to the difficulty in spotting common wallaroos from the air compared to the ground.

Figure 3 – Density estimates (plus or minus 1 standard error) for three macropod species surveyed from the ground and helicopter in the Longreach area 2010



Management implications

From 1998 to 2010 the Queensland government has applied a correction factor of 1.2 to the common wallaroo density estimates derived from helicopter surveys. This figure has always been conservative in comparison to the findings of Clancy et al. (1997) who suggest that a correction factor of 2–3 would return density estimates closer to the true density of common wallaroos.

The 2010 ground survey results reported in this paper support the work by Clancy et al. (1997) and Cairns et al. (2008) and suggest that a correction factor of 1.85 should be applied to densities of common wallaroos when calculated from helicopter surveys. This figure is less than that suggested by Clancy et al. (1997) and was chosen to be conservative. This figure is also consistent with the correction factor used in New South Wales for the estimation of common wallaroo population densities. Density estimates for common wallaroos used by the Queensland government from 2011 are therefore based on a correction factor of 1.85.

Acknowledgements

Thank you to Professor Gordon Grigg, Dr Tony Pople and Dr Hamish McCallum for assistance in designing the walked line surveys described in this report. Thank you also to David Akers who assisted with selection of private properties in the Longreach area and to the property owners and managers who allowed departmental staff to use their properties for this study.

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