



Office of
Environment
& Heritage

2016 Annual Report

New South Wales Commercial
Kangaroo Harvest Management Plan
2017–21

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Introduction

The New South Wales Office of Environment and Heritage (OEH) (and its predecessor organisations) has been researching, monitoring and managing the commercial harvest of kangaroos in NSW since the 1970s. During this period, a sequence of kangaroo management plans has provided the framework for the harvest, in accordance with legislative requirements.

In December 2016 the Commonwealth Government declared the New South Wales Commercial Kangaroo Harvest Management Plan 2017–21 to be an approved wildlife trade management plan for the purposes of the *Environment Protection and Biodiversity Conservation Act 1999*. This Plan set the framework for the commercial harvest of kangaroos in NSW following the expiry on 31 December 2016 of the New South Wales Commercial Kangaroo Harvest Management Plan 2012–16.

This report gives details of the operation of the New South Wales Commercial Kangaroo Harvest Management Plan 2012–16 in its fifth year (2016), as required by Performance Indicator 18.1 of the plan. Appendix A describes each performance indicator and the progress made during 2016.

The following information is presented:

- actual harvest, by zone and species, compared with the approved quotas
- details of any special quota used (see page 5 for an explanation of special quotas)
- harvest sex bias for each species in each zone
- average carcase weights for each species in each zone
- compliance statistics
 - number of licensees
 - number of premises inspected
 - number of Penalty Infringement Notices issued and the reasons
 - number of prosecutions undertaken (offence and outcome)
 - any joint surveillance/enforcement activities completed
- any unusual situations that arose (e.g. flood/disease outbreaks; market factors)
- any experiments or research undertaken by OEH or sponsored by OEH.

Details of population survey methods, the results of aerial surveys and the setting of quotas are given in a separate report, namely the 2016 NSW Kangaroo Quota Report, available from the [Kangaroo Management Program's \(KMP\) web page](#).

Actual harvest in 2016, by zone and species

Table 1 summarises the 2016 harvest for each management zone, across all species combined. '%q' is the commercial take as a percentage of the approved quota. '%p' is the commercial take as a percentage of the population estimate, and 'Ave. wt' is the average carcase weight in kilograms of harvested females (F) and males (M).

Table 1. Harvest in 2016, by zone for all species combined

All species									
Management zone	No.	Population (p)	Quota (q)	Harvest	%q	%p	% take Male	Ave.wt (F)	Ave. wt (M)
Tibooburra	1	1,296,711	215,742	31,057	14.4	2.4	98.1	20.9	35
Broken Hill	2	2,732,816	453,297	70,282	15.5	2.6	97.5	18.5	30.7
Lower Darling	4	748,232	119,980	23,599	19.7	3.2	96.5	18.4	29.2
Cobar	6	849,493	134,570	7,929	5.9	0.9	99.7	17.1	28.2
Bourke	7	978,997	156,943	19,885	12.7	2.0	94.2	17.7	29.9
Narrabri	8	1,128,854	174,695	49,635	28.4	4.4	89.1	17.8	26.9
Armidale	9	308,440	46,266	15,242	32.9	4.9	80.2	18	30.5
Coonabarabran	10	2,342,085	361,421	65,168	18.0	2.8	93.4	18.3	27.7
Griffith	11	2,065,514	321,613	28,756	8.9	1.4	92.2	18.9	29.2
Glen Innes	13	402,605	60,391	11,203	18.6	2.8	87.4	17.3	28.2
Upper Hunter	14	154,180	23,127	12,976	56.1	8.4	89.7	19.4	30.5
SE NSW	16	1,284,300	192,645	4,291	2.2	0.3	100	0	32.1
C/T North	48	1,193,600	179,040	12,040	6.7	1.0	95.9	18.7	30
C/T South	49	811,800	121,770	6,388	5.2	0.8	92.8	17.3	30.3
Totals		16,297,627	2,561,500	358,451	14.0	2.2	94.0	18.3	29.9

Table 2 lists the details of the 2016 harvest by zone and species. ‘%q’ is the commercial take as a percentage of the approved quota. ‘%p’ is the commercial take as a percentage of the population estimate, and ‘Ave. wt’ is the average carcass weight in kilograms of harvested females (F) and males (M).

Table 2. Harvest in 2016, by zone and species

Eastern grey kangaroo									
Management zone	No.	Population (p)	Quota (q)	Harvest	%q	%p	% take Male	Ave. wt (F)	Ave. wt (M)
Tibooburra	1	186,964	28,045	660	2.4	0.4	93.3	18.6	33.0
Broken Hill	2	235,336	35,301	3,140	8.9	1.3	95.0	18.5	29.1
Lower Darling	4	112,970	16,946	4,246	25.1	3.8	96.1	18.4	29.9
Cobar	6	204,882	30,732	2,939	9.6	1.4	99.3	17.1	26.6
Bourke	7	293,153	43,973	6,004	13.7	2.0	91.7	17.3	27.9
Narrabri	8	807,143	121,071	41,608	34.4	5.2	88.3	17.7	26.3
Armidale	9	263,300	39,495	13,123	33.2	5.0	77.5	18.1	31.0
Coonabarabran	10	1,700,049	255,007	50,269	19.7	3.0	92.7	18.1	27.2
Griffith	11	1,223,988	183,598	15,619	8.5	1.3	92.2	19.2	28.9
Glen Innes	13	374,300	56,145	9,341	16.6	2.5	84.9	17.3	28.6
Upper Hunter	14	126,800	19,020	9,948	52.3	7.8	86.7	19.4	31.2
SE NSW	16	1,284,300	192,645	4,291	2.2	0.3	100	0	32.3
C/T North	48	1,193,600	179,040	12,054	6.7	1.0	95.9	18.7	30.0
C/T South	49	811,800	121,770	6,376	5.2	0.8	92.8	17.3	30.3
Totals		8,818,585	1,322,788	179,618	13.6	2.0	90.0	18.1	29.5
Red kangaroo									
Management zone	No.	Population (p)	Quota (q)	Harvest	%q	%p	% take Male	Ave. wt (F)	Ave. wt (M)
Tibooburra	1	1,061,784	180,503	29,872	16.5	2.8	98.3	21.2	35.1
Broken Hill	2	2,168,733	368,685	59,427	16.1	2.7	97.7	18.6	31.0
Lower Darling	4	387,272	65,836	13,310	20.2	3.4	97.0	18.4	29.9
Cobar	6	357,287	60,739	2,742	4.5	0.8	99.9	17.0	31.5
Bourke	7	504,671	85,794	12,954	15.1	2.6	95.1	18.1	30.8
Narrabri	8	315,429	53,623	8,016	14.9	2.5	93.1	18.3	29.9
Coonabarabran	10	505,429	85,923	13,690	15.9	2.7	95.5	19.5	29.7
Griffith	11	589,282	100,178	10,470	10.5	1.8	91.2	18.5	30.1
Totals		5,889,886	1,001,281	150,481	15.0	2.6	97.0	18.7	31.0

Walleroo									
Management zone	No.	Population (p)	Quota (q)	Harvest	%q	%p	% take Male	Ave. wt (F)	Ave. wt (M)
Armidale	9	45,140	6,771	2,119	31.3	4.7	96.9	17.1	27.7
Glen Innes	13	28,305	4,246	1,862	43.9	6.6	99.7	21.2	26.7
Upper Hunter	14	27,380	4,107	2,995	72.9	10.9	99.4	25.3	28.8
Totals		100,825	15,124	5,410	35.8	5.4	98.7	21.2	27.7
Western grey kangaroo*									
Management zone	No.	Population (p)	Quota (q)	Harvest	%q	%p	% take Male	Ave. wt (F)	Ave. wt (M)
Tibooburra	1	47,962	7,194	525	7.3	1.1	92.0	19.9	34.3
Broken Hill	2	328,746	49,312	7,715	15.6	2.3	97.0	18.1	29.4
Lower Darling	4	247,989	37,198	6,043	16.2	2.4	95.8	18.4	27.4
Cobar	6	287,324	43,099	2,248	5.2	0.8	100	0	26.2
Bourke	7	181,173	27,176	927	3.4	0.5	98.5	17.0	28.6
Coonabarabran	10	136,607	20,491	1,194	5.8	0.9	98.1	17.5	24.8
Griffith	11	252,243	37,837	2,667	7.0	1.1	96.0	19.4	27.7
Totals		*1,488,326	222,307	21,319	9.6	1.4	97.0	18.4	28.3

*There is a small population (6,282) of western grey kangaroos in Narrabri zone and is included in the population estimate, but no quota is set for this species in this zone.

Harvest quota management

To accommodate small holdings a reduction in the number of tags per licence is available for holdings under 100 hectares. This quota management measure is detailed below, as per Table 3.

Table 3. Limits on number of tags available per occupier's licence for 2016

Species available by zone	Less than 40 ha	40-99 ha	100-499 ha	500-4,999 ha	5,000 ha or more
Southeast	10	20	50	100	100
Central Tablelands North	10	20	50	100	150
Central Tablelands South	10	20	50	100	150
Armidale	10	20	50	100	150
Glenn Innes	10	20	50	100	150
Upper Hunter	10	20	50	100	100
Narrabri	10	20	50	100	150
Coonabarabran	10	20	50	100	200
Griffith	10	20	50	100	200
Lower Darling	No formal restrictions but applications that appear unreasonable may be queried				
Cobar					
Tibooburra					
Broken Hill					
Bourke					

Special quota

A special quota endorsed by the Commonwealth Government in 2012 as part of the overall commercial quota and was potentially available to minimise the number of kangaroos shot under non-commercial licences.

The special quota is not a pseudo-commercial quota; its sole purpose is to provide for commercial utilisation of kangaroos that would otherwise be shot and left in the field under the normal non-commercial licensing system.

OEH may use the special quota only when the commercial quota for a particular kangaroo management zone has been fully issued. As specified in the New South Wales Commercial Kangaroo Harvest Management Plan 2017–21, the use of a special quota will depend on one or more of the following:

- full utilisation of a commercial quota set at the usual proportion for that species in that zone
- consideration of local conditions, including drought declarations and/or Western Lands de-stocking orders
- kangaroo population trends (based on the most recent complete surveys)
- climatic conditions during the quota year.

However, non-commercial culling proceeds regardless of the available commercial quota and is typically less than 10% of the commercial harvest. An authorised OEH officer must assess each application for a non-commercial licence. In areas where commercial harvesting is available, non-commercial licences are generally requested only when:

- it is not economically viable to take kangaroos commercially
- the commercial kangaroo industry is unable to fulfil the landholders' needs
- management zone commercial quotas are fully utilised.

It is not necessarily intended to fully utilise the special quota, unless the criteria justify such action.

During 2016, no special quota was used.

Sex bias by species and zone

The commercial harvest is typically biased towards males, as they tend to be larger and heavier than females. For the period 1999 to 2015 inclusive, the total harvest consisted of between 69.6% and 90.4% males (Figure 1). Data gathered from harvester returns throughout 2016 indicate that 94.7% of the harvest overall was male; this is higher than the long-term average of 73.0%

One processing company made the decision to accept only male carcasses from October 2012 onward in response to customer concerns regarding the fate of dependent young orphaned by the harvest. As a result, the proportion of males in the harvest increased during the final quarter of 2012 and has continued to increase through 2016.

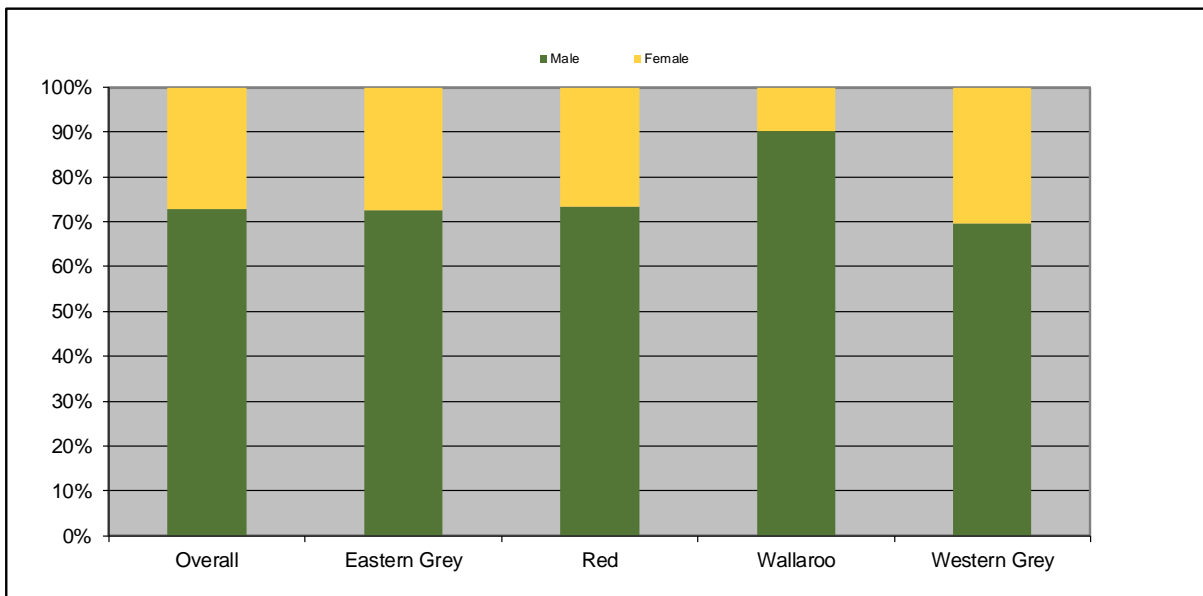


Figure 1. Average sex bias (overall and by species) in the commercial harvest, 1999–2015. Male bias is higher in the wallaroo than in other species because of the more pronounced size difference between males and females. Minimum carcass weights were introduced as licence conditions in September 2003, leading to a slight increase in male bias due to sexual dimorphism in all harvested species.

More so than with the other harvested species (Figures 2, 3 and 5), for wallaroo (*Macropus robustus*) the commercial take (Figure 4) is very strongly biased towards males, because females rarely reach the minimum size dictated by the conditions attached to harvester and fauna dealer licences. This has particularly been the case since 2008, when minimum carcass weights were increased by two kilograms over the previous standards.

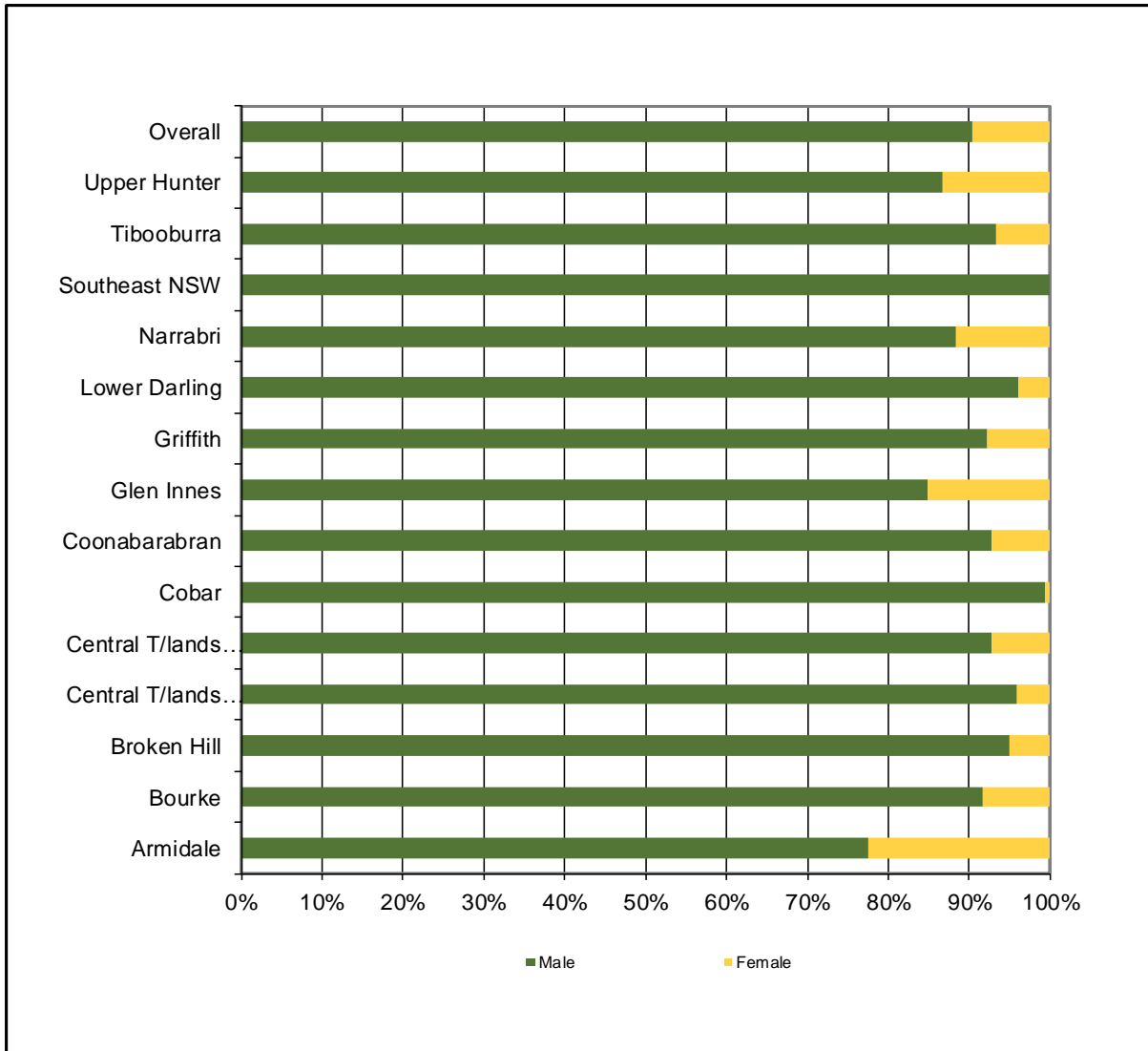


Figure 2. Eastern grey kangaroo sex bias in the commercial harvest, 2016. No consideration is given in this chart to the total harvest of this species in each zone; for example, the Tibooburra harvest was about 660 animals, compared with over 41,000 for the Narrabri zone.

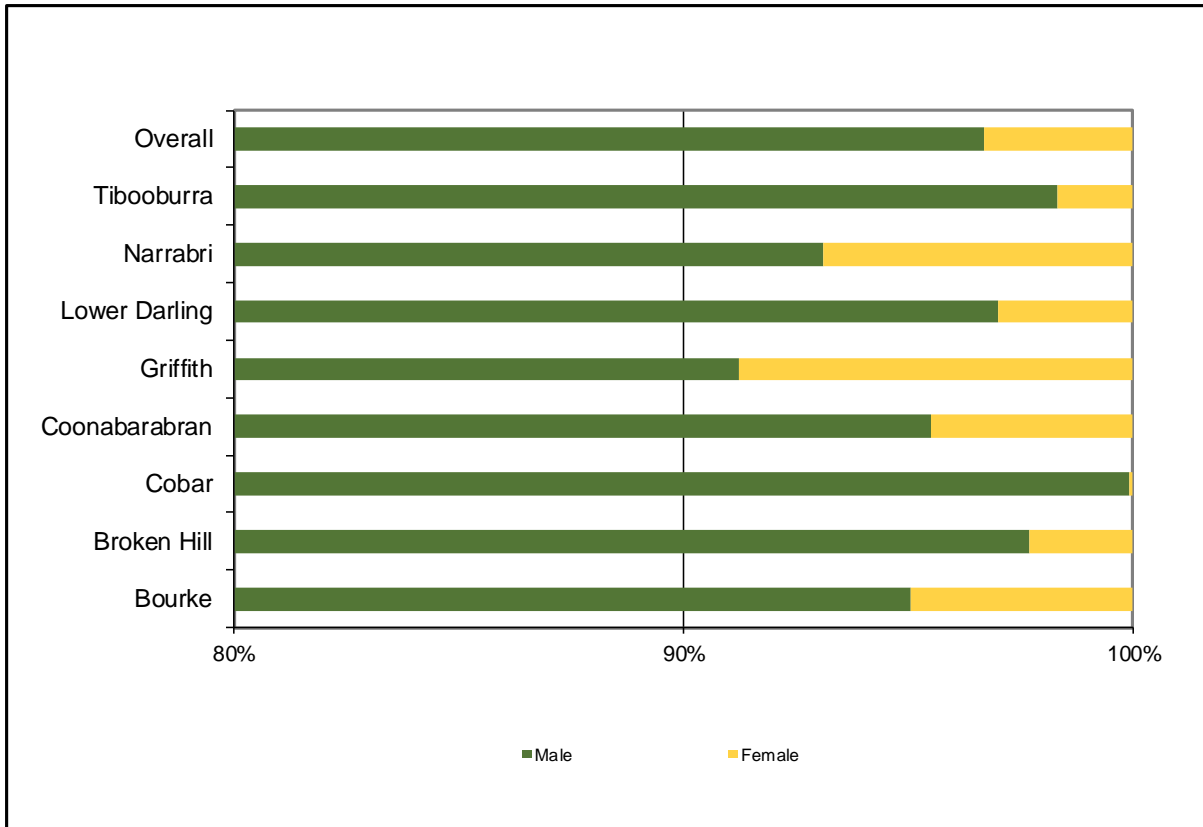


Figure 3. Red kangaroo sex bias in the commercial harvest, 2016. No consideration is given in this chart to the total harvest of this species in each zone. For example, the Cobar harvest was around 2700 animals, compared with over 59,000 for the Broken Hill zone.

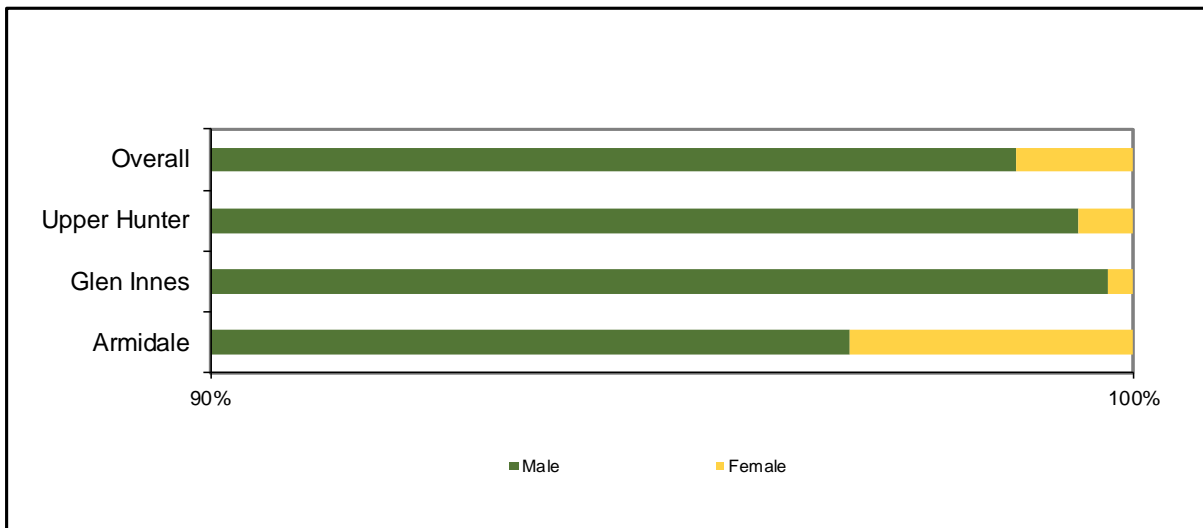


Figure 4. Wallaroo sex bias in the commercial harvest, 2016. The total harvest of wallaroos was around 6900 animals—about 6.8% of the total population for 2016. Male bias is very strong, because female wallaroos rarely reach the minimum size for commercial harvest.

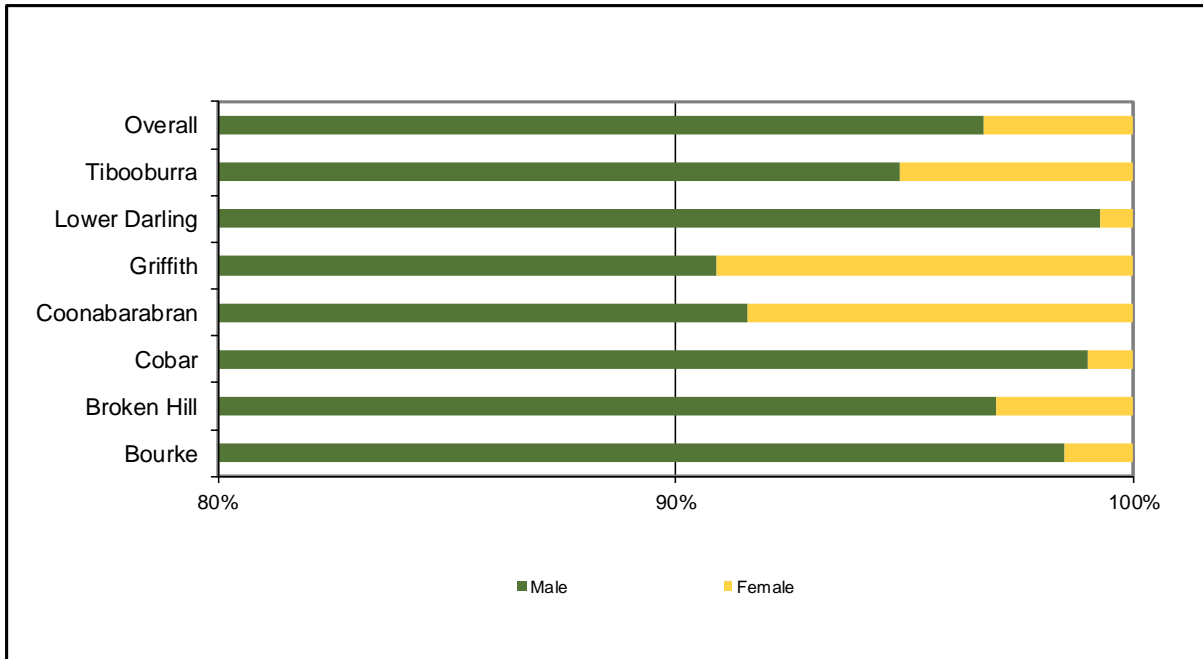


Figure 5. Western grey kangaroo sex bias in the commercial harvest, 2016. No consideration is given in this chart to the total harvest of this species in each zone. For example, the Coonabarabran harvest was about 1200 animals, and the total harvest of this species across zones was only about 21,000.

Compliance officers also record the sex bias of the harvest opportunistically, such as when a chiller inspection coincides with the carcasses being loaded onto trucks. Results of these opportunistic inspections during 2016 indicated a strong bias towards males.

Average weights by species and zone

Conditions attached to commercial harvest licences during 2016 required that kangaroo carcasses delivered to chillers for sale were not to weigh less than 14 or 15 kilograms. (The two different values reflect differences in the way the carcasses are dressed). Before 1 January 2008, the minimum carcass weights were 12 and 13 kilograms, respectively. Above these minimum weights, a wide range of weights is targeted.

The long-term average carcass weights by sex and species (across all zones) are shown in Figure 6. Data collected from harvester returns during 2016 indicate that average carcass weight across all species was 29.7 kilograms for males and 18.5 kilograms for females; these values are higher than the long-term averages. This is to be expected, given the increase in minimum carcass weight as part of licence conditions.

OEH does not require licensees to record individual carcass weights. Instead, harvester returns provide total weights for each category of carcasses (e.g. mean weight of female eastern grey kangaroos = total weight of females/number of females). These totals are used to calculate the average weights of carcasses by sex, species and zone (Figures 7–13).

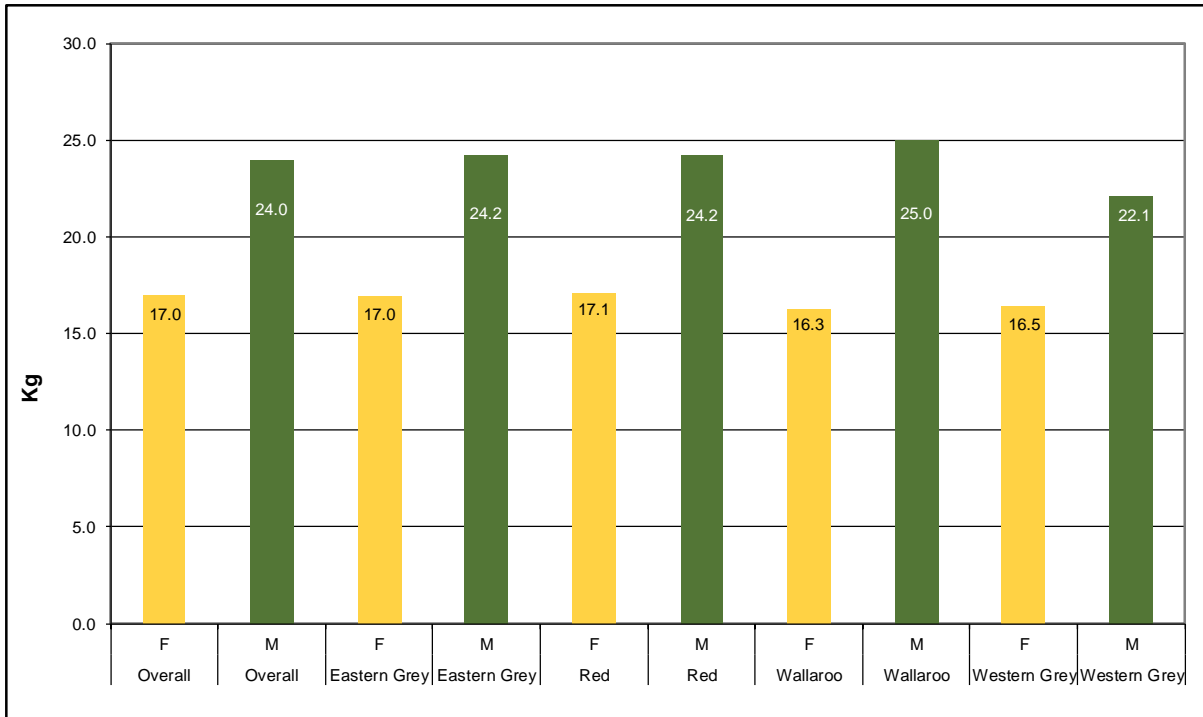


Figure 6. Average weights of carcasses in the commercial harvest, 1999– 2015. Minimum carcass weights were introduced as licence conditions in September 2003. They increased by two kilograms from 1 January 2008, leading to a slight increase in the long-term average.

Average carcass weights were calculated monthly and compared with the long-term average (1999–2015) for each sex, species and zone, as required by Performance Indicator 13.1 of the plan. None of the 2016 monthly results were more than one standard deviation below the long-term average. Standard deviations ranged from 0.18 kilograms for eastern grey females in the Bourke zone to 12.9 kilograms for red males in the Tibooburra zone, reflecting the degree of variation in the size of animals taken and the relative sample sizes.

For most combinations of species, sex and zone, average carcass weights were reasonably consistent from month to month. However, in the following charts, no consideration is given to the differences in sample sizes between sexes, species and zones; for example, the total harvest of female wallaroos during 2016 was just 88 individuals, whereas the harvest of male red kangaroos was about 145,150.

Where large fluctuations occur, the sample size is usually very small and statistical reliability is low. This variation is a result of statistical processes and is not a reflection of changes in the kangaroo population. Weights do not vary significantly where larger samples are available (e.g. in the case of male eastern grey kangaroos in the Coonabarabran zone).

In the charts that follow, there are a number of months in which no animals of a given sex or species were shot in a particular zone; this results in missing columns in the charts. For example, in Figure 7 there were no female eastern grey kangaroos shot in the Southeast zone from January to December.

During routine inspections of chiller premises and processing works, a selection of smaller animals is weighed individually by compliance officers to ensure that the minimum weight standards are being maintained. If underweight carcasses are detected, the harvester responsible may be cautioned or fined, depending on the circumstances.

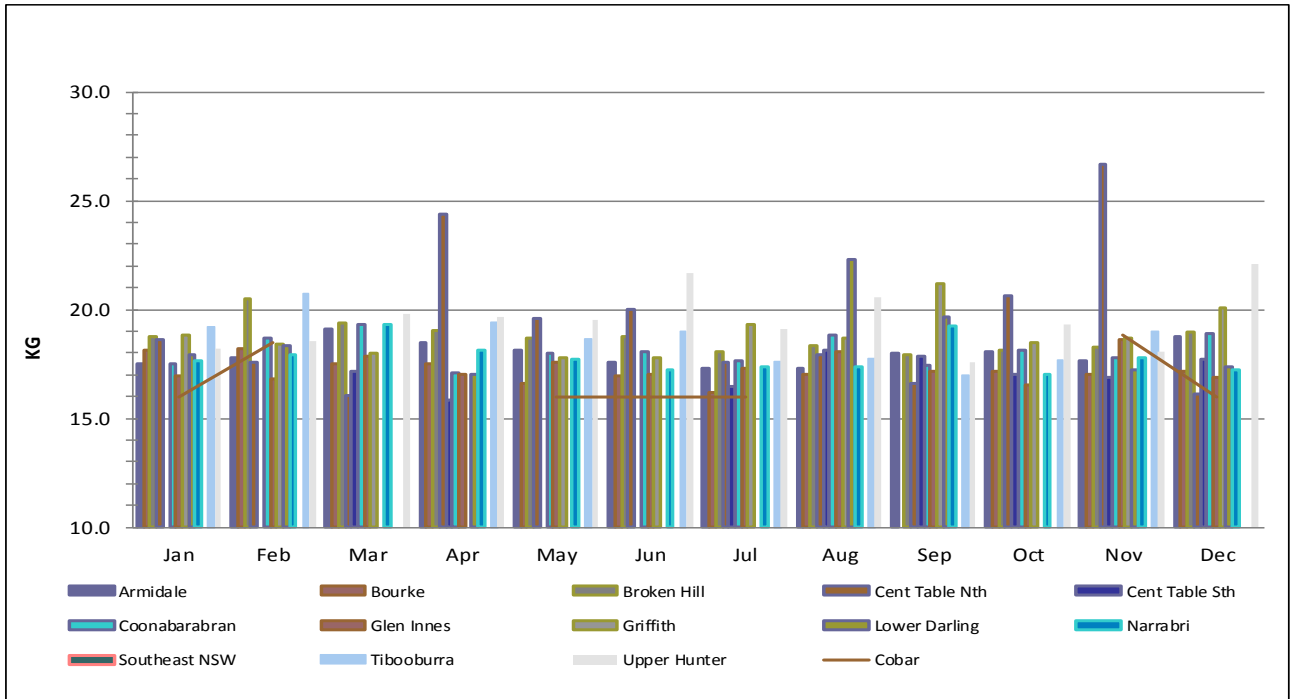


Figure 7. Eastern grey kangaroo female average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. Large fluctuations are usually associated with small numbers of animals. For example, in Cobar zone (line on graph) only 20 animals taken and shows a number of months where no animals were harvested.

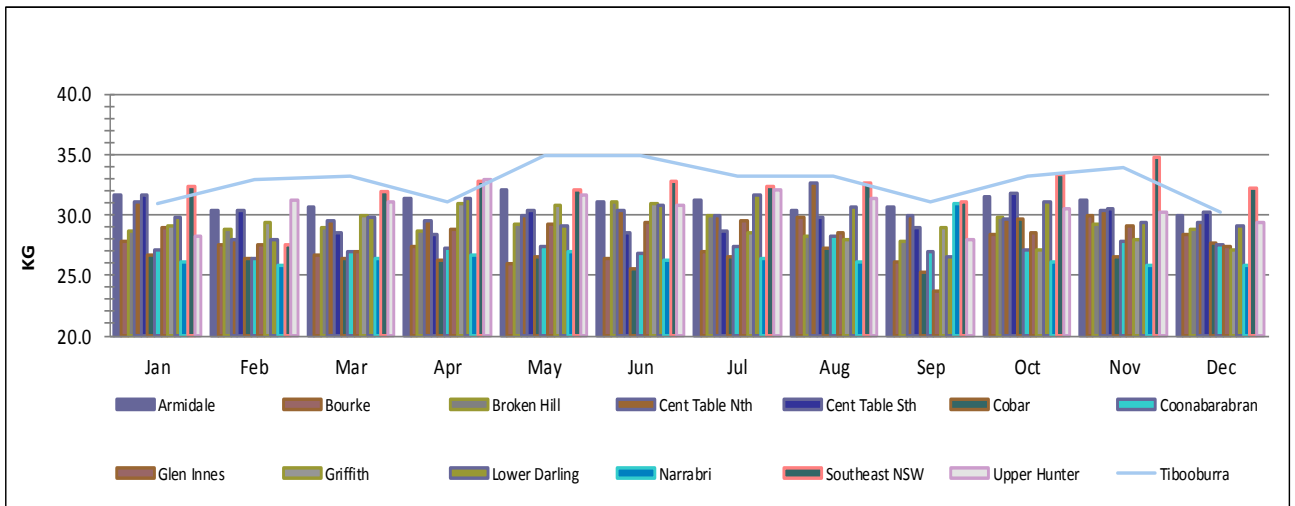


Figure 8. Eastern grey kangaroo male average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. The decline in average weight in Tibooburra zone (line on graph) for April relates to a harvest of only 45 animals and September 80 animals that month.

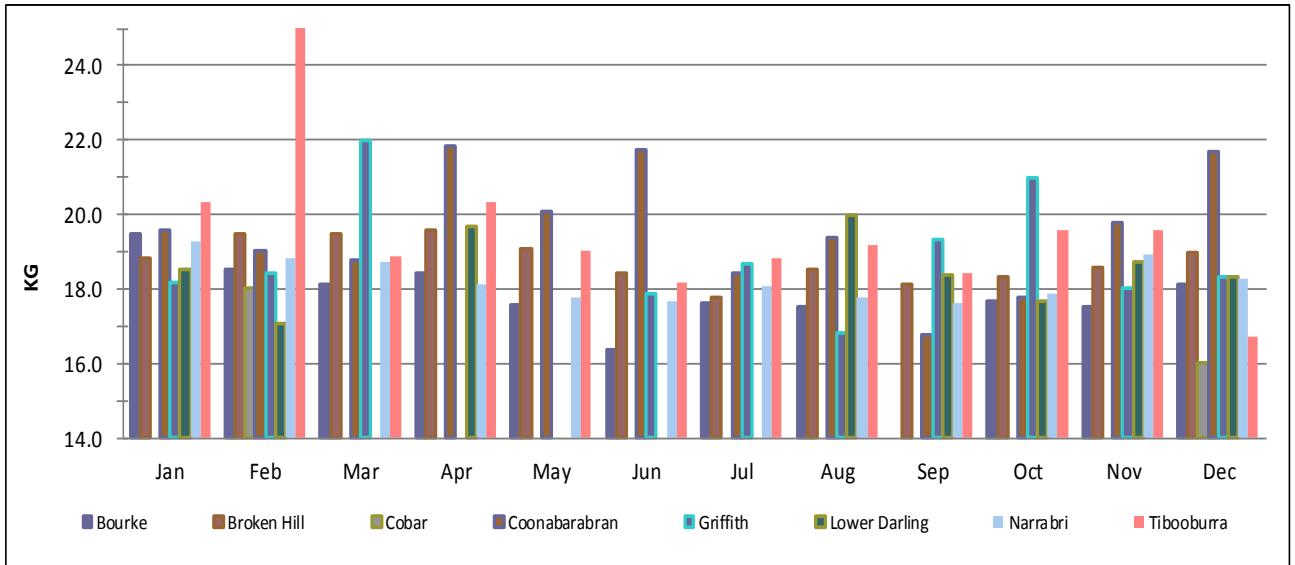


Figure 9. Red kangaroo female average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. The large variation in carcass weights for red females reflects the relatively small harvest compared with the number of males (about 5011 compared with over 145,150).

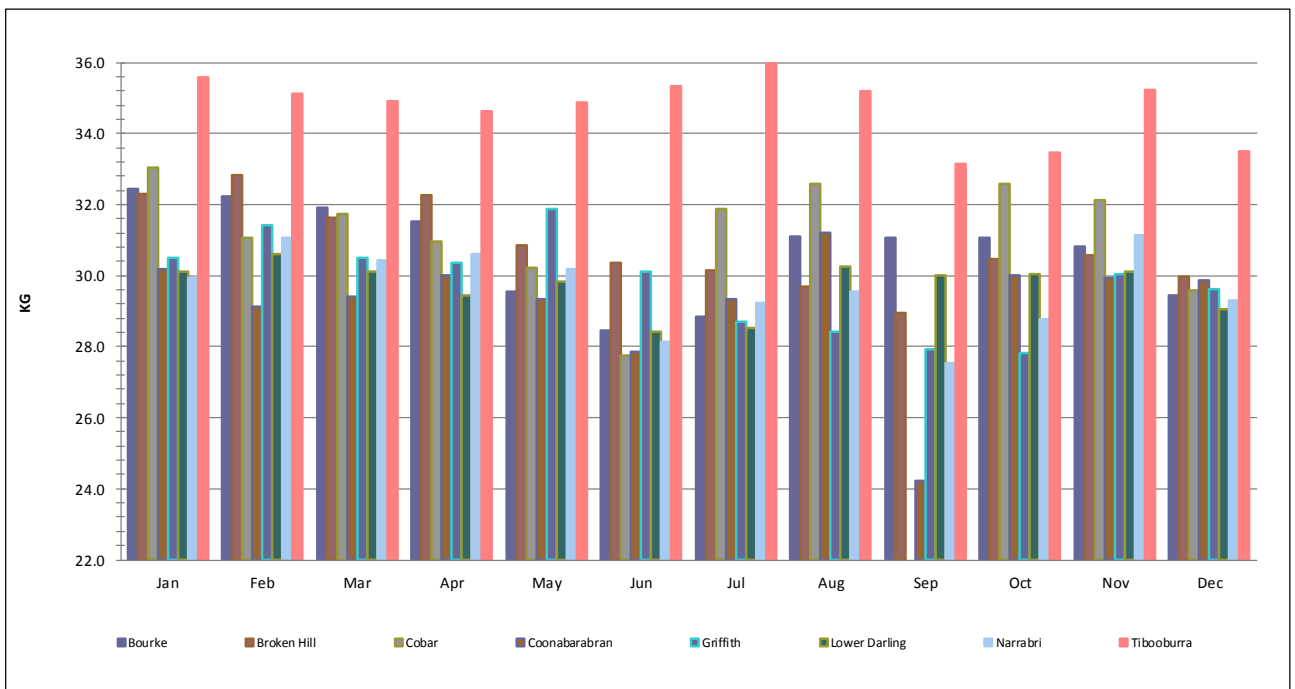


Figure 10. Red kangaroo male average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages.

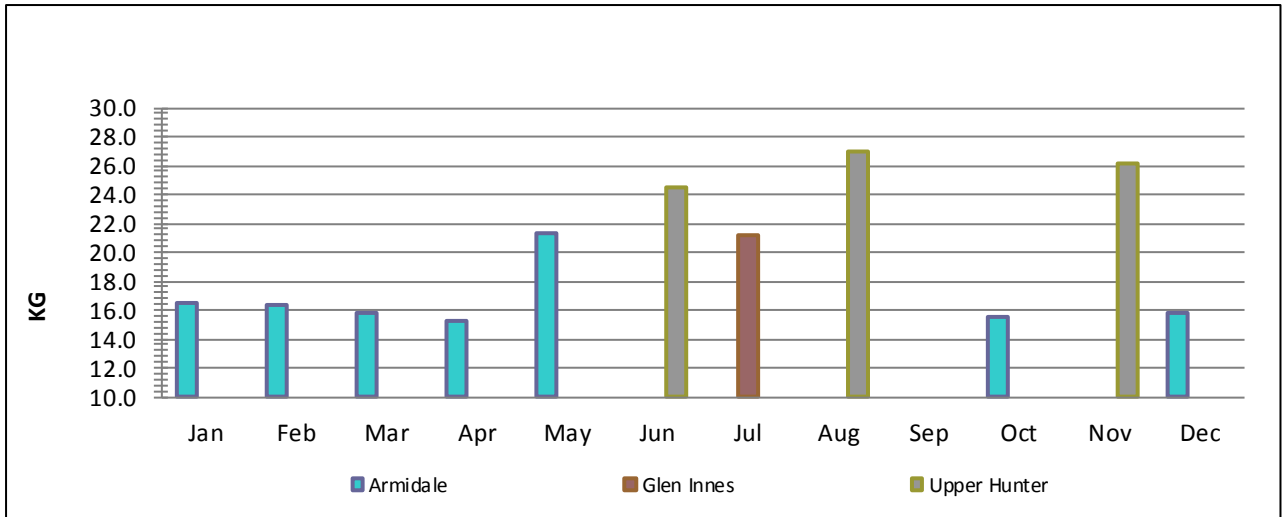


Figure 11. Wallaroo female average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. The apparent fluctuation is the result of extremely small sample sizes: the total harvest for wallaroo females was 88.

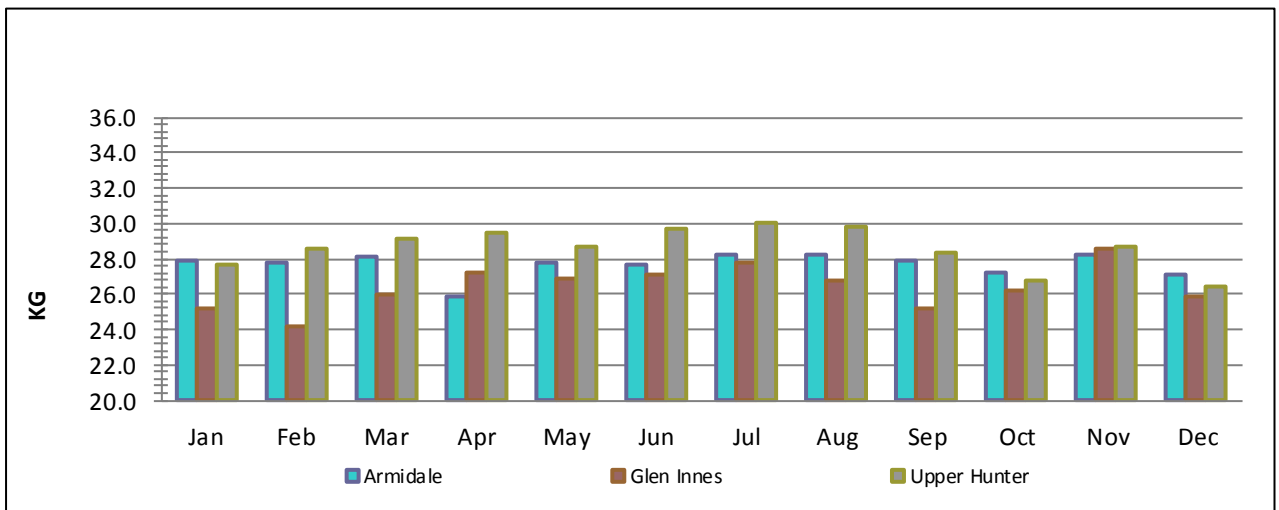


Figure 12. Wallaroo male average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages.

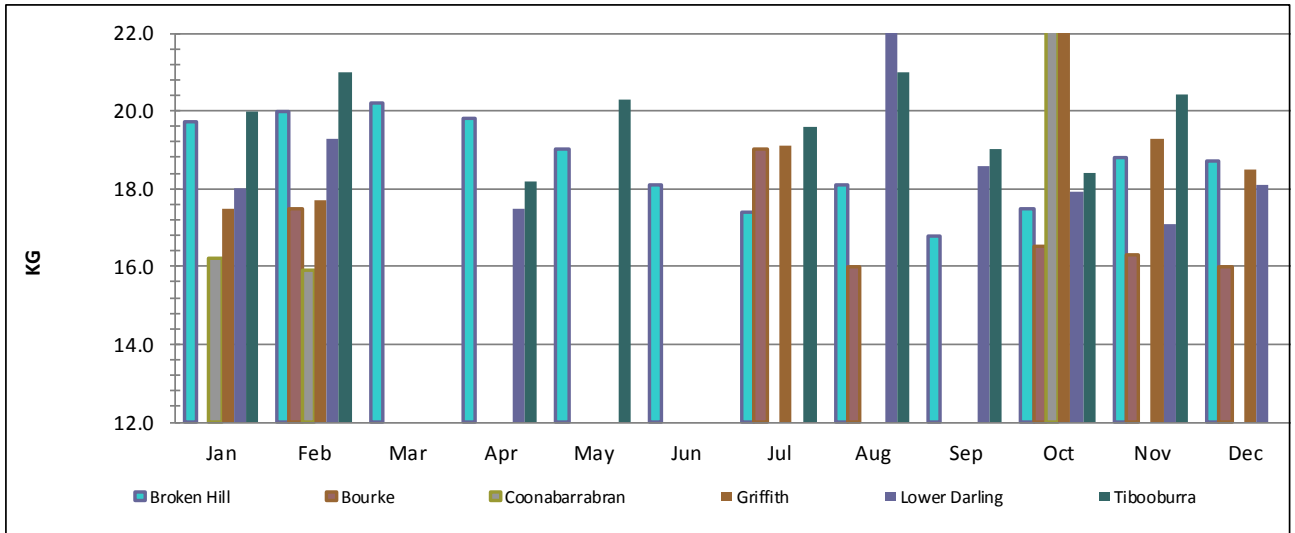


Figure 13. Western grey kangaroo female average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. The total take of female western grey kangaroos in 2016 was about 674 animals.

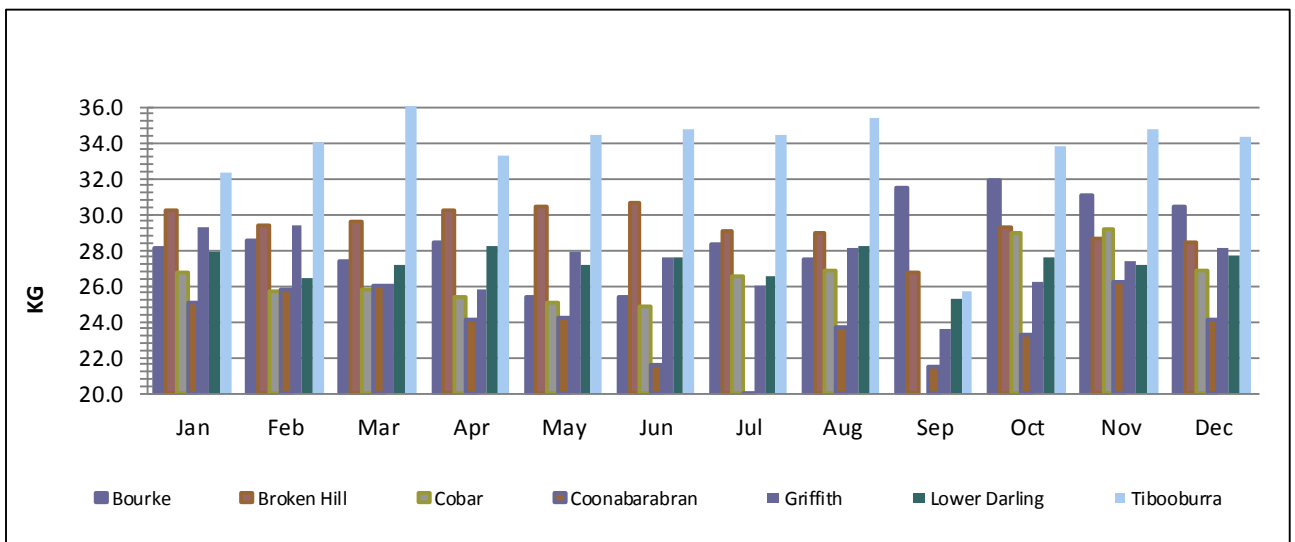


Figure 14. Western grey kangaroo male average carcass weights in the commercial harvest 2016. Minimum carcass weights were introduced as licence conditions in September 2003 and increased by two kilograms from 1 January 2008. Current carcass weights are therefore generally higher than the long-term averages. The apparent fluctuation in carcass weights for the Tibooburra zone is the result of a small sample size, with a total take in 2016 of only about 480 animals.

Non-commercial culling within the commercial harvest zones

Some non-commercial culling always occurs within the commercial zones. Typically, the non-commercial cull represents much less than 10% of the commercial harvest (Figure 15). The Southeast NSW commercial zone has been included in the long-term totals, but the commercial harvest in that zone did not start until 2004. The Central Tablelands North and Central Tablelands South zones have also been included, as these zones did not start operation until 1 June 2009.

The Coonabarrabran and Narrabri zones comprise the majority of winter cropping lands within the commercial harvest areas. As most non-commercial culling is associated with the protection of young winter crops, it is not surprising that these zones also show the highest non-commercial culls relative to the commercial quotas and harvests. In rangelands pastoral areas, non-commercial licences issued for the Lower Darling Zone were equivalent to 1.0% of the commercial quota available over that period.

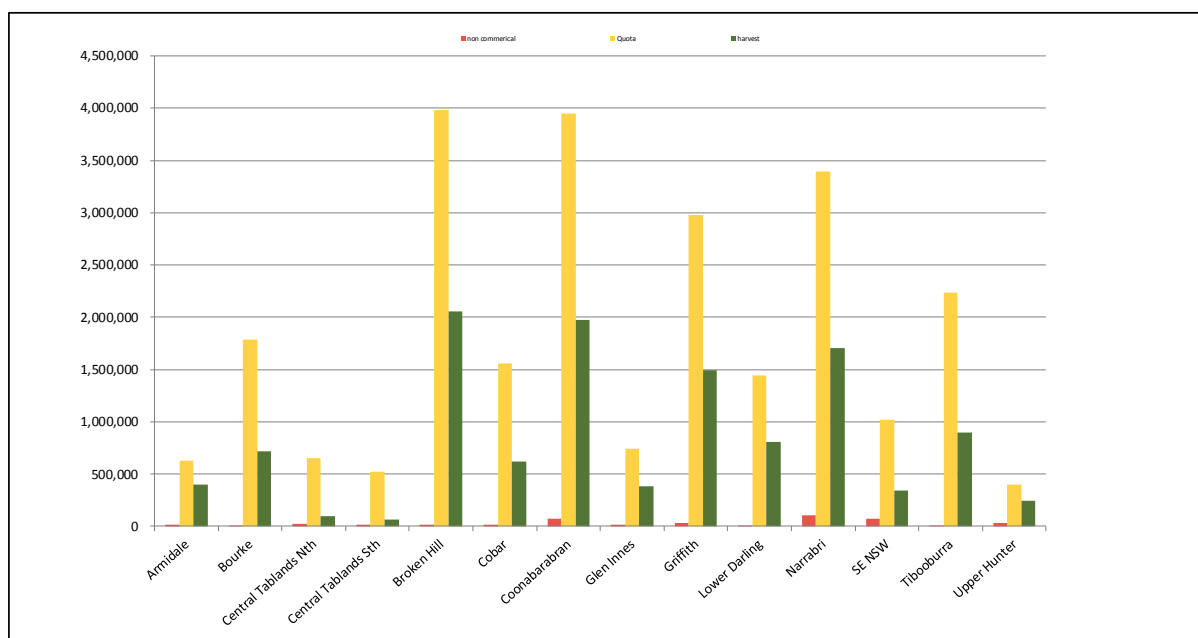


Figure 15, Comparisons of commercial quotas, actual commercial harvests and non-commercial culls for the period 1999–2015. Non-commercial licences are available state wide and can be issued for properties where commercial harvesting is also done. However, the non-commercial cull is typically equivalent to less than 10% of the commercial take and is highest in those areas where high-value pastures and winter crops are important. The Southeast NSW zone commenced operation in 2004; data shown for this zone are therefore limited to 2004–15. Tableland zones commenced in 2009 data shown for these zones are limited to 2009–15.

In 2016 under non-commercial licences 71,796 kangaroos were culled, equivalent to 20% of the commercial harvest, or 2.8% of the commercial quota (Figure 16). The commercial industry continued to operate at a reduced scale during 2016 and because kangaroo populations respond to favourable seasonal conditions, landholders in some areas perceived a need for population control that could not be met through the commercial industry. Consequently, OEHS saw an increase in inquiries regarding non-commercial licences. However, the level of non-commercial culling done remains low relative to the commercial harvest. Except in both Central Tablelands and Southeast zones where the non-commercial cull is higher than the commercial take. This indicates that there is a substantial reliance on non-commercial culling for kangaroo management in these zones.

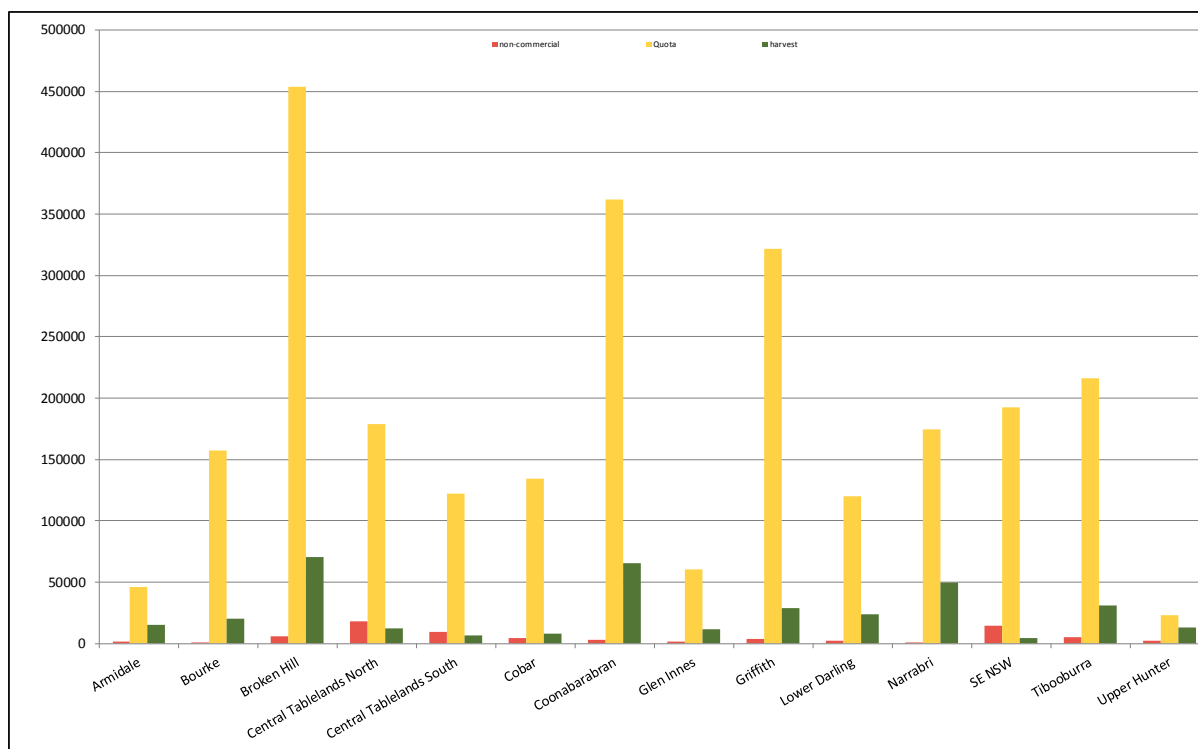


Figure 16. Comparison of commercial quotas, actual commercial harvests and non-commercial culls in 2016. Despite the relatively low commercial harvest, there was no substantial increase in non-commercial culling in 2016. Non-commercial culling remains high in Tableland zones which were open to harvesting in 2009. Southeast NSW zone also has shown an increase in the non-commercial cull.

Note: Non-Commercial culling figures are unreliable given that returns for animals culled are not always submitted to the local National Parks and Wildlife Service (NPWS) Area Office.

Monitoring compliance in the commercial harvest zones

Compliance audits

During 2016 there were 324 licensed commercial harvesters nominated on a total of 2878 commercial occupiers' licences throughout the commercial harvest zone.

Compliance audits of licensees are performed continuously by OEH staff. Checks are 'built in' to the Kangaroo Management System (KMS) database, and OEH compliance officers conduct field investigations and compliance checks. Licensing staff contributed to compliance activities by scrutinising applications, compiling reports and investigating suspect activities and irregularities.

In addition to these activities, compliance staff investigate reports of illegal shooting activities to the fullest extent possible. During 2016 reports of illegal shooting were received, either involving commercial licensees or for commercial purposes. On investigation, several were dismissed because no evidence was found to substantiate the report, or the activities were in fact licensed.

There were no surveillance activities conducted during 2016. These activities when conducted are a joint compliance operation involving Police and OEH Compliance and Regulation teams.

Reports involving matters related to food safety were referred to the NSW Food Authority in accordance with the Memorandum of Understanding between OEH and the Food Authority. Activities involving non-commercial shooting were referred to the relevant National Parks and Wildlife Office.

Information to help enforce the relevant sections of the NSW *National Parks and Wildlife Act 1974* is shared with NSW Police, the NSW Food Authority, the Australian Department of Agriculture and Water Resources and interstate fauna protection agencies as required, within the boundaries of NSW privacy legislation.

Inspection of premises

OEH compliance officers and/or NSW Food Authority compliance staff inspected chillers in kangaroo management zones for:

- non-head-shot kangaroos
- valid tags
- correctly affixed tags
- untagged kangaroos
- display of premises registration number and licence number for either pet food or human consumption (NSW Food Authority)
- presence of other animal carcasses.

Harvesters' vehicles are checked opportunistically for:

- appropriate registration through the NSW Food Authority (for either human consumption or pet food)
- correct setup and fit out (in accordance with a NSW Food Authority memorandum of understanding)
- untagged carcasses.

Harvesters are also checked to ensure that they are carrying a Commercial Kangaroo Harvester's Licence under s.123 of the *National Parks and Wildlife Act 1974*.

Where possible, chiller inspection trips include early morning visits to coincide with deliveries of kangaroos shot the previous night. On these occasions, vehicles are checked as above.

During 2016, there were 86 chiller premises registered by fauna dealer wholesalers including five registered by harvesters and one by an owner occupier for their own use. In total, 54 inspections were conducted by OEH and a further 20 inspections and 48 audits conducted by NSW Food Authority. All chillers were utilised throughout the year and a large number of chiller premises were not operational for significant periods during the year as a result of market factors; if premises are known to be closed, no inspections are conducted.

In addition to routine chiller inspections, OEH officers investigated instances of non-head-shot kangaroo carcasses originating in NSW and reported from processing works in South Australia and Queensland. These investigations resulted in no penalty notices being issued.

Penalty infringement notices

Issuing of verbal cautions, written warnings or infringement notices is at the discretion of the OEH compliance officer, in accordance with the KMP's compliance policy and in consultation with the Manager KMP.

During 2016 a total of 10 infringement notices were issued, nine for the offence of harming protected fauna and one for incorrect tagging.

In addition to the infringement notices, four official cautions, 22 warning letters and three advisory letters were issued for various breaches of licence conditions. Although these cautions do not attract penalties, they are recorded and taken into account in any future compliance considerations.

For the following breaches official cautions were issued:

- 3 fail to submit records
- 1 untagged carcase.

For the following breaches warning letters were issued:

- 1 non-head-shot to carcase
- 1 fail to return unused tags
- 1 underweight carcase
- 7 incorrect display of licence at chiller
- 1 undershot
- 7 overshot
- 2 shot outside licence period
- 2 exceed number authorised.

For the following breaches advisory letters were issued:

- 3 non-head shot to carcase.

OEH officers did not seize any carcasses as a result of licence conditions being breached. Generally, if carcasses are seized and they meet the commercial licensing requirements, they are sold by OEH to avoid wastage. Carcasses that do not meet the licence requirements (i.e. that are underweight or body-shot) are not sold.

Licence cancellations

OEH did not cancel any licences or registrations during 2016.

Prosecutions

There were no prosecutions during 2016. There are other investigations that are continuing and prosecution action may result for offences committed in 2016 (Table 4).

Table 4. Summary of compliance breaches and actions in 2016

Offence	Action	Result
Contravene conditions of licence (s. 133(4) of the NPW Act)	4 cautions 1 penalty notices	No penalty Penalties at \$300 each
Harm protected fauna (s. 98(2) of the NPW Act)	9 penalty notice	Penalties at \$300 each

NPW Act: *National Parks and Wildlife Act 1974*

Other factors affecting the commercial harvest in 2016

There were no reduced quotas set for population estimates for any commercial zone in 2016.

The industry continued to operate at historical lows during 2016 and has achieved limited export of kangaroo meat throughout 2015 and 2016, limiting the industry's capacity to utilise the full commercial quota. As a result of poor market prospects, many chiller premises were closed down for various periods throughout the year or placed limits on the number of carcasses accepted each week so as to manage supply to processing plants.

In October 2012, one processor made the decision to accept only male carcasses in response to customer concerns about the fate of dependent young orphaned by the harvest. This decision has remained in place throughout 2016 and as result, some harvesters are shooting fewer animals.

The combination of these impacts resulted in only 14.0% of the available quota being utilised (about 2.2% of the estimated population).

Research involvement in 2016

The KMP did not initiate any new research proposals in 2016.

Appendix A: Progress against performance indicators in 2016

Action	Performance indicator	Progress in 2016
1.0 All relevant activities are licensed in accordance with the applicable NSW legislation and OEH policy	PI 1.1 – All licences across NSW are assessed, processed and issued in accordance with NSW legislation and OEH policy.	Done. Centralising licensing has resulted in consistent adherence to policy requirements.
2.0 Licence conditions are effective and reflect current NSW legislation, OEH policy and the goal and aims of the plan.	PI 2.1 – Licence conditions are reviewed at least annually and where necessary amended.	Licence conditions have been reviewed; no amendments were necessary.
	PI 2.2 – Licensees are advised in writing of changes to licence conditions within one month of such changes being approved by the Manager, KMP.	Not required.
3.0 OEH will work with the NSW Firearms Safety and Training Council Ltd to ensure that all trappers are competent to achieve the standards set out in the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes.	PI 3.1 – All successful applicants for harvesters' licences have completed the approved accreditation and their accreditation is current.	Validation processes built into the licensing database prevent a harvester's licence being created and saved unless a valid accreditation number is entered. Applicants must provide a certified photocopy of their accreditation card with their application for a harvester's licence.
	PI 3.2 – During the life of this plan, the content of the accreditation course will be reviewed and revised if necessary.	Completed.
4.0 OEH staff will monitor compliance with the National Code of Practice for the Humane Shooting of Kangaroos and Wallabies for Commercial Purposes by commercial kangaroo industry operators.	PI 4.1 – All licensees who are found to have breached licence conditions relating to animal welfare are issued with Penalty Infringement Notices or are prosecuted as appropriate.	Four warning/advisory letters were issued for breach of licence conditions relating to animal welfare. Several other reports of non-head-shot carcasses were investigated including these four letters, but there was insufficient evidence to take penalty action.
	PI 4.2 – During the life of this plan, a selection of harvesters will be audited to determine the level of compliance with the Code of Practice in the field.	Two audits were completed in January 2013 and none completed from 2014 to 2016.

Action	Performance indicator	Progress in 2016
5.0 OEH will facilitate research into improving animal welfare outcomes associated with the commercial harvest of kangaroos.	PI 5.1 – Issues associated with the animal welfare aspects of the commercial harvest are identified and research proposals are sought from universities and other research institutions during the life of this plan.	No research priorities identified.
6.0 OEH staff will undertake both regular and opportunistic monitoring of compliance by commercial kangaroo industry operators.	PI 6.1 – On receipt of harvesters’ licence applications, the authorised OEH officer assessing the applications will ensure that applicants have both a valid and current NSW Firearms accreditation and a valid Firearms Licence.	Done. Validation rules built into licensing database prevent the issuing of a harvester’s licence without this information.
	PI 6.2 – All chiller premises are inspected on average every three months during the life of this plan by OEH staff and/or staff of the NSW Food Authority to ensure compliance with NSW legislation and licence conditions. Where a chiller premises has not been registered for the full calendar year, inspections will be required on a pro rata basis. Chiller premises that are registered, but known to be non-operational may not require regular inspection.	Done. Chillers were not able to be inspected four times because they were either not being used or due to poor weather conditions restricting access. Also See ‘Inspection of premises’ on page 18 of this report.
	PI 6.3 – All kangaroo-processing works in NSW are inspected every three months on average during the life of this plan by OEH staff and/or staff of the NSW Food Authority to ensure compliance with NSW legislation and licence conditions.	Refer to ‘Inspection of premises’ on page 18 of the report.
	PI 6.4 – During the life of this plan, harvesters’ vehicles loaded with kangaroo carcasses are inspected opportunistically to ensure compliance with NSW legislation and licence conditions, and the results of these inspections are documented.	Vehicles inspected during routine chiller inspections.

Action	Performance indicator	Progress in 2016
7.0 Activities not in accordance with the plan and the NSW legislation will be investigated and, where an offence has been committed and it is appropriate, prosecuted.	PI 7.1 – Reports of unlicensed activities and activities in breach of licence conditions are investigated to the fullest extent possible, and where sufficient evidence is available offenders are issued with Penalty Infringement Notices or prosecuted as appropriate.	Allegations and investigations register maintained and updated. All information was investigated to the fullest extent possible. See 'Compliance audits' on page 18 of this report.
8.0 The accuracy of industry returns will be continually monitored during the life of this plan.	PI 8.1 – During the life of this plan, all incoming industry returns are scrutinised and discrepancies are investigated and resolved.	Ongoing. Validation rules built into licensing database help in detecting errors. Administrative staff contact licensees to resolve discrepancies.
9.0 A compliance database will be maintained to support investigations, inspections and audits.	PI 9.1 – A compliance database is maintained.	Ongoing. Enforcement actions are recorded in a database.
10.0 Population surveys will be conducted annually for the Western Plains and three-yearly for tableland zones and other areas that require helicopter surveys.	PI 10.1 – Kangaroo population estimates are obtained by using standard survey methods throughout the life of this plan.	Done. Aerial surveys of Western Plains were conducted in June–July–August and population estimates were made available on the KMP web page in November. Helicopter survey of Northern Tablelands management zones completed in September.
	PI 10.2 – Ground surveys are conducted as required to verify the ratio of eastern grey kangaroos to western grey kangaroos in areas where both species occur.	Not required in 2016.
11.0 Commercial kangaroo harvest quotas will be set in accordance with the provisions of the plan.	PI 11.1 – All commercial kangaroo harvest quotas are set in accordance with the provisions of the plan.	Done. Quotas for 2016 were calculated from 2015 population estimates at 15% for eastern and western grey kangaroos and wallaroos and 17% for red kangaroos, except where low population thresholds were reached.
	PI 11.2 – The Commonwealth Government is advised of commercial harvest quotas for the following calendar year by 30 November.	Done; 2017 Quota report submitted before 30 November.

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Action	Performance indicator	Progress in 2016
	PI 11.3 – If Commonwealth approval is required for quotas set above 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 in 2016.
	PI 11.4 – The Quota Report is made available to the public via the KMP web page.	Done.
12.0 If kangaroo populations decline to specific trigger points, the commercial harvest of particular species in particular zones will be reduced or suspended.	PI 12.1 – Commercial harvest quotas are reduced if population estimates fall below 1.5 standard deviations from the long-term average density, or suspended if population estimates fall below two standard deviations from the long-term average.	Done; For 2016 there was no in reduction in quotas for any zone.
13.0 Special kangaroo harvest quotas will be set in accordance with the provisions of the plan.	PI 13.1 – Special kangaroo harvest quotas are set and utilised in accordance with the provisions of the plan.	Done. Special quotas were calculated at 1.5% of the population estimate as per the Commonwealth’s approval of the plan.
14.0 Kangaroo populations will continually be monitored indirectly throughout the life of this plan.	PI 14.1 – Sudden, sustained or acute changes in the average weights of harvested kangaroos, as ascertained from licence returns, are investigated to determine where practicable the cause of the change.	Done monthly as per the amended plan. No significant changes detected.
	PI 14.2 – Average carcase weights for each species will be analysed each month; if the average falls below the long-term average by more than one standard deviation for three successive months, OEH will investigate (and may reduce or suspend) the commercial harvest for that species in that zone.	Done monthly as per the plan. No significant changes were detected.
15.0 Historical data relating to the commercial kangaroo harvest in NSW will be analysed	PI 15.1 – Analysis of historical kangaroo harvest and management data is undertaken during the life of this plan.	Ongoing.

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Action	Performance indicator	Progress in 2016
during the life of this plan to identify trends; this analysis will be considered in future kangaroo management programs.	PI 15.2 – The results of analysis and research using historical kangaroo harvest and management data are published in an appropriate forum.	Not applicable in 2016.
16.0 Where practicable, experiments will be performed to test deliberate management interventions during the life of this plan.	PI 16.1 – All proposals to undertake active adaptive management experiments are reviewed and assessed by OEH in accordance with the criteria outlined in this plan.	None in 2016.
	PI 16.2 – All necessary approvals (including animal care and ethics) are obtained before experiments testing deliberate management interventions commence.	No approvals necessary.
	PI 16.3 – All adaptive management experiments are continuously monitored and conducted according to approval conditions.	Not applicable in 2016.
	PI 16.4 – Results of all experiments testing deliberate management interventions are published in an appropriate forum.	Not applicable in 2016.
17.0 OEH will facilitate research into the ecology and harvest management of kangaroos.	PI 17.1 – Issues associated with the ecology of harvested species and the management of the commercial harvest are identified and research proposals are sought from universities and other research institutions during the life of this plan.	None in 2016.
18.0 An annual report on the plan will be prepared and submitted to the Commonwealth.	PI 18.1 – An annual report on the operation of the plan for the previous calendar year is submitted to the Commonwealth by the end of March of the following year.	Annual Report for 2015 submitted and accepted.
	PI 18.2 – All annual reports prepared during the life of this plan are posted on the KMP web page.	Done.

Action	Performance indicator	Progress in 2016
<p>19.0 The review of the plan will commence no later than twelve months prior to the expiry of this plan.</p>	<p>PI 19.1 – The schedule of OEH plan review activities initiated no later than 12 months prior to the expiry of this plan will include, but is not limited to:</p> <ul style="list-style-type: none"> • strategic planning prior to a full review of the program • compilation of reports including reviews of relevant literature • public meetings/forums including the KMAP [Kangaroo Management Action Panel] and invited scientists • public exhibition of new draft program • KMAP review of public submissions. 	<p>2017 – 2021 plan commenced on the 1 January 2017.</p>
	<p>PI 19.2 – The success of the current plan in achieving its goal is assessed by measuring performance indicators.</p>	<p>Ongoing through life of plan.</p>
	<p>PI 19.3 – The results of the plan review are presented to the Commonwealth and are placed on the KMP web page.</p>	<p>Done.</p>

Action	Performance indicator	Progress in 2016
<p>20.0 Members of the KMAP will be provided with relevant information and afforded the opportunity to advise OEH on key kangaroo management issues throughout the life of this plan.</p>	<p>PI 20.1 – KMAP is provided with monthly updates on commercial harvest and tag issue throughout the life of this plan.</p>	<p>Done.</p>
	<p>PI 20.2 – KMAP is provided with other relevant information as required or as necessary throughout the life of this plan.</p>	<p>Done. During 2016 the information provided included results of aerial surveys, carcass weight analyses, harvest statistics and copies of information sent to licensees.</p>
	<p>PI 20.3 – KMAP meets at least twice a year to review the progress of the plan in relation to the goal and aims of the plan.</p>	<p>KMAP met in March to review the draft Annual Report and met on in November to review the draft Quota Report.</p>
<p>21.0 Relevant public documents will be made available on the KMP web page.</p>	<p>PI 21.1 – Throughout the life of this plan the KMP web page contains the following information as a minimum standard:</p> <ul style="list-style-type: none"> • current and previous management plans • monthly tag issue and commercial harvest statistics • historical harvest statistics • population survey reports • current population estimates • current commercial quotas • ratified minutes of recent KMAP meetings • contact information for the Kangaroo Management Section • current forms for commercial kangaroo licences. 	<p>Done. All of this information is currently available and is updated as necessary.</p>
<p>22.0 Publicly available information will be provided to interested parties on request.</p>	<p>PI 22.1 – Publicly available kangaroo management information is distributed in an appropriate format to interested parties as soon as practicable after such a request.</p>	<p>Done. Examples include provision of previous Annual and Quota Reports, contracted aerial survey design and analysis reports and aerial survey data.</p>
<p>23.0 Where appropriate, relevant OEH staff will participate in</p>	<p>PI 23.1 – OEH staff participate in interviews with the media where appropriate.</p>	<p>Done.</p>

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Action	Performance indicator	Progress in 2016
media interviews and prepare media releases.	PI 23.2 – Media releases are prepared when appropriate for issues of interest to the community, such as population surveys and the release of quotas for the next calendar year.	Done.
24.0 Relevant information regarding licensing arrangements will be developed as required and distributed to all licensees.	PI 24.1 – A copy of the current <i>Handbook for Kangaroo Trappers</i> is issued with every trapper's licence throughout the life of this plan to ensure that licensees are apprised of relevant licensing requirements and responsibilities.	Done. Copies are also provided to potential applicants by the NSW Firearms Safety and Training Council upon registration to complete the Kangaroo Harvester Accreditation Course. Handbook is also available online.
	PI 24.2 – A copy of the current <i>Handbook for Kangaroo Chiller Managers</i> is issued with every new chiller registration or change in nominated manager to ensure that operators are aware of relevant licensing requirements and responsibilities.	Handbook provided to all new chiller managers.