
2010 KANGAROO QUOTA REPORT

NEW SOUTH WALES

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2010 NEW SOUTH WALES KANGAROO QUOTA REPORT

New South Wales Department of Environment, Climate Change and Water (DECCW) (and its predecessor agencies) has been researching, monitoring and managing the “NSW Kangaroo Management Program” (KMP) since the 1970’s. Throughout this time adjustments have been made to the survey design, population estimation and determination of the commercial quota. This report details the Kangaroo Management Program quotas for the 2010 kangaroo take in accordance with NSW Commercial Kangaroo Harvest Management Plan 2007-2011 (the Plan) and includes:

- Current population estimates for 2009 and quotas for 2010; and
- Details of trends in:
 - population estimates;
 - quotas; and
 - commercial take datafor red kangaroos, eastern and western grey kangaroos and wallaroos.

A: SUMMARY

1. Quotas 2009 and 2010

	2010		2009	
	Quota	Maximum Special Quota	Quota	Maximum Special Quota
Red kangaroo	417,655	36,852	487,851	43,046
Eastern grey kangaroo	546,241	58,639	615,635	47,943
Western grey kangaroo *	90,634	10,834	148,303	14,843
Wallaroo	17,245	1,725	17,245	1,725
Totals	1,071,775	108,050	1,269,034	107,557

2. Population estimates 2009 and quotas 2010

	Population Estimate 2009	Quota – 2010†	Quota – Per cent of Population
Red kangaroo	2,456,795	417,655	17.0
Eastern grey kangaroo - (Western Plains)	1,814,514	232,028	12.8
Eastern grey kangaroo - (Central and Northern Tablelands & Southeast NSW)	2,094,756	314,213	15.0
Western grey kangaroo *	722,255	90,634	12.5
Wallaroo – (Northern Tablelands)	114,966	17,245	15.0
TOTAL	7,203,286	1,071,775	

* There is a small population (650) of western grey kangaroos in the Narrabri management zone. This is included in the population estimate, but no quota is set for this species in this zone.

†The populations of western grey kangaroos in the Coonabarabran zone, and both western and eastern grey kangaroos in the Griffith zone have fallen below the threshold at which harvesting must be suspended, and consequently there is no commercial quota for these species in these zones for 2010.

3. Actual Take To 30 September 2009

%q – commercial take as percentage of approved quota

%p – commercial take as percentage of population estimate

Zone Name	No.	E/Grey				Red				W/Grey				Wallaroo			
		Quota	Take	%q	%p	Quota	Take	%q	%p	Quota	Take	%q	%p	Quota	Take	%q	%p
Tibooburra	1	10,465	1,090	10	2	103,108	26,626	26	4	3,494	884	25	4				
Broken Hill	2	28,152	5,151	18	3	202,351	64,878	32	5	37,753	10,958	29	4				
Lower Darling	4	18,259	2,822	15	2	42,794	11,390	27	5	36,824	6,766	18	3				
Cobar	6	17,898	3,791	21	3	26,629	5,638	21	4	34,740	4,043	12	2				
Bourke	7	15,892	3,988	25	4	23,863	10,659	45	8	7,025	783	11%	2				
Narrabri	8	77,043	34,256	44	7	21,236	6,455	30	5								
Armidale	9	21,242	13,547	64	10									5,679	2,500	44	7
Coonabarabran	10	75,822	29,839	39	6	29,037	5,919	20	3	11,759	577	5	1				
Griffith	11	79,031	28,918	37	5	38,834	10,867	28	5	16,709	4,445	27	4				
Glen Innes	13	35,490	19,828	56	8									4,828	3,150	65	10
Upper Hunter	14	13,802	6,934	50	8									6,738	1,935	29	4
SE NSW	16	77,245	11,147	14	2												
Central T/lands N	48	64,955	2,153	3	0												
Central T/lands S	49	80,340	1,624	2	0												
Totals		615,635	165,088	27	5	487,851	142,432	29	5	148,304	28,456	19	3	17,245	7,585	44	7

B: POPULATION ESTIMATES AND METHOD OF SURVEY USED

Full details of the aerial survey methodology used by the Kangaroo Management Program are contained in a separate document entitled “Population Monitoring for the NSW Kangaroo Management Program”, and in individual survey reports for Northern Tablelands, South-east NSW and Central Tablelands. Reports are all available from the Kangaroo Management Program’s web page:

www.environment.nsw.gov.au/wildlifemanagement/KangarooManagementProgram.htm

A brief outline is provided here.

1. Western Plains

The 2009 survey of the Western Plains commenced on 2 June and was completed on 17 August. The Western Plains covers an area of approximately 450,000 square kilometres, and includes Kangaroo Management Zones 1-8, 10 and 12. The survey was conducted using well-established techniques. This methodology has been refined on the basis of additional research, but has remained largely the same since the early 1980s. It involves flying at a pre-determined speed and height, with trained observers counting animals within a strip equivalent to 100 meters on the ground. This method provides an observed density which is then multiplied by species- and habitat-specific correction factors to give a corrected density. The corrected density is then multiplied by the area of each habitat type in each zone to provide population estimates.

Correction Factors are described in detail in “Population Monitoring for the NSW Kangaroo Management Program”. In essence, correction factors are used to account for the fact that not every kangaroo present will be seen by the observers. The proportion of kangaroos observed will depend on the species (because of different behaviours between species) and the nature of the habitat (a higher proportion of animals will be observed on open grasslands than in woodland habitats). These correction factors have been derived after several years of research using both helicopter and fixed-wing surveys.

Throughout this document two sets of correction factors have been used in calculating population estimates. Where data is presented for the years prior to 2001, correction factors for 200 meter wide survey strips from Cairns and Gilroy (2001) have been applied. For 2001, 2002 and 2003 data (and future years), the most recent correction factors (September 2003) for 100 metre survey strips have been applied. In the tables and figures throughout this document, dark shading has been used to show where the most recent 100 metre correction factors have been used, and light shading where 200 metre correction factors have been applied.

Table A shows the current estimated density and population of kangaroos in each of the Western Plains management zones.

Table A. Red and grey kangaroo population estimates for the Western Plains.

Management Zone	Red Kangaroo Population Estimate	Grey Kangaroo Population Estimate
Tibooburra	560,706 ± 110,759	92,905 ± 20,825
Broken Hill	809,665 ± 63,828	366,677 ± 44,446
Lower Darling	185,449 ± 46,220	215,420 ± 41,838
Cobar	97,823 ± 31,004	251,233 ± 61,969
Bourke	180,413 ± 42,392	147,001 ± 35,221
Narrabri	189,118 ± 55,076	447,330 ± 61,359
Coonabarabran	202,199 ± 53,771	695,066 ± 155,032
Griffith	231,422 ± 58,678	321,138 ± 98,398
Total	2,456,795 ± 174,940	2,536,769 ± 216,153

Note – Table A uses the final correction factors (ie September 2003)

The estimated numbers and densities of red and grey kangaroos in each management zone from 1987 onwards are given in Tables 1 to 8. The population trends for each species are shown in Figures 1 and 2 and Tables 16-18 (Appendix 1).

Combined red and grey kangaroo population estimates, authorised quotas and actual take (from 1973 onwards) are shown in graphical form in Figure 3, and tabular form in Table 16 (Appendix 1). Note that the combined grey kangaroo data in Figure 3 and Table 18 includes eastern grey kangaroos in Northern Tablelands, Central Tablelands and SE NSW.

2. Northern Tablelands

The Northern Tablelands commercial harvest area covers some 48,000 square kilometres and includes Kangaroo Management Zones 9, 13 and 14. Prior to 2001, the commercial quota was set on the basis of ground (walked) surveys conducted in 1989-90, which were adjusted annually based on seasonal changes and results from the surveys of neighbouring zones.

The Northern Tablelands was first surveyed by helicopter in 2001, with additional surveys in 2002, then again in 2004 (Cairns 2004). The most recent survey was conducted between 13 and 20 September 2007, according to a design developed with the assistance of the DISTANCE© software. As helicopter survey techniques are relatively new and still evolving, each survey is redesigned using information gained from previous surveys and advances in software capability. A full report outlining the design of the survey and analysis of the results is available on the Kangaroo Management Program's web page (Cairns 2007a):

www.environment.nsw.gov.au/resources/parks/NT_Report_2007_final.pdf

The population estimates and commercial take of wallaroos are detailed in Table 19 and Figure 7 (Appendix 1). Wallaroo population estimates and quotas for each zone are shown in Tables 9 to 11.

The population estimates and commercial take of eastern grey kangaroos in all zones are detailed in Table 17 and Figures 3 & 5. Eastern grey population estimates and quotas for each of the Northern Tablelands zones are shown in Tables 9 to 11.

Table B shows the current estimated density and population of kangaroos in each of the Northern Tablelands management zones, based on aerial surveys conducted in 2007.

Table B. 2007 population estimates for the Northern Tablelands

Management Zone	Zone Area (km ²)*	Eastern Grey Kangaroo			Wallaroo		
		Density	Population Estimate	Quota	Density*	Population Estimate	Quota
Glen Innes	18,449	11.3	236,600 ± 44,039	35,490	1.5	32,184 ± 7,431	4,828
Armidale	15,809	8.7	141,610 ± 29,738	21,242	2.3	37,859 ± 14,839	5,679
Upper Hunter	14,004	6.3	92,016 ± 17,351	13,802	3.1	44,923 ± 14,995	6,738
TOTAL	48,262		470,226	70,534		114,966	17,245

*Zone Areas exclude National Park's estate, Forests and Reserves where harvesting is prohibited.

**Densities above have been multiplied by 1.85 as suggested in Cairns (2003)

3. South-east NSW

South-east NSW (Kangaroo Management Zone 16), with the addition of the former Young Rural Lands Protection Board, was surveyed in September 2009. About 23% of the total area of the zone is not available for commercial harvest either because it is reserved for conservation or State Forest, or the terrain is too difficult. These areas are excluded from the survey, which covers approximately 38,500 square kilometres. The population estimate gained from the survey of the zone in September 2009 will remain current until the next survey in 2012.

The study area was originally surveyed in 2003 in accordance with a design developed by consultants based on latest methodologies (Pople, Cairns & Menke 2003). Due to the nature of the terrain, survey using fixed-wing aircraft was not possible and a helicopter was used as for the Northern Tablelands zones. The consultant's report on the results of the survey was presented with the 2005 Quota Submission and is available on the KMP web page (Cairns 2004a):

www.environment.nsw.gov.au/resources/nature/KMPSENSWSurveyResults.pdf

In accordance with the approval, a second aerial survey was conducted in September 2006 to provide updated population estimates. The 2006 survey was designed after consideration of the results of the original survey and harvest data, and advances in survey design software. As a result of the re-design, the 2006 survey included greater overall length of survey lines, and shorter individual lines, leading to more appropriate coverage of the total area and greater statistical precision. A full report of the 2006 survey is available (Cairns 2007b).

www.environment.nsw.gov.au/resources/parks/Final_report_SENSW_survey_2006.pdf

Following the approval of additional commercial harvest zones in the Central Tablelands area, the former Young Rural Lands Protection Board has been

incorporated into the South-east NSW commercial harvest zone, adding an additional 8,884 square kilometres.

Table C shows the current estimated density and population of kangaroos in each of the Rural Lands Protection Boards in the South-east NSW management zone.

Table C. 2009 population estimates for eastern grey kangaroos in each of the five Rural Lands Protection Board areas comprising the SE NSW zone.

RPLB	Area (km ²)	Survey effort (km)	Density (km ⁻²)	Population Est.
Goulburn	6,028	232	12.0	71,800
Braidwood	4,284	163	18.4	78,800
Gundagai	6,342	359	10.8	69,100
Yass	5,615	540	17.9	100,300
Cooma	7,271	352	34.8	252,800
Young	8,884	183	9.4	83,100
Total / (Average)	38,424	1,829	(17.2)	655,900

The population estimates and commercial take of eastern grey kangaroos in all zones are detailed in Table 17 and Figures 3 & 5. Eastern grey population estimates and quotas for this zone are shown in Table 12.

4. Central Tablelands

The initial helicopter survey of the new Central Tablelands management zone was conducted in 2008. It was designed to provide separate population estimates for the Hunter/Mudgee-Merriwa and Central Tablelands areas, allowing the area to be managed as either one or two zones. Since its commencement on 1 June 2009, the area has been managed as two zones (Central Tablelands North and Central Tablelands South).

The population estimates and densities derived from this initial helicopter survey are shown in Table D.

Table D. 2008 population estimates for eastern grey kangaroos in each of the new Central Tablelands commercial harvest zones.

Zone	Area (km ²)	Density (km ⁻²)	Population Est.
Hunter-Mudgee (Central Tablelands North)	29,379	14.7	433,030
Central Tablelands South	23,105	23.2	535,600
Total / (Average)	52,484	(19.0)	968,630

The population estimates and commercial take of eastern grey kangaroos in all zones are detailed in Table 17 and Figures 3 & 5. Eastern grey population estimates and quotas for this zone are shown in Tables 13 and 14.

C: DETERMINATION OF THE QUOTAS

1. Commercial quotas

Annual commercial quotas are set at a proportion of the estimated macropod populations. For the Western Plains, quotas are set at 17 per cent of the estimated red kangaroo population, and 15 per cent of the estimated population for eastern grey and western grey kangaroos. For the Northern Tablelands, quotas have been set at 15 per cent for both eastern grey kangaroos and wallaroos. Eastern grey kangaroo quotas for the South-east NSW and Central Tablelands zones have also been set at 15 per cent. These proportions are specified in the NSW Commercial Kangaroo Harvest Management Plan 2007-2011 (the Plan), and any proposal to set a commercial harvest quota above these rates requires specific approval from the Commonwealth.

Based on the population dynamics of red and grey kangaroos and wallaroos, and the male bias of the commercial take, quotas set at these levels are considered sustainable in the long-term for kangaroo populations. More than 20 years of available data indicates that kangaroo populations harvested at these rates continue to fluctuate primarily in response to seasonal conditions.

As the quota is based on harvesting a proportion of the estimated population, changes in populations are reflected in the quotas. As such, the quotas for 2010 are still considered to be sustainable in the long term.

Amendments made to the Plan following an appeal in the Administrative Appeals Tribunal require DECCW to suspend harvesting if new aerial surveys indicate that the population estimate for a particular species in a zone has fallen below the specified threshold. The Tribunal's decision is available at:

www.austlii.edu.au/au/cases/cth/AATA/2008/1079.html

The 2009 aerial survey indicated that populations of western grey kangaroos in the Coonabarabran management zone and both eastern and western grey kangaroos in the Griffith management zone have fallen below their respective thresholds. Consequently, there is no commercial harvest quota set for these species in these zones for 2010.

In accordance with the provisions of the amended plan, a pro rata commercial quota of 10 per cent of the population estimate may be set for these species in these zones if the 2010 aerial survey indicates that populations have increased to levels above the respective thresholds. In this case, an addendum to this Quota Report will be prepared and submitted to the Commonwealth Government for information.

2. Special quota

A special quota for 2010 has been calculated in accordance with the provisions of the Plan and will potentially be available to minimise the number of kangaroos shot under non-commercial licences. The special quota will only be used when the commercial quota for a particular kangaroo management zone has been fully issued. This is not a pseudo commercial quota, its sole purpose is to provide for commercial utilisation of kangaroos that would be shot and left in the field under the normal non-

commercial licensing system. As specified in the plan, the use of this quota will depend on one or more of the following:

- consideration of local conditions including exceptional circumstance declarations;
- kangaroo population trends (based on 2010 survey if completed); and
- climatic conditions during 2010.

The maximum number of animals that may be taken under Special Quota provisions in any commercial harvest zone is five per cent of the population estimate for that species in that zone. However, across the combined commercial zones, the Special Quota utilised must not exceed 1.5 per cent of the population estimate for that species.

Non-commercial culling is available to landholders throughout NSW, and occurs even where commercial harvesting is available. Each application must be assessed by an authorised DECCW officer before the licence is issued. In the commercial zone, non-commercial licenses are generally only requested when:

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

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

D: TRENDS IN POPULATIONS, QUOTAS AND COMMERCIAL TAKE

1. Populations

Around 68 per cent of New South Wales remains drought declared in October 2009, with less than five per cent considered satisfactory (Industry and Investment NSW, 2009). The prolonged dry conditions have resulted in overall population declines across the Western Plains for both grey and red kangaroos of 20 and 13 per cent respectively, however significant regional variation is apparent. Eastern grey kangaroos declined by about 18 per cent, while western grey kangaroos declined by about 25 per cent.

Over the past three years, the central northern parts of the state have received average or above average rainfall, while the far west and southern parts have received consistently below-average falls (Bureau of Meteorology 2009). Over the period May-October 2009, the Bureau of Meteorology has again reported average or above average rainfall in the central north and significantly below average falls in the far west and south. The observed changes in kangaroo populations from the 2009 survey of the Western Plains are largely consistent with this rainfall pattern.

- Red kangaroo populations declined in the far west and central parts of the state by between 7 and 38 per cent, but increased by up to 51 per cent in the central northern zones, suggesting a drift to the east and north in response to better rainfall. Red kangaroo populations and densities are highest in the west, so higher proportional increases in central zones are more than offset by declines in the larger populations of the western zones, and the net impact has been a decline of 12.8 per cent since the 2008 surveys.
- Western grey kangaroo populations increased only in the Bourke zone (in the central north). Elsewhere the populations declined by up to 44 per cent in the southwest. This species is at the edge of its distribution within the Coonabarabran zone, comprising only about 10 per cent of the total population of grey kangaroos. The proportional decline in the Coonabarabran zone is only about half the magnitude of the declines elsewhere, suggesting that this population may have been buffered to some extent by better rainfall and improved conditions.
- Eastern grey kangaroo populations declined in all zones except Coonabarabran. The highest proportional declines (between 27 and 54 per cent) occurred in the Far West and Griffith zones, where densities are on average much less than half of those in Coonabarabran zone.
- Against the trend, Tibooburra zone in the far northwest saw only minor changes (between 3 and -8 per cent) in any species, despite serious rainfall deficiencies over the last three years. Populations may have stabilised in the continuing drought conditions.

The Southeast NSW management zone was surveyed in 2009, and has been expanded to include the former Young Rural Lands Protection Board. Since the previous survey in 2006, the population within the original zone boundaries has increased by 37.9 per cent. Young RLPB was surveyed as part of the baseline population estimate for the new commercial harvest areas in 2008, and the population of this area has decreased by 16.6 per cent.

Over the three year period since the last survey, the SE NSW area has received between 70 and 90 per cent of its average rainfall, increasing to between 60 and 100 per cent of average in the last 12 months. The Cooma area has generally fared the best, receiving above average falls in the last three months, and average falls over the last 6 to 12 months. This is reflected in the significant increase in eastern grey kangaroo populations since the previous survey. The magnitude of the increase suggests a movement southward from other areas in addition to local population increases.

RED KANGAROO

The 2009 red kangaroo population estimate and trends in abundance are shown in Table E. Refer to Figure 1 for trends in red kangaroo abundance since 1984.

Table E. 2009 red kangaroo population estimates and trends in abundance

Year	Population Estimate (millions)	Density (reds km ⁻²)	Trends in Abundance (% change from previous year)
2009	2.46 ± 0.17	4.58	-14
2008	2.87 ± 0.21	5.26	14
2007	2.52 ± 0.21	4.44	16
2006	2.18 ± 0.16	4.05	-3
2005	2.24 ± 0.22	4.32	-11
2004	2.51 ± 0.24	4.66	12
2003	2.24 ± 0.16	4.22	-53
2002	4.80 ± 0.39	9.35	-6
2001	5.12 ± 0.34	9.74	*17
2000	4.39 ± 0.40	8.49	-7
1999	4.71 ± 0.44	8.82	-19
1998	5.81 ± 0.61	11.36	10
1997	5.29 ± 0.40	10.01	40

Note: dark shading has been used to indicate the use of September 2003 100m CF; light shading indicates the use of 200m CF.
*Invalid comparison due to a change in correction factors and survey strip width.

EASTERN GREY KANGAROO

The 2009 grey kangaroo (eastern and western) estimate for the area surveyed by fixed-wing aircraft is 2.54 million (density 4.98 km⁻²). Refer to Figure 2 for trends in grey kangaroo abundance since 1984. The relative proportions of eastern and western grey kangaroos in the area surveyed were examined in 2000. Application of these proportions to the 2009 survey gives an eastern grey kangaroo population estimate for the area surveyed by air of 1.81 million (3.49 km⁻²).

The 2009 eastern grey kangaroo population estimate and trends in abundance for the Western Plains are shown in Table F.

Table F. 2009 eastern grey kangaroo population estimates and trends in abundance for the Western Plains.

Year	Population Estimate (millions)	Density (eastern greys km ⁻²)	Trend in Abundance (% change from previous year)
2009	1.81 ± 0.19	3.49	-16
2008	2.15 ± 0.21	3.97	0
2007	2.15 ± 0.27	3.99	7
2006	2.14 ± 0.32	3.92	7
2005	2.00 ± 0.33	3.65	-25
2004	2.66 ± 0.32	5.03	-31
2003	3.83 ± 0.58	7.42	-51
2002	7.80 ± 1.02	15.07	24
2001	6.29 ± 0.72	12.48	*22
2000	5.17 ± 0.57	9.86	6
1999	4.87 ± 0.42	9.43	-6
1998	5.19 ± 0.54	9.91	17
1997	4.43 ± 0.63	8.53	12

Note: dark shading has been used to indicate the use of September 2003 100m CF; light shading indicates the use of 200m CF.
 *Invalid comparison due to a change in correction factors and survey strip width.

The **Northern Tablelands** management zones were surveyed in September 2007. Based on this survey, the number of eastern grey kangaroos estimated to be in the Northern Tablelands region is 470,226 (Table G). The estimate in 1989/90 was 581,950, and in 2004 was 378,846. The Northern Tablelands region will be surveyed again in 2010.

Tables 9b, 10b and 11b show population estimates and quotas for the Northern Tablelands management zones from 1989 to 2008.

Table G. 2007 eastern grey kangaroo population estimates and trends in abundance for the Northern Tablelands zones.

Year	Zone	Population Estimate	Density (km ⁻²)	Trend in Abundance (% change from previous survey)
2007	Armidale	141,610	8.7	-12
	Glen Innes	236,600	11.3	58
	Upper Hunter	92,016	6.3	36
	Total	470,226		24
2004	Armidale	161,726	10.2	4
	Glen Innes	149,621	8.1	-35
	Upper Hunter	67,499	4.8	-28
	Total	378,846		-23
2001/2	Armidale	173,109	10.6	N/A
	Glen Innes	221,975	10.6	N/A
	Upper Hunter	95,273	6.5	N/A
	Total	490,357		N/A

Prior to approval of the commercial harvest zone in **SE NSW**, a baseline population estimate was established using helicopter survey methodology developed in the Northern Tablelands. A second survey was conducted in September 2006 in accordance with the approval, and indicated an increase of 42 per cent in the population since the 2003 survey. The area was surveyed again in 2009, with the addition of the former Young Rural Lands Protection Board (Table H). Trend in abundance is not shown in Table H, as the areas surveyed in 2006 and 2009 are different.

The increase in population within the original zone area is due mainly to a significant increase of 138% in the Cooma RLPB over the last three years. The magnitude of this change suggests a combination of increases in local populations, immigration from adjacent drier areas, and possibly also improvements in the survey design based on information gathered in the previous two surveys.

Populations also increased by between 20 and 38 per cent in the Braidwood, Gundagai and Yass boards, but declined by 37 per cent in the Goulburn area.

There has also been a decline of about 17 per cent in the Young board since it was first surveyed in 2008. Improved survey design as a result of information obtained in the initial survey is likely to be the major contributing factor to this change.

Table H. 2009 eastern grey kangaroo population estimates and trends in abundance for South-east NSW.

Year	Population Estimate	Density (km ⁻²)	Trend in Abundance (% change from previous survey)
2009*	655,900	17.1	N/A
2006	415,271	14.07	42
2003	292,455	11.95	N/A

* the 2009 population estimate is for a larger area than the previous two surveys, as it includes the former Young RLPB

Table 12 shows population estimates and quotas for the South-east NSW management zone.

Central Tablelands North and South zones were surveyed for the first time in 2008, and commenced operation on 1 June 2009. Consequently, no trend information is yet available.

WESTERN GREY KANGAROO

The 2009 grey kangaroo (eastern and western) estimate for the area surveyed by fixed-wing aircraft is 2.54 million (density 4.98 km⁻²). Refer to Figure 2 for trends in grey kangaroo abundance since 1984. The relative proportions of eastern and western grey kangaroos in the area surveyed were examined in 2000. Application of these proportions to the 2009 survey gives a western grey kangaroo population estimate for the area surveyed by air of 722,255 (1.49 km⁻²).

The 2009 western grey kangaroo population estimate and trends in abundance for the Western Plains are shown in Table I.

Table I. 2009 western grey kangaroo population estimates and trends in abundance.

Year	Population Estimate (millions)	Density (western greys km ⁻²)	Trend in Abundance (% change from previous year)
2009	0.72 ± 0.08	1.49	-27
2008	0.99 ± 0.10	2.07	36
2007	0.73 ± 0.09	1.55	11
2006	0.65 ± 0.11	1.35	9
2005	0.60 ± 0.09	1.31	-33
2004	0.89 ± 0.11	1.89	-29
2003	1.27 ± 0.26	2.72	-47
2002	2.39 ± 0.30	5.02	18
2001	2.03 ± 0.22	4.53	*13
2000	1.79 ± 0.24	3.86	-14
1999	2.09 ± 0.19	4.50	11
1998	1.88 ± 0.18	3.97	-11
1997	2.11 ± 0.27	4.33	22

Note: dark shading has been used to indicate the use of September 2003 100m CF; light shading indicates the use of 200m CF.
*Invalid comparison due to a change in correction factors and survey strip width.

WALLAROO

The 2007 wallaroo population estimate and trends in abundance for the Northern Tablelands management zones are shown in Table J.

Tables 9a, 10a and 11a show population estimates and quotas from 1989 to 2008.

Table J. 2007 wallaroo population estimates and trends in abundance for the Northern Tablelands.

Year	Zone	Population Estimate	Density (km ⁻²)	Trend in Abundance (% change from previous survey)
2007	Armidale	37,859	2.3	-58
	Glen Innes	32,184	1.5	-43
	Upper Hunter	44,923	3.1	-27
	Total	114,966		-44.8
2004	Armidale	89,787	5.7	158
	Glen Innes	56,657	3.1	-56
	Upper Hunter	61,660	4.4	7
	Total	208,104		-5.8
2001/2	Armidale	34,744	2.1	N/A
	Glen Innes	128,323	6.1	N/A
	Upper Hunter	57,762	4.0	N/A
	Total	220,829		N/A

2. Quotas

Quotas have been set at the same percentage of the population estimate for several years. These proportions are specified in the Plan, and are considered to be sustainable in the long term, based on the population dynamics of the species and the selectivity of kangaroo harvesters for male kangaroos.

RED KANGAROO

The quota for 2010 of 417,655 represents 17 per cent of the population estimated by aerial survey, as specified in the NSW Commercial Kangaroo Harvest Management Plan 2007-11.

EASTERN GREY KANGAROO

The quota for 2010 of 232,028 for the Western Plains represents 12.8 per cent of the population estimated by aerial survey. The NSW Commercial Kangaroo Harvest Management Program 2007-11 specifies a maximum harvest rate of 15 per cent of the population estimate. No eastern grey kangaroo quota has been set for the Griffith management zone, as the zone population has declined to below the threshold for suspension of the harvest. This has resulted in a reduction of approximately 40,000 in the potential maximum commercial quota for this species.

The quota for 2010 of 70,534 for the Northern Tablelands region represents 15 per cent of the estimated population of 470,226 derived from aerial surveys in 2007.

The South-east NSW quota is 98,385 which represents 15 per cent of the population estimate of 655,900 derived from aerial surveys in 2009. This includes the former Young Rural Lands Protection Board.

The combined 2010 eastern grey quota is 546,241.

WESTERN GREY KANGAROO

The quota for 2010 of 90,634 represents 12.5 per cent of the population estimated by aerial survey. The NSW Commercial Kangaroo Harvest Management Plan 2007-11 specifies a maximum commercial quota of 15 per cent of the population estimate. No commercial quota has been set for this species in the Griffith or Coonabarabran management zones, as the population estimates are below the threshold at which harvesting must be suspended in accordance with the amended management plan. This has resulted in a reduction of approximately 17,700 in the potential maximum commercial quota for this species.

WALLAROO

For 2004, the quotas for wallaroos in the Northern Tablelands were changed from five per cent to 15 per cent of the population estimate as a result of the more rigorous scientific basis to survey and estimation methodologies. For the 2009 quota, this proportion will remain at 15 per cent, which is in accordance with the NSW Commercial Kangaroo Harvest Management Plan 2007-11.

The 2009 quota is 17,245 for the Northern Tablelands.

3. Commercial take

Species: Red Kangaroo (*Macropus rufus*)
Eastern Grey Kangaroo (*Macropus giganteus*)
Western Grey Kangaroo (*Macropus fuliginosus*)
Wallaroo (*Macropus robustus robustus*)

Extent: Commercial Zone

Frequency: Continuous

Methodology: Collection and compilation of returns from licensed Harvesters, Registered Premises and Wholesalers

Data: Species, sex, group weight and location taken (property)

For 2008 the minimum carcase weight requirement increased from 12 to 14 kilograms for carcasses dressed as for pet food processing, and from 13 to 15 kilograms for carcasses dressed for human consumption processing. Due to the size difference between male and female wallaroos in particular, this requirement almost eliminates females from the harvest as they are too small to meet the carcase weight requirement. The impact is less pronounced on the other harvested species, however in all cases the carcase weights for the period to 30 September 2009 are higher than both the average for the period 1996-2007 (the long term average) and 2008.

RED KANGAROO

Harvester returns indicate that during 2008, 72.1 per cent of red kangaroos taken were males. For the year to 30 September 2009, harvester returns reported a male bias of 76.8 per cent, which is significantly higher than the long-term average of 69.1 per cent.

The actual take of red kangaroos is shown against the authorised quota in Table 14 and Figure 4.

The *average* take as a proportion of the authorised quota from 1997 to 2008 is 70.8 per cent.

EASTERN GREY KANGAROO

Harvester returns indicate that during 2008, 70.7 per cent of eastern grey kangaroos taken were males. For the year to 30 September 2009, harvester returns report a male bias of 73.5 per cent, significantly higher than the long-term average of 69.8 per cent.

The actual take of eastern grey kangaroos is shown against the authorised quota in Table 15 and Figure 5.

The *average* take as a proportion of the authorised quota from 1997 to 2008 is 76.6 per cent.

WESTERN GREY KANGAROO

Harvester returns indicate that during 2008, 75.5 per cent of western grey kangaroos taken were males. For the year to 30 September 2009, harvester returns record a male bias of 76.8 per cent, significantly higher than the long-term average of 66.9 per cent.

The actual take of western grey kangaroos is shown against the authorised quota in Table 16 and Figure 6.

The *average* take as a proportion of the authorised quota from 1997 to 2008 is 65.1 per cent.

WALLAROO

Harvester returns indicate that during 2008, 96.7 per cent of wallaroos taken were males. For the year to 30 September 2009, harvester returns record a male bias of 98.1 per cent, significantly higher than the long-term average of 87.5 per cent.

The actual take of wallaroos is shown against the authorised quota in Table 17 and Figure 7.

The *average* take as a proportion of the authorised quota from 1997 to 2008 is 48.5 per cent.

E: PROPOSED CHANGES TO QUOTAS

DECCW does not propose to make any changes to the proportional commercial harvest quotas during 2010 for most zones and species.

However, in accordance with the provisions of the amended Plan, DECCW proposes to suspend the harvest of western grey kangaroos in the Coonabarabran management zone, and both western and eastern grey kangaroos in the Griffith management zone for 2010. Aerial surveys conducted during 2009 indicate that the populations of these species in these zones have fallen below their respective thresholds, and the harvest will not recommence until such time as the population increases above the thresholds. No commercial quota has been set for these species in these zones in 2010.

F: NEW COMMERCIAL ZONES

A proposal to introduce commercial harvesting in the former Rural Lands Protection Board of Bombala has been lodged with DECCW. The proposal suggests amalgamating Bombala with the former Cooma Board (which is already within the South-east NSW zone) into a "Monaro" zone. Alternatively, Bombala Board could be added to the existing Southeast NSW zone.

The request was made by the former Bombala and Cooma Rural Lands Protection Boards in conjunction with the NSW Farmers' Association and Snowy River Interstate Landcare Committee Inc. Collectively these organisations are referred to as the Monaro Kangaroo Management Committee. The committee conducted a survey throughout the Bombala RLPB area, and concluded that kangaroo populations are expanding rapidly, and that land managers are concerned with the financial and environmental impacts that result.

The proposal was referred to the NSW Kangaroo Management Advisory Panel for comment and was discussed at its meeting in October 2009. The panel agreed to defer a decision regarding the proposal as a result of the current downturn in the commercial kangaroo industry, and the industry's limited capacity to utilise the quota already available in commercial harvest zones. The proposal will be considered again at the March 2010 meeting if there has been an improvement in the industry's situation.

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Appendix 1- Tables and Figures

Kangaroo Management Zone No. 1- TIBOOBURRA

Table 1a. RED KANGAROO

AVERAGE DENSITY		16.41			
AREA : Km., sq.		54,848			
STANDARD DEVIATION		6.84			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	1,078,700	19.7	55.6	73,000	10.5
1989	1,123,200	20.5	4.1	147,800	13.7
1990	1,004,500	18.3	-10.6	161,900	14.4
1991	1,468,600	26.8	46.2	149,200	14.9
1992	845,000	15.4	-42.5	337,800	23.0
1993	1,230,319	22.4	45.6	135,200	16.0
1994	1,103,648	20.1	-10.3	221,457	18.0
1995	1,078,399	19.7	-2.3	139,300	12.6
1996	1,009,295	18.4	-6.4	141,100	13.1
1997	1,673,668	30.5	65.8	132,800	13.2
1998	1,576,827	28.7	-5.8	190,900	11.4
1999	925,897	16.9	-41.3	104,570	6.6
2000	927,889	16.9	0.2	107,300	11.6
2001	1,389,398	25.3	49.7	106,200	11.4
2002	754,013	13.7	-45.7	229,200	16.5
2003	420,721	7.7	-44.2	124,700	16.5
2004	487,004	8.9	15.8	71,523	17.0
2005	629,502	11.5	29.3	82,791	17.0
2006	361,586	6.6	-42.6	107,015	17.0
2007	432,096	7.9	19.5	61,470	17.0
2008	606,518	11.1	40.4	73,456	17.0
2009	560,706	10.2	-7.6	103,108	17.0
2010				95,320	17.0

Table 1b. GREY KANGAROO

AVERAGE DENSITY		16.41			
AREA : Km., sq.		54,848			
STANDARD DEVIATION		6.84			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	46,700	0.9	-2.9	5,000	10.4
1989	56,100	1	20.1	4,500	9.6
1990	83,400	1.5	48.7	7,400	13.2
1991	55,500	1	-33.5	11,000	13.2
1992	45,900	0.8	-17.3	8,900	16.0
1993	136,489	2.5	197.4	7,803	17.0
1994	162,375	3	19.0	34,122	25.0
1995	150,510	2.7	-7.3	8,653	5.3
1996	151,515	2.8	0.7	10,460	6.9
1997	274,399	5	81.1	7,185	4.7
1998	356,751	6.5	30.0	12,410	4.5
1999	212,896	3.9	-40.3	36,300	10.2
2000	209,231	3.8	-1.7	16,350	7.7
2001	242,312	4.4	15.8	18,100	8.7
2002	184,093	3.4	-24.0	41,700	17.2
2003	73,098	1.3	-60.3	31,000	16.8
2004	72,890	1.3	-0.3	10,965	15.0
2005	52,605	1	-27.8	10,933	15.0
2006	59,034	1.1	12.2	7,891	15.0
2007	64,222	1.2	8.8	8,855	15.0
2008	93,058	1.7	44.9	9,633	15.0
2009	92,905	1.7	-0.2	13,959	15.0
2010				13,936	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

KANGAROO MANAGEMENT ZONE No. 2- BROKEN HILL

Table 2a. RED KANGAROO

AVERAGE DENSITY		12.45			
AREA : Km., sq.		90,845			
STANDARD DEVIATION		3.61			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	1,202,400	13.2	13.4	121,000	11.4
1989	1,381,500	15.2	14.9	169,000	14.1
1990	1,654,100	18.2	19.7	203,700	14.7
1991	1,480,900	16.3	-10.5	252,600	15.3
1992	1,031,700	11.4	-30.3	263,900	17.8
1993	1,205,576	13.3	16.9	160,785	15.6
1994	1,059,378	11.7	-12.1	148,568	12.3
1995	1,477,215	16.3	39.4	125,732	11.9
1996	1,100,017	12.1	-25.5	174,059	11.8
1997	1,785,627	19.7	62.3	120,768	11.0
1998	1,437,241	15.8	-19.5	223,480	12.5
1999	1,358,991	15	-5.4	203,800	14.2
2000	959,482	10.6	-29.4	191,175	14.1
2001	1,487,845	16.4	55.1	143,000	14.9
2002	1,121,294	12.3	-24.6	220,200	14.8
2003	584,448	6.4	-47.9	166,950	14.9
2004	925,845	10.2	58.4	99,356	17.0
2005	538,956	5.9	-41.8	157,394	17.0
2006	725,035	8	34.5	91,622	17.0
2007	1,092,982	12.0	50.7	123,256	17.0
2008	1,190,299	13.1	8.9	185,807	17.0
2009	809,665	8.9	-32.0	202,351	17.0
2010				137,643	17.0

Table 2b. GREY KANGAROO

AVERAGE DENSITY		5.64			
AREA : Km., sq.		90,845			
STANDARD DEVIATION		3.44			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	263,100	2.9	-3.2	34,800	12.8
1989	247,800	2.7	-5.8	38,600	14.7
1990	465,100	5.1	87.7	37,100	15.0
1991	449,700	5	-3.3	81,600	17.5
1992	457,500	5	1.7	102,900	22.9
1993	1,071,541	11.8	134.2	106,642	23.3
1994	660,124	7.3	-38.4	81,954	7.6
1995	1,291,048	14.2	95.6	50,450	7.6
1996	704,719	7.8	-45.4	118,800	9.2
1997	840,578	9.3	19.3	59,687	8.5
1998	711,846	7.8	-15.3	62,650	7.5
1999	645,471	7.1	-9.3	79,160	11.1
2000	730,421	8	13.2	71,650	11.1
2001	723,937	8	-0.9	71,600	9.8
2002	982,041	10.8	35.7	101,000	14.0
2003	263,796	2.9	-73.1	138,000	14.1
2004	251,867	2.8	-4.5	39,569	15.0
2005	174,358	1.9	-30.8	37,780	15.0
2006	216,474	2.4	24.2	26,154	15.0
2007	281,904	3.1	30.2	32,471	15.0
2008	439,369	4.8	55.9	42,286	15.0
2009	366,677	4.04	-16.5	65,905	15.0
2010				55,002	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

KANGAROO MANAGEMENT ZONE No. 4- LOWER DARLING

Table 3a. RED KANGAROO

AVERAGE DENSITY		5.12			
AREA : Km., sq.		56,460			
STANDARD DEVIATION		2.11			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	307,900	5.5	53.0	19,000	9.4
1989	260,300	4.6	-15.5	26,700	8.7
1990	349,400	6.2	34.2	34,800	13.4
1991	377,600	6.7	8.1	49,700	14.2
1992	399,200	7.1	5.7	86,800	23.0
1993	268,066	4.7	-32.8	95,808	24.0
1994	555,979	9.8	107.4	42,890	16.0
1995	402,592	7.1	-27.6	75,768	13.6
1996	385,844	6.8	-4.2	55,900	13.9
1997	493,302	8.7	27.9	73,117	18.9
1998	315,945	5.6	-36.0	75,000	15.2
1999	364,651	6.5	15.4	39,910	12.6
2000	221,468	3.9	-39.3	54,300	14.9
2001	279,185	4.9	26.1	36,820	16.6
2002	468,072	8.3	67.7	40,900	14.6
2003	197,864	3.5	-57.7	69,200	14.8
2004	166,340	2.9	-15.9	33,637	17.0
2005	124,665	2.2	-25.1	28,278	17.0
2006	113,119	2	-9.3	21,193	17.0
2007	188,018	3.3	66.2	19,230	17.0
2008	251,731	4.5	33.9	31,963	17.0
2009	185,450	3.3	-26.3	42,794	17.0
2010				31,527	17.0

Table 3b. GREY KANGAROO

AVERAGE DENSITY		8.11			
AREA : Km., sq.		56,460			
STANDARD DEVIATION		4.74			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	184,200	3.3	-43.4	46,600	14.3
1989	248,200	4.4	34.7	19,100	10.4
1990	445,800	7.9	79.6	39,700	16.0
1991	696,900	12.3	56.3	75,800	17.0
1992	573,900	10.2	-17.6	188,163	27.0
1993	1,091,834	19.3	90.2	134,293	23.4
1994	1,050,128	18.6	-3.8	207,448	19.0
1995	880,562	15.6	-16.1	88,660	8.4
1996	609,376	10.8	-30.8	91,124	10.3
1997	620,029	11	1.7	59,340	9.7
1998	497,977	8.8	-19.7	54,150	8.7
1999	663,487	11.8	33.2	59,100	11.9
2000	362,692	6.4	-45.3	70,750	10.7
2001	454,782	8.1	25.4	44,600	12.3
2002	512,465	9.1	12.7	69,300	15.2
2003	336,387	6	-34.4	78,300	15.3
2004	306,466	5.4	-8.9	50,458	15.0
2005	110,876	2	-63.8	45,970	15.0
2006	220,666	3.9	99.0	16,631	15.0
2007	226,569	4.0	2.7	33,100	15.0
2008	367,220	6.5	62.1	33,985	15.0
2009	215,420	3.82	-41.3	55,083	15.0
2010				32,313	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

KANGAROO MANAGEMENT ZONE No. 6- COBAR

Table 4a. RED KANGAROO

AVERAGE DENSITY		4.29			
AREA : Km., sq.		40,339			
STANDARD DEVIATION		1.48			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	164,300	4.1	-10.4	30,500	16.6
1989	209,200	5.2	27.3	27,000	16.4
1990	264,300	6.6	26.3	38,300	18.3
1991	238,600	5.9	-9.7	48,500	18.4
1992	170,700	4.2	-28.5	45,300	19.0
1993	127,658	3.2	-25.2	27,312	16.0
1994	201,113	5	57.5	12,766	10.0
1995	151,314	3.8	-24.8	28,116	14.0
1996	170,917	4.2	13.0	31,441	20.8
1997	163,624	4.1	-4.3	19,780	11.6
1998	312,413	7.7	90.9	25,580	15.6
1999	228,367	5.7	-26.9	41,640	13.3
2000	231,400	5.7	1.3	29,375	12.9
2001	196,029	4.9	-15.3	29,700	12.8
2002	258,662	6.4	32.0	29,200	14.9
2003	121,756	3	-52.9	38,600	14.9
2004	146,292	3.6	20.2	20,699	17.0
2005	117,137	2.9	-19.9	24,870	17.0
2006	107,825	2.7	-7.9	19,913	17.0
2007	85,913	2.1	-20.3	18,330	17.0
2008	156,639	3.9	82.3	14,605	17.0
2009	97,823	2.4	-37.5	26,629	17.0
2010				16,630	17.0

Table 4b. GREY KANGAROO

AVERAGE DENSITY		11.62			
AREA : Km., sq.		40,339			
STANDARD DEVIATION		7.03			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	226,000	5.6	54.0	20,500	14.0
1989	250,100	6.2	10.7	31,600	14.0
1990	275,100	6.8	10.0	38,800	15.5
1991	305,800	7.6	11.2	44,700	16.2
1992	313,000	7.8	2.4	73,400	24.0
1993	602,794	14.9	92.6	78,250	25.0
1994	558,152	13.8	-7.4	126,587	21.0
1995	894,671	22.2	60.3	47,542	8.5
1996	598,600	14.8	-33.1	73,738	8.2
1997	683,136	16.9	14.1	40,820	6.8
1998	775,992	19.2	13.6	40,900	6.0
1999	857,216	21.3	10.5	81,650	10.5
2000	755,493	18.7	-11.9	78,850	9.2
2001	1,052,432	26.1	39.3	67,700	9.0
2002	938,507	23.3	-10.8	131,500	12.5
2003	551,434	13.7	-41.2	114,900	12.2
2004	303,491	7.5	-45.0	82,715	15.0
2005	279,121	6.9	-8.0	45,524	15.0
2006	208,066	5.2	-25.5	41,868	15.0
2007	282,841	7.0	35.9	31,210	15.0
2008	350,925	8.7	24.1	42,426	15.0
2009	251,233	6.2	-28.4	52,639	15.0
2010				37,685	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

KANGAROO MANAGEMENT ZONE No. 7- BOURKE

Table 5a. RED KANGAROO

AVERAGE DENSITY		5.12			
AREA : Km., sq.		55,005			
STANDARD DEVIATION		2.69			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	239,000	4.3	-2.2	29,000	11.9
1989	391,200	7.1	63.7	35,100	14.7
1990	483,100	8.8	23.5	65,500	16.7
1991	356,600	6.5	-26.2	82,600	17.1
1992	245,300	4.5	-31.2	60,600	17.0
1993	380,260	6.9	55.0	39,248	16.0
1994	230,959	4.2	-39.3	68,447	18.0
1995	171,539	3.1	-25.7	14,920	6.5
1996	192,031	3.5	11.9	14,920	8.7
1997	208,276	3.8	8.5	19,080	9.9
1998	281,932	5.1	35.4	23,055	11.1
1999	380,435	6.9	34.9	45,950	16.3
2000	438,249	8	15.2	52,500	13.8
2001	487,321	8.9	11.2	59,200	13.5
2002	756,705	13.8	55.3	72,900	15.0
2003	191,581	3.5	-74.7	114,450	15.1
2004	203,764	3.7	6.4	32,569	17.0
2005	220,567	4	8.2	34,640	17.0
2006	258,668	2.7	17.3	37,496	17.0
2007	143,043	2.6	-44.7	43,973	17.0
2008	140,371	2.6	-1.9	24,317	17.0
2009	180,413	3.3	28.5	23,863	17.0
2010				30,670	17.0

Table 5b. GREY KANGAROO

AVERAGE DENSITY		8.55			
AREA : Km., sq.		55,005			
STANDARD DEVIATION		5.95			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	225,200	4.1	-12.8	29,000	11.2
1989	274,400	5	21.8	33,800	15.0
1990	454,300	8.3	65.6	42,000	15.3
1991	338,200	6.1	-25.6	75,600	16.6
1992	524,400	9.5	55.1	54,100	16.0
1993	1,147,159	20.9	118.8	144,734	27.6
1994	753,367	13.7	-34.3	240,903	21.0
1995	438,500	8	-41.8	50,473	6.7
1996	554,855	10.1	26.5	17,500	4.0
1997	645,291	11.7	16.3	34,005	6.1
1998	616,180	11.2	-4.5	47,090	7.3
1999	751,599	13.7	22.0	65,950	10.7
2000	828,888	15.1	10.3	79,250	10.5
2001	1,220,882	22.2	47.3	88,300	10.7
2002	1,013,389	18.4	-17.0	152,200	12.5
2003	298,422	5.4	-70.6	126,700	12.5
2004	268,883	4.9	-9.9	44,763	15.0
2005	181,025	3.3	-32.7	40,332	15.0
2006	110,115	2	-39.2	27,154	15.0
2007	183,442	3.3	66.6	16,517	15.0
2008	152,776	2.8	-16.7	27,516	15.0
2009	147,001	2.7	-3.8	22,916	15.0
2010				22,050	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

KANGAROO MANAGEMENT ZONE No. 8-NARRABRI

Table 6a. RED KANGAROO

AVERAGE DENSITY		4.75			
AREA : Km., sq.		65,787			
STANDARD DEVIATION		3.81			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	168,100	2.6	21.3	15,000	10.8
1989	272,300	4.1	62.0	26,900	16.0
1990	246,100	3.7	-9.6	44,500	16.3
1991	242,600	3.7	-1.4	41,700	16.9
1992	170,100	2.6	-29.9	41,200	17.0
1993	458,957	7	169.8	27,216	16.0
1994	222,974	3.4	-51.4	91,791	20.0
1995	297,913	4.5	33.6	17,220	7.7
1996	124,694	1.9	-58.1	26,809	9.0
1997	283,171	4.3	127.1	11,865	9.5
1998	1,046,075	15.9	269.4	23,200	8.2
1999	506,146	7.7	-51.6	109,450	10.5
2000	924,453	14.1	82.6	52,850	10.4
2001	532,460	8.1	-42.4	98,400	10.6
2002	692,966	10.5	30.1	79,800	15.0
2003	224,010	3.4	-67.7	103,950	15.0
2004	167,484	2.5	-25.2	38,082	17.0
2005	198,190	3	18.3	28,472	17.0
2006	233,780	3.6	18.0	33,692	17.0
2007	121,426	1.8	-48.1	39,743	17.0
2008	124,915	1.9	2.9	20,642	17.0
2009	189,118	2.9	51.4	21,236	17.0
2010				32,150	17.0

Table 6b. GREY KANGAROO *

AVERAGE DENSITY		13.10			
AREA : Km., sq.		65,787			
STANDARD DEVIATION		7.11			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	431,900	6.6	-40.4	75,000	10.4
1989	808,200	12.3	87.1	71,200	16.5
1990	1,005,900	15.3	24.5	142,700	17.7
1991	987,000	15	-1.9	186,000	18.5
1992	898,500	13.7	-9.0	187,500	19.0
1993	1,964,801	29.9	118.7	188,685	21.0
1994	1,168,552	17.8	-40.5	412,608	21.0
1995	835,633	12.7	-28.5	103,530	8.9
1996	369,992	5.6	-55.7	61,964	7.4
1997	671,027	10.2	81.4	34,931	9.4
1998	1,214,523	18.5	81.0	63,543	9.5
1999	867,516	13.2	-28.6	175,310	14.4
2000	1,491,090	22.7	71.9	119,500	13.8
2001	1,523,954	23.2	2.2	182,500	12.2
2002	1,927,959	29.3	26.5	191,200	12.5
2003	874,080	13.3	-54.7	247,300	12.8
2004	367,179	5.6	-58.0	131,112	15.0
2005	399,672	6.1	8.8	55,077	15.0
2006	398,589	6.1	-0.3	59,853	15.0
2007	697,531	10.6	75.0	59,788	15.0
2008	513,617	7.8	-26.4	104,630	15.0
2009	447,330	6.8	-12.9	77,043	15.0
2010				67,002	15.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

*includes WGK population but no quota

KANGAROO MANAGEMENT ZONE No. 10-COONABARABRAN

Table 7a. RED KANGAROO

AVERAGE DENSITY		3.70			
AREA : Km., sq.		61,590			
STANDARD DEVIATION		1.82			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	135,800	2.2	35.5	11,000	11.0
1989	213,200	3.5	57.0	19,900	14.7
1990	186,000	3	-12.8	33,100	15.5
1991	311,600	5.1	67.5	29,900	16.1
1992	114,400	1.9	-63.3	71,700	23.0
1993	353,658	5.7	209.1	18,304	16.0
1994	95,586	1.6	-73.0	70,732	20.0
1995	254,715	4.1	166.5	9,675	10.1
1996	170,558	2.8	-33.0	23,494	9.2
1997	344,758	5.6	102.1	11,535	6.8
1998	567,057	9.2	64.5	24,015	7.0
1999	392,685	6.4	-30.8	64,100	11.3
2000	295,403	4.8	-24.8	44,000	11.2
2001	301,341	4.9	2.0	42,320	14.3
2002	345,431	5.6	14.6	45,100	15.0
2003	204,649	3.3	-40.8	51,300	14.9
2004	199,348	3.2	-2.6	34,790	17.0
2005	135,328	2.2	-32.1	33,889	17.0
2006	161,119	2.6	19.1	23,006	17.0
2007	168,001	2.7	4.3	27,390	17.0
2008	170,804	2.8	1.7	28,560	17.0
2009	202,199	3.3	18.4	29,037	17.0
2010				34,374	17.0

Table 7b. GREY KANGAROO *

AVERAGE DENSITY		19.46			
AREA : Km., sq.		61,590			
STANDARD DEVIATION		11.19			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	456,100	7.4	-16.5	77,800	14.2
1989	706,400	11.5	54.9	74,500	16.3
1990	755,700	12.3	7.0	124,600	17.6
1991	811,410	13.2	7.4	138,100	18.3
1992	521,100	8.5	-35.8	219,100	27.0
1993	2,151,730	34.9	312.9	88,587	17.0
1994	1,497,000	24.3	-30.4	537,933	25.0
1995	1,768,625	28.7	18.1	62,007	4.1
1996	1,422,035	23.1	-19.6	83,312	4.7
1997	1,683,707	27.3	18.4	54,810	3.9
1998	1,551,195	25.2	-7.9	91,245	5.4
1999	1,717,979	27.9	10.8	130,250	8.4
2000	1,430,884	23.2	-16.7	137,600	8.0
2001	2,078,208	33.7	45.2	112,700	7.9
2002	3,195,179	51.9	53.7	245,800	11.8
2003	1,824,168	29.6	-42.9	375,000	11.7
2004	1,259,605	20.5	-30.9	273,625	15.0
2005	702,576	11.4	-44.2	188,941	15.0
2006	905,594	14.7	28.9	105,386	15.0
2007	568,378	9.2	-37.2	135,839	15.0
2008	583,873	9.5	2.7	85,257	15.0
2009	695,066	11.3	19.0	87,581	15.0
2010				94,685	13.6

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

*includes WGK population but no quota

KANGAROO MANAGEMENT ZONE No. 11- GRIFFITH

Table 8a. RED KANGAROO

AVERAGE DENSITY		3.31			
AREA : Km., sq.		98,171			
STANDARD DEVIATION		1.28			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	180,300	1.8	39.9	16,960	13.2
1989	249,900	2.5	38.6	29,200	16.2
1990	311,800	3.2	24.8	38,300	15.3
1991	278,900	2.8	-10.6	51,800	16.6
1992	408,500	4.2	46.5	48,800	17.5
1993	370,933	3.8	-9.2	94,895	23.2
1994	490,469	5	32.2	35,040	9.4
1995	351,806	3.6	-28.3	72,952	14.9
1996	633,758	6.5	80.1	38,930	11.1
1997	333,569	3.4	-47.4	76,868	12.1
1998	272,267	2.8	-18.4	33,310	10.0
1999	548,493	5.6	101.5	32,650	12.0
2000	393,042	4	-28.3	58,950	10.7
2001	447,833	4.6	13.9	43,110	11.0
2002	401,414	4.1	-10.4	48,600	10.9
2003	290,084	3	-27.7	35,200	8.8
2004	212,159	2.2	-26.9	49,314	17.0
2005	277,153	2.8	30.6	36,067	17.0
2006	221,656	2.3	-20.0	47,116	17.0
2007	292,970	3.0	32.2	37,682	17.0
2008	228,433	2.3	-22.0	49,805	17.0
2009	231,422	2.4	1.3	38,834	17.0
2010				39,342	17.0

Table 8b. GREY KANGAROO *

AVERAGE DENSITY		8.12			
AREA : Km., sq.		98,171			
STANDARD DEVIATION		4.10			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1988	256,300	2.6	7.4	35,904	15.0
1989	401,000	4.1	56.5	43,500	17.0
1990	566,000	5.8	41.1	62,800	15.7
1991	704,600	7.2	24.5	105,100	18.6
1992	669,100	6.8	-5.0	190,200	27.0
1993	1,395,898	14.2	108.6	160,584	24.0
1994	1,105,248	11.3	-20.8	108,744	7.8
1995	1,093,657	11.1	-1.0	128,016	11.6
1996	1,288,316	13.1	17.8	113,564	10.4
1997	1,121,800	11.4	-12.9	128,047	9.9
1998	1,349,050	13.7	20.3	74,650	6.7
1999	1,244,734	12.7	-7.7	154,860	11.5
2000	1,157,073	11.8	-7.0	131,050	10.5
2001	1,022,526	10.4	-11.6	147,600	12.8
2002	1,437,265	14.6	40.6	140,100	13.7
2003	874,589	8.9	-39.1	194,450	13.5
2004	722,872	7.4	-17.3	131,188	15.0
2005	701,493	7.1	-3.0	108,431	15.0
2006	677,124	6.9	-3.5	105,224	15.0
2007	571,999	5.8	-15.5	101,569	15.0
2008	638,262	6.5	11.6	85,800	15.0
2009	321,138	3.3	-49.7	95,739	15.0
2010				0	0.0

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

*harvest of grey kangaroos suspended in accordance with amended management plan.

KANGAROO MANAGEMENT ZONE No. 9-ARMIDALE

Table 9a. WALLAROO

AVERAGE DENSITY		6.3			
AREA : Km., sq.		16,331			
STANDARD DEVIATION		1.90			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	121,520	7.4	5	2,800	2.4
1992	127,680	7.8	5	6,160	5.1
1993	127,680	7.8	0	6,160	4.8
1994	121,296	7.4	-5	6,432	5
1995	126,148	7.7	4	6,118	5
1996	98,396	6	-22	6,308	5
1997	111,187	6.8	13	4,920	5
1998	120,860	7.4	9	5,559	5
1999	119,651	7.3	-1	6,043	5
2000	125,600	7.7	5	5,975	5
2001	125,600	7.7	0	6,250	5
2002	125,600	7.7	0	6,250	5
2003*	34,744	2.1	-72	6,250	5
2004**	89,787	5.7	158	5,212	15
2005**	89,787	5.7	0	13,468	15
2006**	89,787	5.7	0	13,468	15
2007***	37,859	2.3	-58	13,468	15
2008***	37,859	2.3	0	5,679	15
2009***	37,859	2.3	0	5,679	15
2010				5,679	15

Table 9b. GREY KANGAROO

AVERAGE DENSITY		11.4			
AREA : Km., sq.		16,331			
STANDARD DEVIATION		1.58			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	223,650	13.7	5	21,300	10
1992	223,650	13.7	0	33,370	14.9
1993	234,655	14.4	5	46,931	21
1994	199,474	12.2	-15	46,931	20
1995	207,462	12.7	4	43,882	22
1996	161,821	9.9	-22	45,640	22
1997	182,857	11.2	13	32,364	20
1998	198,765	12.2	9	31,085	17
1999	196,777	12	-1	33,790	17
2000	206,600	12.7	5	33,450	17
2001*	173,109	10.6	-16	35,100	17
2002*	173,109	10.6	0	25,966	15
2003*	180,456	11	4	25,966	15
2004**	161,726	10.2	-10	27,068	15
2005**	161,726	10.2	0	24,259	15
2006**	161,726	10.2	0	24,259	15
2007***	141,610	8.7	-12	24,259	15
2008***	141,610	8.7	0	21,242	15
2009***	141,610	8.7	0	21,242	15
2010				21,242	15

* Population estimate based on aerial surveys conducted in 2001/2002

**Population estimate based on aerial surveys

conducted in 2004

*** Population estimate based on aerial surveys conducted in 2007

KANGAROO MANAGEMENT ZONE No. 13- GLEN INNES

Table 10a. WALLAROO

AVERAGE DENSITY		5.4			
AREA : Km., sq.		20,941			
STANDARD DEVIATION		2.26			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	121,520	5.8	5	2,800	2.4
1992	127,680	6.1	5	6,160	5.1
1993	127,680	6.1	0	6,160	4.8
1994	121,296	5.8	-5	6,432	5
1995	126,148	6	4	6,118	5
1996	98,396	4.7	-22	6,308	5
1997	111,187	5.3	13	4,920	5
1998	120,860	5.8	9	5,559	5
1999	119,651	5.7	-1	6,043	5
2000	125,600	6	5	5,975	5
2001	215,500	10.3	72	6,250	5
2002	215,500	10.3	0	6,250	2.9
2003*	128,232	6.1	-40	6,250	2.9
2004**	56,657	3.1	-56	19,235	15
2005**	56,657	3.1	0	8,499	15
2006**	56,657	3.1	0	8,499	15
2007***	32,184	1.5	-43	8,499	15
2008***	32,184	1.5	0	4,828	15
2009***	32,184	1.5	0	4,828	15
2010				4,828	15

Table 10b. GREY KANGAROO

AVERAGE DENSITY		9.7			
AREA : Km., sq.		20,941			
STANDARD DEVIATION		1.17			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	223,650	10.7	5	21,300	10
1992	223,650	10.7	0	33,370	14.9
1993	234,655	11.2	5	46,931	21
1994	199,474	9.5	-15	46,931	20
1995	207,462	9.9	4	43,882	22
1996	161,821	7.7	-22	45,640	22
1997	182,857	8.7	13	32,364	20
1998	198,765	9.5	9	31,085	17
1999	196,777	9.4	-1	33,790	17
2000	206,600	9.9	5	33,450	17
2001*	221,975	10.6	7	35,122	17
2002*	221,975	10.6	0	33,296	15
2003*	229,723	11	3	33,296	15
2004**	149,621	8.1	-35	34,458	15
2005**	149,621	8.1	0	22,443	15
2006**	149,621	8.1	0	22,443	15
2007***	236,600	11.3	58	22,443	15
2008***	236,600	11.3	0	35,490	15
2009***	236,600	11.3	0	35,490	15
2010				35,490	15

* Population estimate based on aerial surveys conducted in 2001/2002
conducted in 2004

**Population estimate based on aerial surveys
*** Population estimate based on aerial surveys conducted in 2007

KANGAROO MANAGEMENT ZONE No. 14-UPPER HUNTER

Table 11a. WALLAROO

AVERAGE DENSITY		6.1			
AREA : Km., sq.		14,590			
STANDARD DEVIATION		1.56			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	104,160	7.1	5	2,400	2.4
1992	109,440	7.5	5	5,280	5.1
1993	109,440	7.5	0	5,280	4.8
1994	103,968	7.1	-5	5,512	5
1995	108,128	7.4	4	5,244	5
1996	84,340	5.8	-22	5,408	5
1997	95,304	6.5	13	4,217	5
1998	103,595	7.1	9	4,765	5
1999	102,559	7	-1	5,180	5
2000	107,650	7.4	5	5,125	5
2001	107,650	7.4	0	5,350	5
2002	107,650	7.4	0	5,350	5
2003*	57,762	4	-46	5,350	5
2004**	61,660	4.4	7	8,664	15
2005**	61,660	4.4	0	9,249	15
2006**	61,660	4.4	0	9,249	15
2007***	44,923	3.1	-27	9,249	15
2008***	44,923	3.1	0	6,738	15
2009***	44,923	3.1	0	6,738	15
2010				6,738	15

Table 11b. GREY KANGAROO

AVERAGE DENSITY		9.1			
AREA : Km., sq.		14,590			
STANDARD DEVIATION		2.87			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
1991	182,700	12.5	5	17,400	10
1992	182,700	12.5	0	27,260	14.9
1993	191,690	13.1	5	38,338	21
1994	162,952	11.2	-15	38,338	20
1995	169,476	11.6	4	35,848	22
1996	132,192	9.1	-22	37,283	22
1997	149,377	10.2	13	26,438	20
1998	162,372	11.1	9	25,394	17
1999	160,748	11	-1	27,600	17
2000	168,750	11.6	5	27,350	17
2001	95,273	6.5	-44	25,313	15
2002	95,273	6.5	0	14,291	15
2003*	94,251	6.5	-1	14,291	15
2004**	67,499	4.8	-28	14,138	15
2005**	67,499	4.8	0	10,125	15
2006**	67,499	4.8	0	10,125	15
2007***	92,016	6.3	36	10,125	15
2008***	92,016	6.3	0	13,802	15
2009***	92,016	6.3	0	13,802	15
2010				13,802	15

* Population estimate based on aerial surveys conducted in 2001/2002
 conducted in 2004

**Population estimate based on aerial surveys
 conducted in 2007

KANGAROO MANAGEMENT ZONE- South-eastern NSW

Table 12. GREY KANGAROO

AVERAGE DENSITY		11.95			
AREA : Km²		29,516			
STANDARD DEVIATION		N/A			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
2003	292,455	11.95	-	-	-
2004	292,455	11.95	-	43,868	15
2005	292,455	11.95	-	43,868	15
2006	415,271	14.07	42	43,868	15
2007	415,271	14.07	-	62,291	15
2008	415,271	14.07	-	62,291	15
2009	655,900		47.6	62,291	15
2010				98,385	15

KANGAROO MANAGEMENT ZONE- Central Tablelands North

Table 13. GREY KANGAROO

AVERAGE DENSITY		14.74			
AREA : Km²		29,379			
STANDARD DEVIATION		N/A			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
2008	433,030	14.74	N/A		
2009	433,030	14.74	N/A	64,995	15.0
2010				64,995	15.0

KANGAROO MANAGEMENT ZONE- Central Tablelands South

Table 14. GREY KANGAROO

AVERAGE DENSITY		23.18			
AREA : Km²		23,105			
STANDARD DEVIATION		N/A			
YEAR	POPULATION	DENSITY	%CHANGE	QUOTA	%POPULATION
2008	535,600	23.18	N/A		
2009	535,600	23.18	N/A	80,340	15.0
2010				80,340	15.0

Table 15. RED AND GREY KANGAROO ANNUAL POPULATION ESTIMATES- ANNUAL QUOTAS, ANNUAL TAKE FIGURES AND RELATIVE PERCENTAGES.

Note	YEAR	POPULATION	QUOTA	% POPULATION	TAKE	% POPULATION	% QUOTA
1	1975	3,365,300	212,000	0	123,000	0	58.0
1	1976	no estim.	319,400	9.49	96,000	2.85	30.1
1	1977	4,699,000	321,000	0	167,200	0	52.1
1	1978	4,383,000	345,000	7.3	220,000	4.7	63.8
1	1979	4,288,000	645,000	14.7	520,000	11.9	80.6
1	1980	6,174,000	645,000	15.0	619,023	14.4	96.0
1	1981	7,046,000	694,500	11.2	488,647	7.9	70.4
1	1982	9,400,000	843,000	12.0	664,342	9.4	78.8
1	1983	5,500,000	843,000	9.0	400,477	4.3	47.5
2	1984	2,738,000	500,000	9.1	229,484	4.2	45.9
2	1985	4,155,000	300,000	11.0	326,028	11.9	108.7
2	1986	4,662,100	577,000	13.9	444,509	10.7	77.0
2	1987	5,425,000	577,000	12.4	473,454	10.2	82.1
2	1988	5,498,000	730,000	13.5	421,200	7.8	57.7
3	1989	7,593,500	804,000	14.6	500,355	9.1	62.2
3	1990	9,150,000	1,172,000	15.4	633,000	8.3	54.0
3	1991	9,734,000	1,520,000	16.6	856,406	9.4	56.3
3	1992	7,981,900	2,074,000	21.3	796,007	8.2	38.4
3	1993	14,618,672	1,663,600	20.8	775,220	9.7	46.6
3	1994	11,476,951	1,409,100	9.6	971,694	6.6	69.0
3	1995	12,123,100	1,146,626	10.0	977,459	8.5	85.2
3	1996	9,942,520	1,206,000	9.9	1,149,917	9.5	95.3
3	1997	12,341,062	976,000	9.8	897,937	9.0	92.0
3	1998	13,443,170	1,175,140	9.5	940,789	7.6	80.1
3	1999	12,220,865	1,532,916	11.4	937,642	7.0	61.2
3	2000	11,939,107	1,416,285	11.6	883,478	7.2	62.4
3	2001	13,982,496	1,418,212	11.9	1,169,500	9.8	82.5
3	2002	15,479,854	1,920,100	13.7	1,441,276	10.3	75.1
4	2003	8,127,976	2,083,590	13.5	996,507	6.4	47.8
4	2004	6,732,789	1,263,900	15.5	827,291	10.2	65.5
4	2005	5,514,526	1,060,083	15.7	731,772	10.9	69.0
4	2006	5,772,567	871,912	15.8	810,104	14.7	92.9
4	2007	6,286,831	909,540	15.8	780,999	13.5	85.9
4	2008	6,894,305	1,001,757	15.9	584803	9.3	58.4
4	2009	7,088,320	1,091,539	15.8			
5	2010		1,054,531	14.9			

Note: above, dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF for the Western Plains.

1 Based on survey of seven 1:250 000 monitor blocks.

2 Based on survey of the Western Plains of New South Wales.

3 Western Plains of New South Wales plus Northern Tablelands.

4 Western Plains plus Northern Tablelands and South-eastern NSW.

5 Western Plains plus Central and Northern Tablelands and South-eastern NSW.

Table 16. SUMMARY STATISTICS COMMERCIAL TAKE- RED KANGAROO

Year	Population Estimate	Quota	% of Previous Year's Population	Take	% of Previous Year's Population	% of Quota
1973	no survey					
1974	no survey					
1975	2,073,000					
1976	no survey	110,000	5			
1977	2,669,000	150,000				
1978	2,069,000	150,000	6			
1979	2,355,000	300,000	15			
1980	3,377,000	300,000	13			
1981	4,626,000	333,000	10			
1982	5,700,000	550,000	12	398,200	8.6	72.4
1983	3,400,000	550,000	10	264,900	4.6	48.2
1984	1,650,000	270,000	8	158,000	4.6	58.5
1985	2,363,000	190,000	12	213,300	12.9	112.3
1986	2,574,000	313,000	13	263,000	11.1	84.0
1987	2,777,000	313,000	12	270,500	10.5	86.4
1988	3,440,000	354,000	13	218,100	7.9	61.6
1989	4,101,000	487,000	14	297,000	8.6	61.0
1990	4,499,000	626,000	15	377,200	9.2	60.3
1991	4,755,000	706,000	16	496,000	11.0	70.3
1992	3,348,900	956,000	20	412,200	8.7	43.1
1993	4,395,426	598,800	18	359,820	10.7	60.1
1994	3,960,106	483,850	11	397,791	9.1	82.2
1995	4,185,494	483,680	12	431,663	10.9	89.2
1996	3,787,113	507,000	12	531,370	12.7	104.8
1997	5,285,995	450,780	12	415,395	11.0	92.2
1998	5,809,757	648,560	12	495,100	9.4	76.3
1999	4,705,664	642,070	11	450,020	7.7	70.1
2000	4,391,385	590,450	13	389,204	8.3	65.9
2001	5,121,413	558,750	13	527,521	12.0	94.4
2002	4,798,558	765,900	15	538,856	10.5	70.4
2003	2,235,114	704,350	15	274,900	5.7	39.0
2004	2,508,236	379,970	17	244,379	10.9	64.3
2005	2,241,497	426,400	17	241,503	9.6	56.6
2006	2,182,788	381,054	17	338,631	15.1	88.9
2007	2,524,448	371,074	17	304,732	14.0	82.1
2008	2,869,709	429,156	17	210,654	8.3	49.1
2009	2,456,795	487,850	17			
2010		417,655	17			

Note:

1975-1983 population estimates based on survey of seven 1:250 000 monitor blocks

1984-2000 population estimates based on survey of virtually all the Western Plains

2001-2009 population estimates based on survey of virtually all the Western Plains, and incorporates revised correction factors.

Dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

Table 17. SUMMARY COMMERCIAL TAKE- EASTERN GREY KANGAROO

Year	Population Estimate	Quota	% of Previous Year's Population	Take	% of Previous Year's Population	% of Quota
1989	2,535,000	444,000	-	257,300	-	58.0
1990	3,354,800	394,000	15.5	170,800	6.7	43.4
1991	3,587,300	548,000	16.3	254,800	7.6	46.5
1992	3,313,000	790,300	22.0	264,400	7.4	33.5
1993	7,738,749	757,000	22.8	284,300	8.6	37.6
1994	5,426,382	657,200	8.5	363,659	4.7	55.3
1995	5,384,828	474,177	8.7	370,757	6.8	78.2
1996	4,427,575	480,000	8.9	402,356	7.5	83.8
1997	4,947,349	391,290	8.8	333,426	7.5	85.2
1998	5,754,812	382,500	7.7	314,328	6.4	82.2
1999	5,426,433	657,641	11.4	355,845	6.2	54.1
2000	5,755,494	582,697	10.7	376,851	6.9	64.7
2001	6,829,471	628,416	10.9	527,521	9.2	83.9
2002	8,293,707	882,625	12.9	704,010	10.3	79.8
2003	4,627,831	1,065,789	12.9	616,718	7.4	57.9
2004	3,328,133	694,175	15.0	490,868	10.6	70.7
2005	2,670,822	499,220	15.0	419,220	12.6	84.0
2006	2,936,255	400,623	15.0	388,396	14.5	96.9
2007	3,036,020	440,438	15.0	394,906	13.4	89.7
2008	3,035,904	455,403	15.0	320,026	10.5	70.3
2009	3,909,270	455,386	15.0			
2010		546,241	14.0			

Note:

Quota based on a Grey Kangaroo ratio of 72:28% E/W Grey kangaroos.

1987-01 populations and quotas based on aerial surveys and counts of grey kangaroos, applying species proportions determined from ground surveys for Western Plains.

1975-1983 population estimates based on survey of seven 1:250 000 monitor blocks

1984-2000 population estimates based on survey the Western Plains (not monitor blocks)

2001-2007 population estimates based on survey of the Western Plains, and incorporates revised correction factors.

Dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF for Western Plains estimates. CF do not apply to helicopter surveys.

Helicopter surveys of the Northern Tablelands were undertaken for the first time in 2001. Prior to this, estimates were based on ground surveys conducted in the 1980s.

SE NSW management zone was added from 2003 population estimate.

Central Tablelands zones added from 2009 population estimate.

Table 18. SUMMARY COMMERCIAL TAKE- WESTERN GREY KANGAROOS

Year	Population Estimate	Quota	% of Previous Year's Population	Take	% of Previous Year's Population	% of Quota
1987	806,500	75,000		62,900		83.9
1988	626,500	105,000	13.0	72,800	9.0	69.3
1989	957,500	95,000	15.2	67,300	10.7	70.8
1990	1,296,400	152,000	15.9	83,700	8.7	55.1
1991	1,391,700	220,000	17.0	106,600	8.2	48.5
1992	1,320,000	327,700	23.5	173,600	12.5	53.0
1993	2,484,496	307,800	23.3	191,000	14.5	62.1
1994	2,090,463	268,050	10.8	210,244	8.5	78.4
1995	2,552,778	188,800	9.0	175,039	8.4	92.7
1996	1,727,832	219,000	8.6	216,191	8.5	98.7
1997	2,107,718	148,000	8.6	141,167	8.2	95.4
1998	1,878,601	151,700	7.2	123,826	5.9	81.6
1999	2,088,768	220,119	11.7	122,481	6.5	55.6
2000	1,792,228	216,553	10.4	107,902	5.2	49.8
2001	2,031,612	203,556	11.4	145,787	8.1	71.6
2002	2,387,589	271,575	13.4	183,513	9.0	67.6
2003	1,265,031	313,378	13.1	104,889	4.4	33.5
2004	896,420	189,755	15.0	92,044	7.3	48.5
2005	602,208	134,463	15.0	71,049	7.9	52.8
2006	653,524	90,331	15.0	83,077	13.8	92.0
2007	726,363	98,029	15.0	81,361	12.4	83.0
2008	989,559	108,954	15.0	54,123	7.5	49.67
2009	722,255	148,434	15.0			
2010		90,634	12.5			

Note:

1987-04 populations and quotas based on aerial survey counts of grey kangaroos, applying species proportions determined from ground surveys.

1975-1983 population estimates based on survey of seven 1:250 000 monitor blocks

1984-2000 population estimates based on survey of the Western Plains

2001-2009 population estimates based on survey of the Western Plains, and incorporates revised correction factors.

Dark shading indicates the use of September 2003 100m CF; light shading indicates 200m CF.

Table 19. SUMMARY COMMERCIAL TAKE- WALLAROOS (Northern Tablelands)

Year	Population Estimate	Quota	% of Previous Year's Population	Take	% of Previous Year's Population	% of Quota
1979		5,000				
1980		5,000				
1981		5,000				
1982		5,000		2,066		41
1983		5,000		714		14
1984		1,000		632		63
1985		1,000		763		76
1986		0		0		
1987		0		0		
1988		0		0		
1989	300,000	1,000		97		10
1990	413,700	10,000	3	1,967	0.66	20
1991	434,000	10,000	2	1,378	0.33	14
1992	456,000	22,000	5	1,377	0.32	6
1993	456,000	22,000	5	1,678	0.37	8
1994	433,200	17,600	4	3,431	0.75	19
1995	450,528	17,700	4	7,949	1.83	45
1996	351,414	22,300	5	6,530	1.45	29
1997	397,096	17,780	5	6,323	1.80	36
1998	431,879	19,900	5	5,035	1.27	25
1999	427,559	21,586	5	5,490	1.27	25
2000	448,750	21,355	5	6,562	1.53	31
2001	448,750	22,330	5	9,053	2.02	41
2002	448,750	22,330	5	6,615	1.47	30
2003	220,738	22,330	5	13,388	2.98	60
2004	208,104	33,111	15	15,304	6.93	46
2005	208,104	31,216	15	21,299	10.23	68
2006	208,104	31,216	15	24,540	11.79	79
2007	114,966	31,216	15	22,532	10.83	72
2008	114,966	17,245	15	12,069	10.50	70
2009	114,966	17,245	15			
2010		17,245	15			

Note:

1979-85, whole of commercial zone.

1989-2000, Tablelands only.

2001, helicopter survey of Tablelands.

2004, helicopter survey of Tablelands.

2007, helicopter survey of Tablelands.

2004 quota changed from 5% to 15% in line with KMP 2002-2006.

Figure 1. Population trends in red kangaroos in the Western Plains of NSW

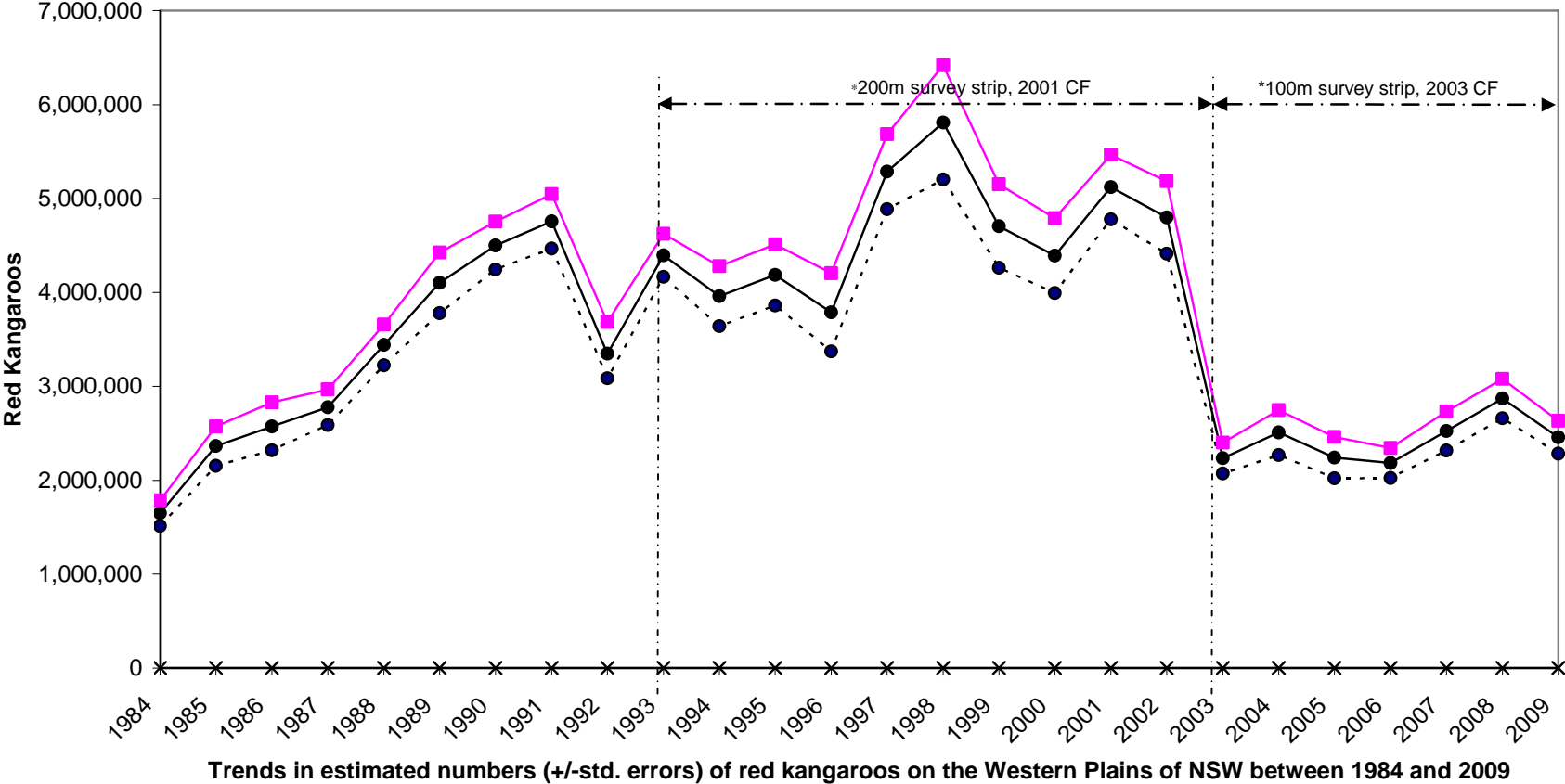
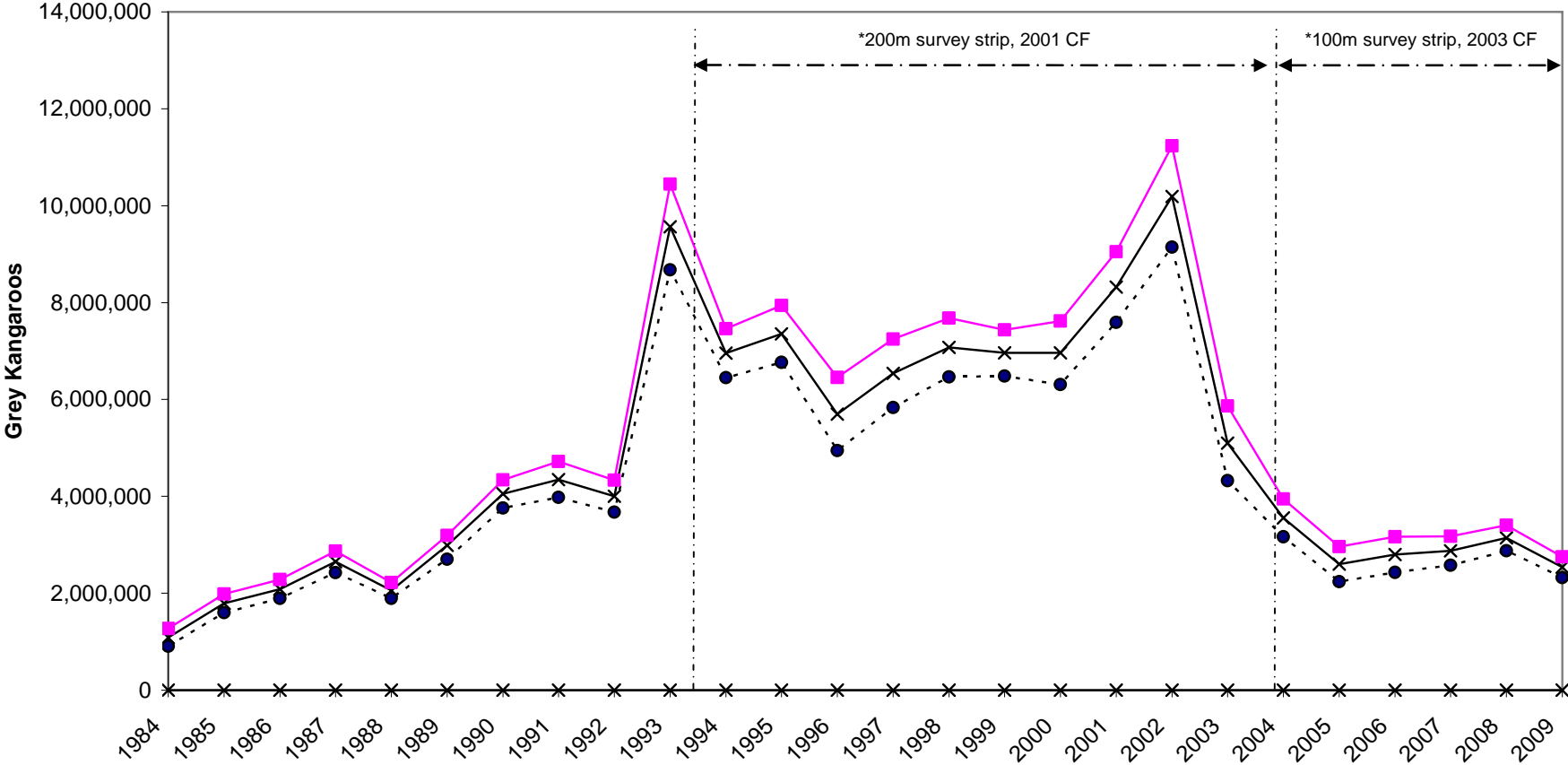


Figure 2. Population trends in grey kangaroos in the Western Plains of NSW



Trends in the estimated numbers (+/-std. errors) of grey kangaroos on the Western Plains of NSW between 1984 and 2009

Figure 3. NSW combined red and grey kangaroo population estimates, authorised quota & actual take 1982-2010

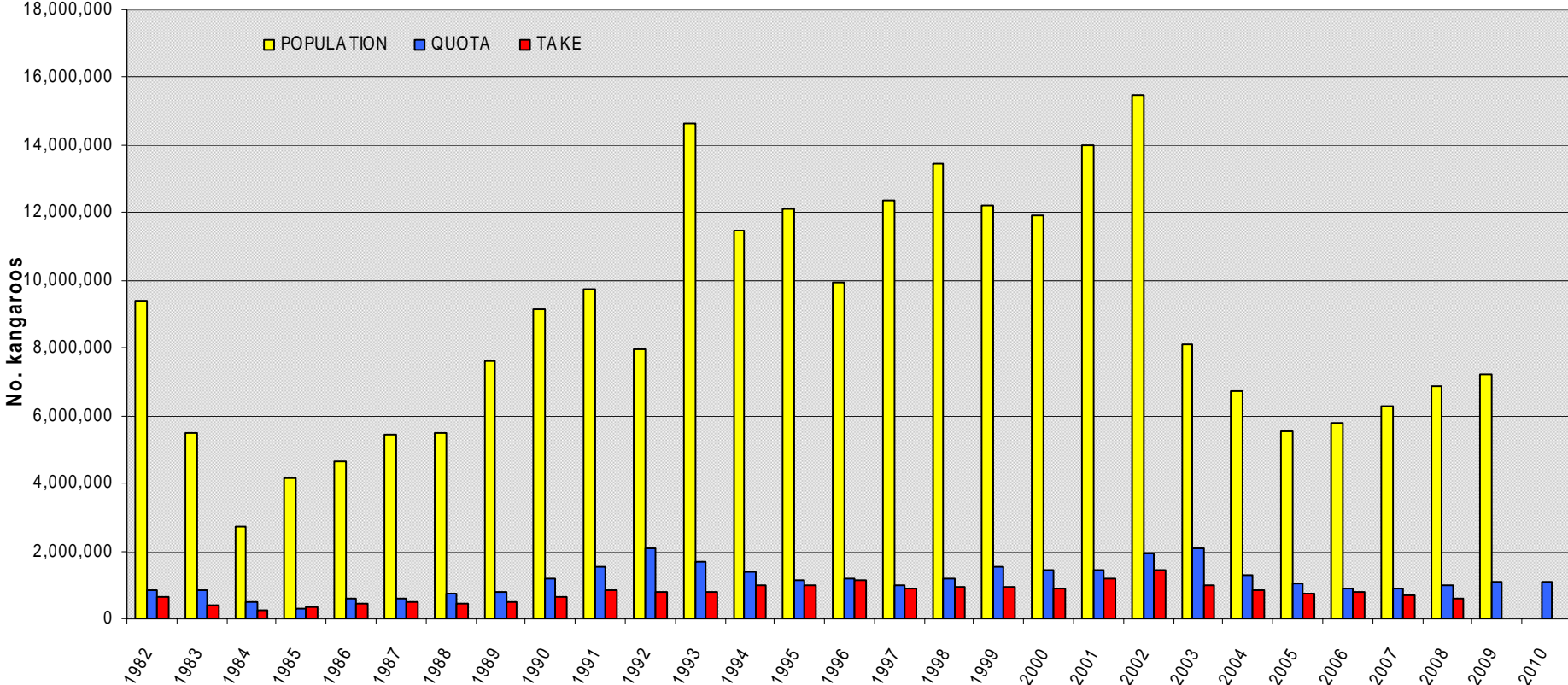


Figure 4. NSW red kangaroo quotas and take 1982-2010

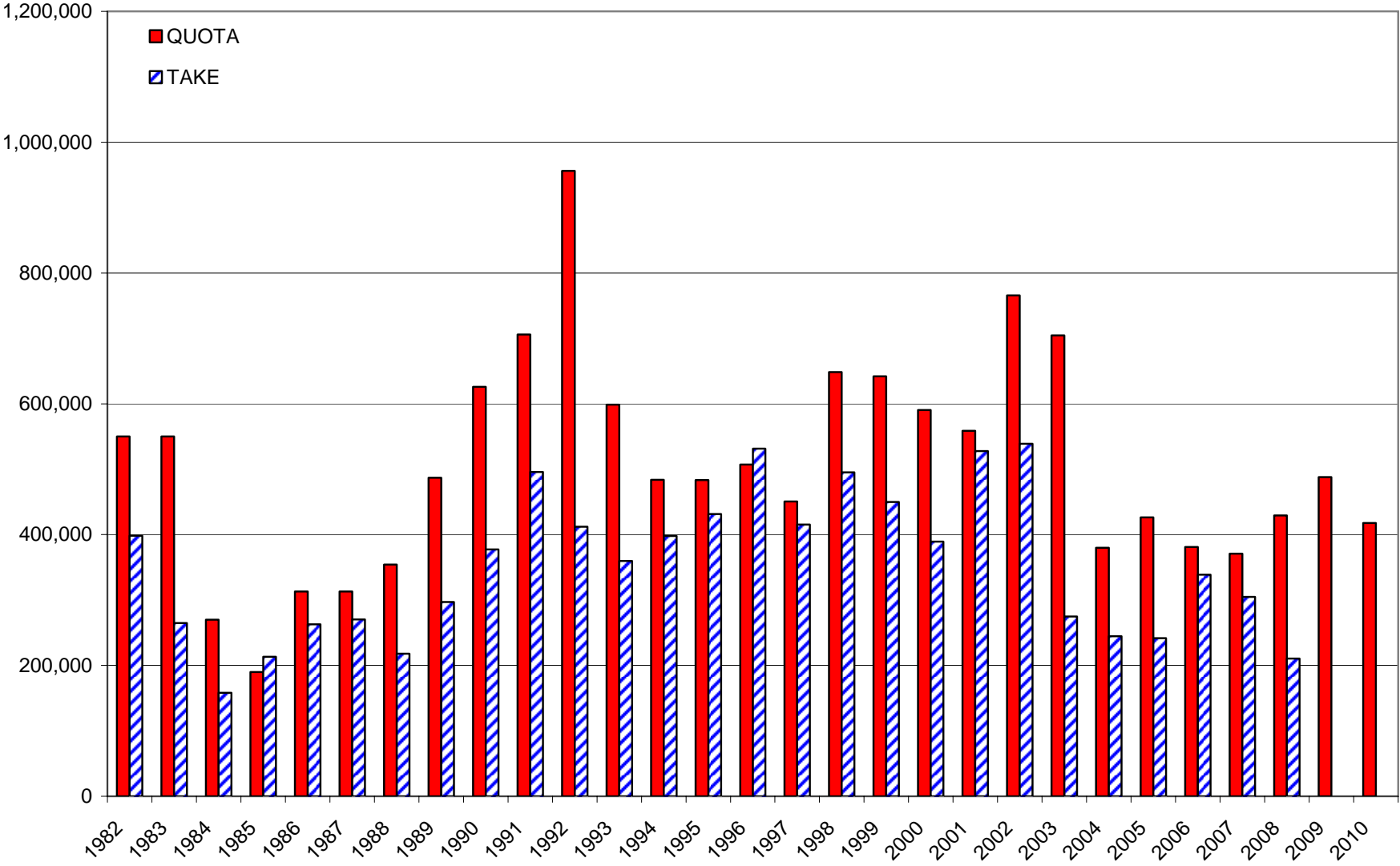


Figure 5. NSW eastern grey kangaroo quotas and take 1989-2010

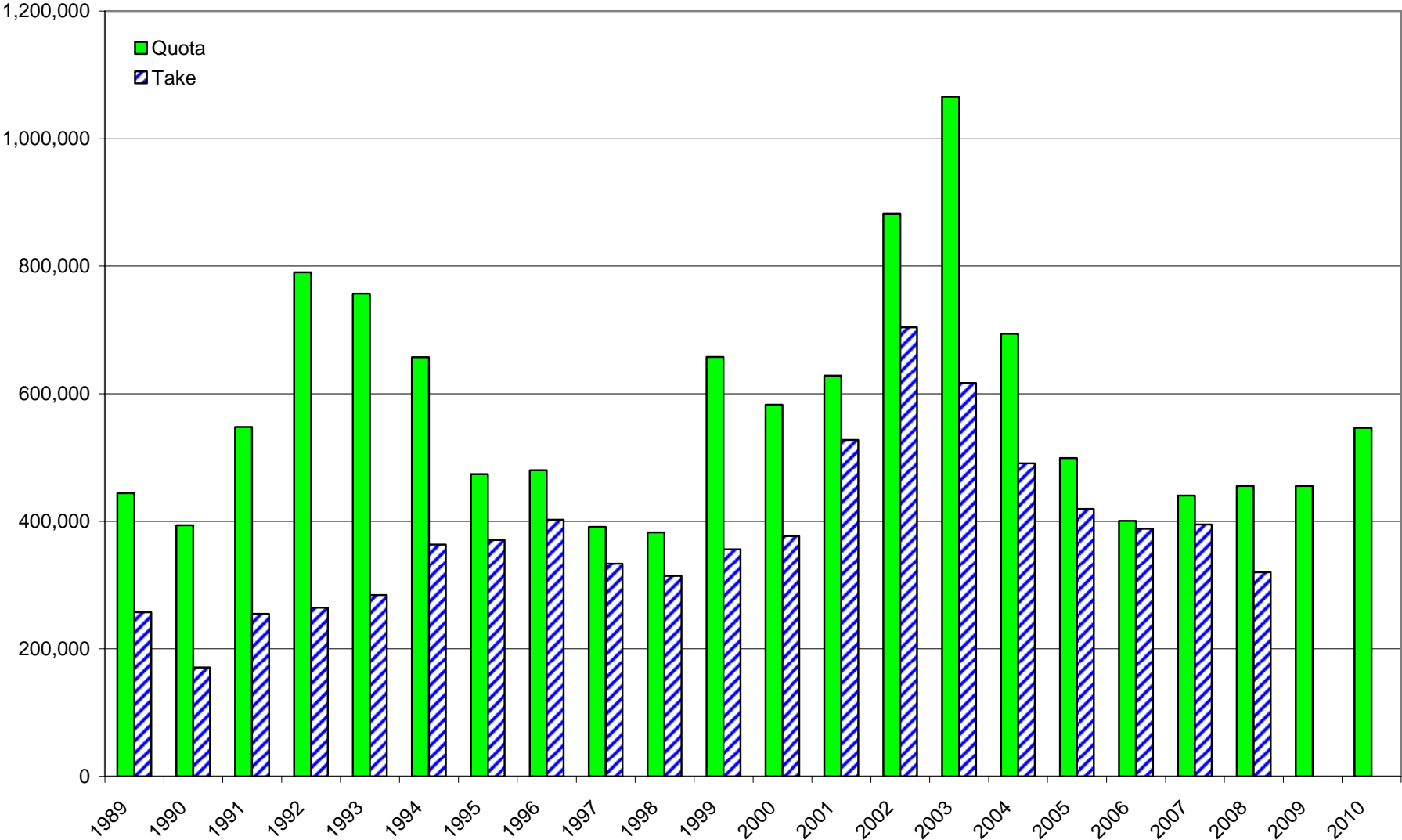


Figure 6. NSW western grey kangaroo quotas and take 1987-2009

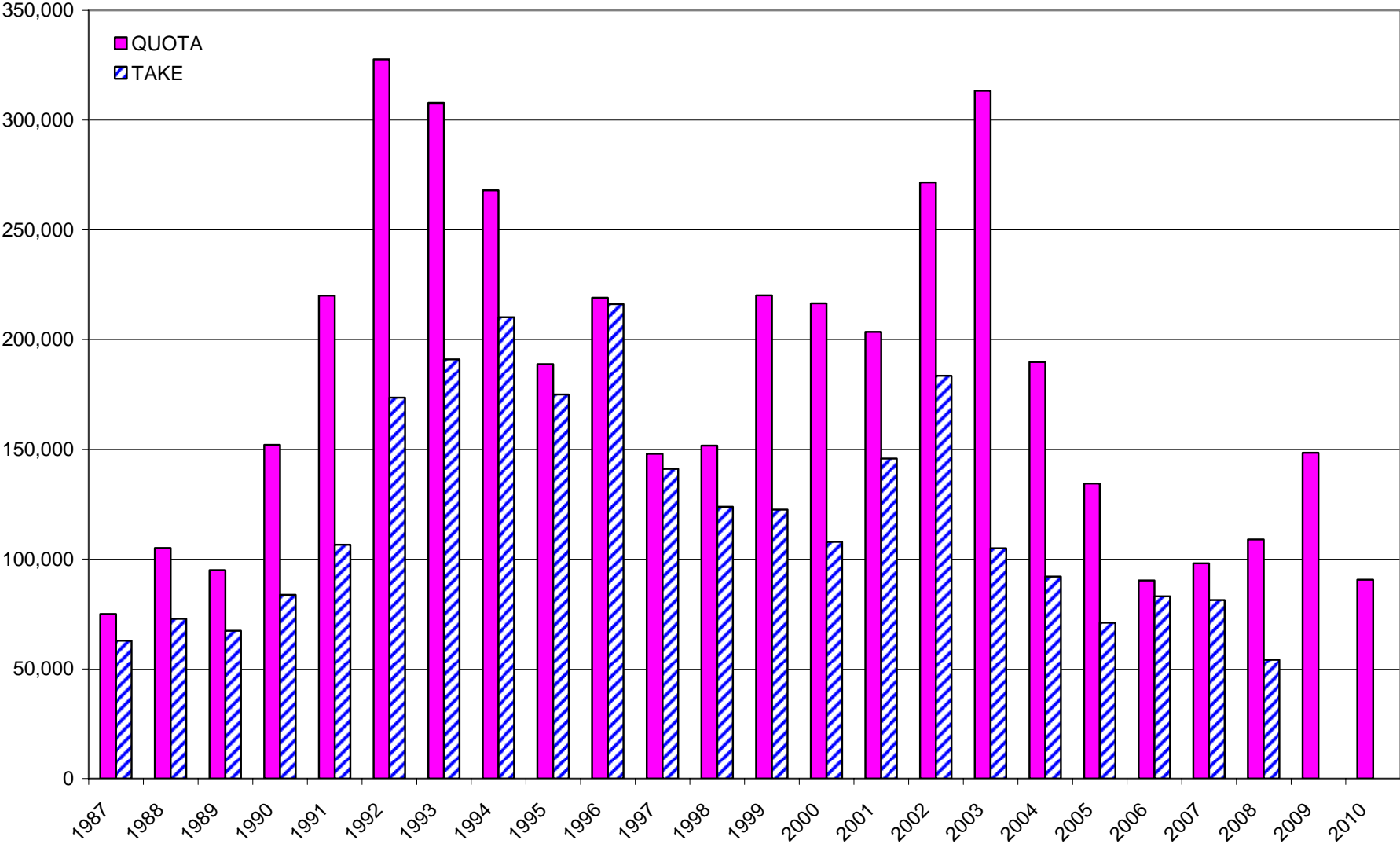


Figure 7. NSW wallaroo quotas and take 1987-2009

