



Department of
Environment and Conservation

**Wildlife Trade Operation for the Euro (*Macropus robustus erubescens*)
in Western Australia 2007-2009**

For submission under the Australian *Environment Protection and Biodiversity
Conservation Act 1999*

July 2007

Department of Environment and Conservation

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Background Information

Preamble

The Wildlife Trade Operation for Euros in Western Australia 2007-2009 is a developmental management strategy for the Euro (*Macropus robustus erubescens*) [hereafter referred to as the Euro in this document] in Western Australia. A management plan for Euros had been in place in Western Australia from 1973-2002.

There are many stakeholders in the management and conservation of macropod species within Western Australia. The Government of Western Australia makes significant contributions to both the conservation and management of macropods through the maintenance of protected areas and targeted conservation management projects. The commercial kangaroo industry and the general community are also stakeholders in kangaroo management. Every member of the community has the potential to benefit from the effective conservation and management of macropod species in Western Australia.

Aboriginal people have a unique social and cultural interest in kangaroos. This document works within the boundaries of the *Native Title Act 1983* and section 23C(1) of the *Western Australian Wildlife Conservation Act 1950*.

This wildlife trade operation, the developmental aspects and the management strategies described in it are designed to integrate with the natural resource management (NRM) strategies of the Western Australian Government.

This proposal for approval of a Euro management plan as an Approved Wildlife Trade Operation has been designed to facilitate the development of a longer term and more substantial full Euro management plan for Western Australia. It is well proven and accepted that Euros can put significant pressure on grazing enterprises through their dietary overlap with domesticated grazers. As a native species with good survival and breeding capacity in the Western Australian rangelands, the Euro is also a species that can be harvested sustainably for commercial use of meat and skins.

The Western Australian Department of Environment and Conservation (DEC) is keen to develop a Euro management plan for approval under the *Environment Protection and Biodiversity Conservation Act 1999*, to cover the ongoing sustainable use of Euros. In order to do this we need to better develop our population monitoring techniques for Euros and this is best achieved during the operation of a developmental management plan for the species as a Wildlife Trade Operation. In this Wildlife Trade Operation we will investigate and verify a trial population monitoring system based on aerial surveys, with coincident ground counts, to establish one degree block and management region population estimates for Euros that have a high degree of certainty. In the initial years of operation of this plan we will use a conservative correction factor of 4.8 for standard aerial surveys.

Should the development work and investigations conducted during this proposed Wildlife Trade Operation not give satisfactory certainty of WA Euro correction factors other than 4.8, DEC may seek approval for a further Wildlife Trade Operation from 2010 to 2012.

Species Covered in this Plan

The Euro is one of 50 species of macropod found in Australia, 23 of which were present in Western Australia at the time of European settlement. Subsequent changes to the natural landscape of Western Australia, such as agricultural, pastoral and urban development, have markedly changed the abundance and distribution of some macropod species. In 2006 only 19 of those 23 macropod species in Western Australia remain extant, and two of those are now restricted to offshore islands. Six species of macropod are currently considered 'rare or likely to become extinct' (i.e.

threatened) under section 14(2)(ba) of the Western Australian *Wildlife Conservation Act 1950*, and a further four species are listed as ‘presumed extinct’ (see Table 1).

The Euro is considered common and abundant in Western Australia and is not listed as threatened under State or Australian legislation.

Table 1: Macropod species of Western Australia (Superfamily Macropodoidea), and their conservation status in Western Australia and Australia. The species covered by this management plan are shown in bold type.

Species	Conservation Status	
	Western Australia*	Australia**
Family Macropodidae		
Euro <i>Macropus robustus</i>	Common	Not listed
Western Grey Kangaroo <i>Macropus fuliginosus</i>	Common	Not listed
Red Kangaroo <i>Macropus rufus</i>	Common	Not listed
Antilopine Kangaroo <i>Macropus antilopinus</i>	Common	Not listed
Western Brush Wallaby <i>Macropus irma</i>	Common	Not listed
Tammar Wallaby <i>Macropus eugenii</i>	Common	Not listed
Black-flanked Rock-wallaby <i>Petrogale lateralis</i>	Threatened	Vulnerable
Short-eared Rock-wallaby <i>Petrogale brachyotis</i>	Common	Not listed
Rothschild’s Rock-wallaby <i>Petrogale rothschildi</i>	Common	Not listed
Monjon <i>Petrogale burbidgei</i>	Common	Not listed
Nabarlek <i>Peradorcas concinna</i>	Common	Not listed
Quokka <i>Setonix brachyurus</i>	Threatened	Not listed
Northern Nailtail Wallaby <i>Onychogalea unguifera</i>	Common	Not listed
Crescent Nailtail Wallaby <i>Onychogalea lunata</i>	Extinct	Extinct
Central Hare-wallaby <i>Lagorchestes asomatus</i>	Extinct	Extinct
Spectacled Hare-wallaby <i>Lagorchestes conspicillatus</i>	Common	Not listed
Rufous Hare-wallaby <i>Lagorchestes hirsutus</i>	Threatened	Vulnerable
Banded Hare-wallaby <i>Lagostrophus fasciatus</i>	Threatened	Vulnerable
Family Potoroidae		
Brush-tail Bettong <i>Bettongia penicillata</i>	Common	Not listed
Burrowing Bettong <i>Bettongia lesueur</i>	Threatened	Vulnerable
Nullarbor Dwarf Bettong <i>Bettongia pusilla</i>	Extinct	Extinct
Gilbert’s Potoroo <i>Potorous gilbertii</i>	Threatened	Critically Endangered
Broad-faced Potoroo <i>Potorous platyops</i>	Extinct	Extinct

*Conservation status as per Schedule 1 of the Western Australian *Wildlife Conservation (Specially Protected Fauna) Notice 2006*.

**Conservation status as per the *EPBC Act 1999*.

Species Disadvantaged by European Settlement

European settlement has had a greater negative impact on the smaller macropods than the larger kangaroo species. Macropod species that have gone extinct or declined in number since European settlement tend to fall below a mean adult body weight of 5.5kg (Critical Weight Range, CWR; Burbidge and McKenzie, 1989), namely the smaller wallabies, hare-wallabies and bettongs. Many species have severely declined in range or number since European settlement, persisting only as small populations in remnant patches of native habitat, or in island populations. The Banded and Rufous Hare-Wallabies are extinct on the mainland in Western Australia, but common on a small number of islands that have not been subject to landscape

modifications or the introduction of predators. Until recently the Burrowing Bettong was also extinct on the mainland but has recently been reintroduced.

No single cause for the decline of small macropods has been identified (Johnson *et al.*, 1989; Morton 1990). Instead a combination of factors has been suggested, including habitat modification and loss, changes in fire regimes, and grazing by introduced herbivores. Predation by feral foxes and cats has been implicated as a major cause of local extinctions following habitat fragmentation.

Species Advantaged by European Settlement

The larger-bodied kangaroo species have generally been advantaged by European settlement, and these species are secure and widespread across Western Australia. Kangaroo population estimates in Western Australia for 2006 were in excess of 843,900 for Red Kangaroos, 1,412,700 for Western Grey Kangaroos and 312,100 for Euros. A reduction in predation following the construction of a dingo-proof fence around the sheep rangelands, and the provision of additional water sources and pasture are the most likely reasons for population increase (see discussion in Pople and Grigg, 1999).

Some kangaroo species have also recorded increases to their distribution. The Western Grey Kangaroo is confined to the southerly parts of Western Australia and has not extended its range since European settlement, while the Euro occupies most of the arid and semi-arid rangelands of Western Australia but is absent from the un-watered desert regions (see Figs. 1.7 and 1.10 in Caughley *et al.*, 1984).

Legislation and Scope of this Plan

The Wildlife Trade Operation for Euros in Western Australia 2007-2009 has been developed to satisfy the requirements of the Australian *Environment Protection and Biodiversity Conservation Act 1999* (the *EPBC Act*).

This Wildlife Trade Operation is restricted in its application to the conservation and management of the Euro (*Macropus robustus erubescens*).

Considered within this Wildlife Trade Operation is the commercial utilisation of the Euro meat (for pet meat or human consumption) and skins. The export of commercial Euro products from Australia requires Australian Government approval under the *EPBC Act*. Annual commercial Euro harvest quotas for Western Australia will be set using a proportion of the population estimate.

Euros and all native fauna in Western Australia are protected under the *Wildlife Conservation Act 1950*. Harvesting of a protected species in Western Australia requires a licence under Regulation 6 of the *Wildlife Conservation Regulations 1970*. The taking of Euros in Western Australia is regulated via licence and tag procedures detailed in Regulations under this Act. This legislative framework applies to the entire State of Western Australia.

Pursuant to Section 35 of the *Agriculture and Related Resources Protection Act 1976*, the Euro is declared by the Agriculture Protection Board as a "Category A7" declared animal in the whole of Western Australia. Category A7 declaration applies in respect of an area if the animals are native to that area and are animals for which a management program should, in the opinion of the Board, be approved and implemented in relation to that area.

The non-commercial destruction of Euros is not considered within this Wildlife Trade Operation. This Wildlife Trade Operation covers commercial harvest management actions and is submitted as an *Approved Wildlife Trade Operation* (Section 303FN of the EPBC Act and EPBC Regulation 9A.20).

This Wildlife Trade Operation (WTO) is valid for a three-year period, from 1 January 2007 to 31 December 2009, or until replaced by an approved Wildlife Trade Management Plan.

Goals and Aims

Goals of this Wildlife Trade Operation (WTO)

This WTO has four goals:

- To collect sufficient survey data during the life of this WTO using aerial (standard fixed wing) and ground methods to satisfy an Approved Wildlife Trade Management Plan for the commercial harvest of Euros in Western Australia pursuant to section 303FO of the EPBC Act;
- To maintain populations of Euros over their natural range in Western Australia in an ecologically sustainable manner;
- To contain the deleterious effects of Euros on other land management values; and
- Where possible, to manage kangaroo species as a renewable natural resource providing the conservation of the species is not compromised.

For the purpose of this WTO, the use of the term ecological sustainability encompasses the following principles as they relate to Euro conservation and management:

- Protect biological diversity and maintain viable populations of Euro across its natural range;
- Apply a precautionary approach to management, to ensure that management actions conducted within this management plan minimise the risk of unwanted or unintended outcomes to Euros, their habitat and ecosystems (the precautionary principle);
- Provide for inter-generational equity by ensuring that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- Ensure that decision-making processes relating to Euros effectively integrate both long-term and short-term economic, environmental, social and equitable considerations; and
- Ensure that conservation and management programs for Euros acknowledge and accommodate the interests of Aboriginal stakeholders where appropriate.

Measures of Performance

This WTO has four aims that set strategic directions for the management of commercial Euro harvest in Western Australia. Under each aim are one or more objectives that detail operational directions for Euro management.

Progress towards each objective will be measured by the completion of key actions and clearly defined performance targets and measurable indicators.

Objectives will be audited against performance measures annually, with a major assessment and review at the end of the three-year term of the WTO. Mechanisms will be developed to ensure that performance measures are linked to future management strategies, by incorporating lessons learnt from previous successes and failures.

AIMS OF THE WILDLIFE TRADE OPERATION

The aims of this WTO for Euros are:

1. Ensure conservation of Euros through monitoring and promotion of research.

Monitor Euro populations using aerial (standard fixed wing) and ground survey techniques to quantify the relationship between aerial and ground population estimates. This information will be used to determine an appropriate correction factor that can be applied to fixed wing aerial survey estimates that is valid for Western Australian conditions, support research targeted to key areas identified for Euros, and promote the regional conservation of Euro populations across their natural range.

2. Manage Euro populations as a sustainable commercial harvest.

Manage the commercial harvest of Euros through a best practice quota setting system, effective licence and tag procedures, and monitoring and maximising compliance with relevant legislation. Improve understanding of the impacts of commercial harvest on Euros, their habitat and ecosystems.

3. Adhere to best practice animal welfare standards in conservation and management programs for Euros.

Adhere to animal welfare standards by maximising compliance with the *Australian Code of Practice for the Humane Shooting of Kangaroos* and the *Western Australian Animal Welfare Act 2002*.

4. Ensure effective communication and education of *kangaroo* conservation and management programs throughout the community.

Promote the Western Australian Euro WTO through public education and consultation. Support and administer a kangaroo management advisory committee to guide the development of the commercial Euro industry in Western Australia, and investigate an equitable and efficient distribution of costs within the commercial Euro industry. Promote legislation and policy relevant to Euro management in Western Australia.

Aim 1. Conservation

Ensure conservation of Euros through monitoring and promotion of research

Conservation of Euro populations within Western Australia is the key aim of this WTO. All management actions conducted within this WTO must not be detrimental to the long-term conservation and population viability of Euros across their natural range.

1.1 MONITORING

Objective: Monitor regional Euro populations using an appropriate survey technique.

Adequate monitoring of a population is essential to ensure its proper management. Commonwealth and State government agencies have conducted standard aerial surveys of Western Australian kangaroo populations since 1981 (see Grigg *et al.*, 1999 for details of methodology), providing a high quality monitoring dataset on which to base management decisions. These surveys have focussed on red and western grey kangaroos, with some data for Euros. From 2006, the focus will be on all three kangaroo species.

Monitoring is conducted in three Kangaroo Management Regions (Figure 1).

The following three techniques will be used for monitoring Euro populations:

1. Broad-scale aerial survey using fixed wing aircraft and fixed strip-width (200m) transect survey methodology;
2. Medium-scale aerial survey using fixed wing aircraft and fixed strip-width (200m) transect survey methodology; and
3. Small-scale (intensive) ground surveys by vehicle using variable-width line transect survey methodology.

Between 1981 and 1993, broad-scale aerial surveys of the density and distribution of kangaroo populations in Western Australia were undertaken on a triennial basis. Following advice from the former Australian Nature Conservation Agency that it was withdrawing its assistance to Western Australia for kangaroo surveys after 1993, CALM replaced the triennial surveys over the entire pastoral zone with an annual survey system, covering approximately one-third of the previous total survey area each year. The total survey area has been divided into three regions (Figure 1), each with an area of over 300,000km². These survey zones are also the population monitoring and harvest regions. Population estimates are derived from these surveys using standardised correction factors.

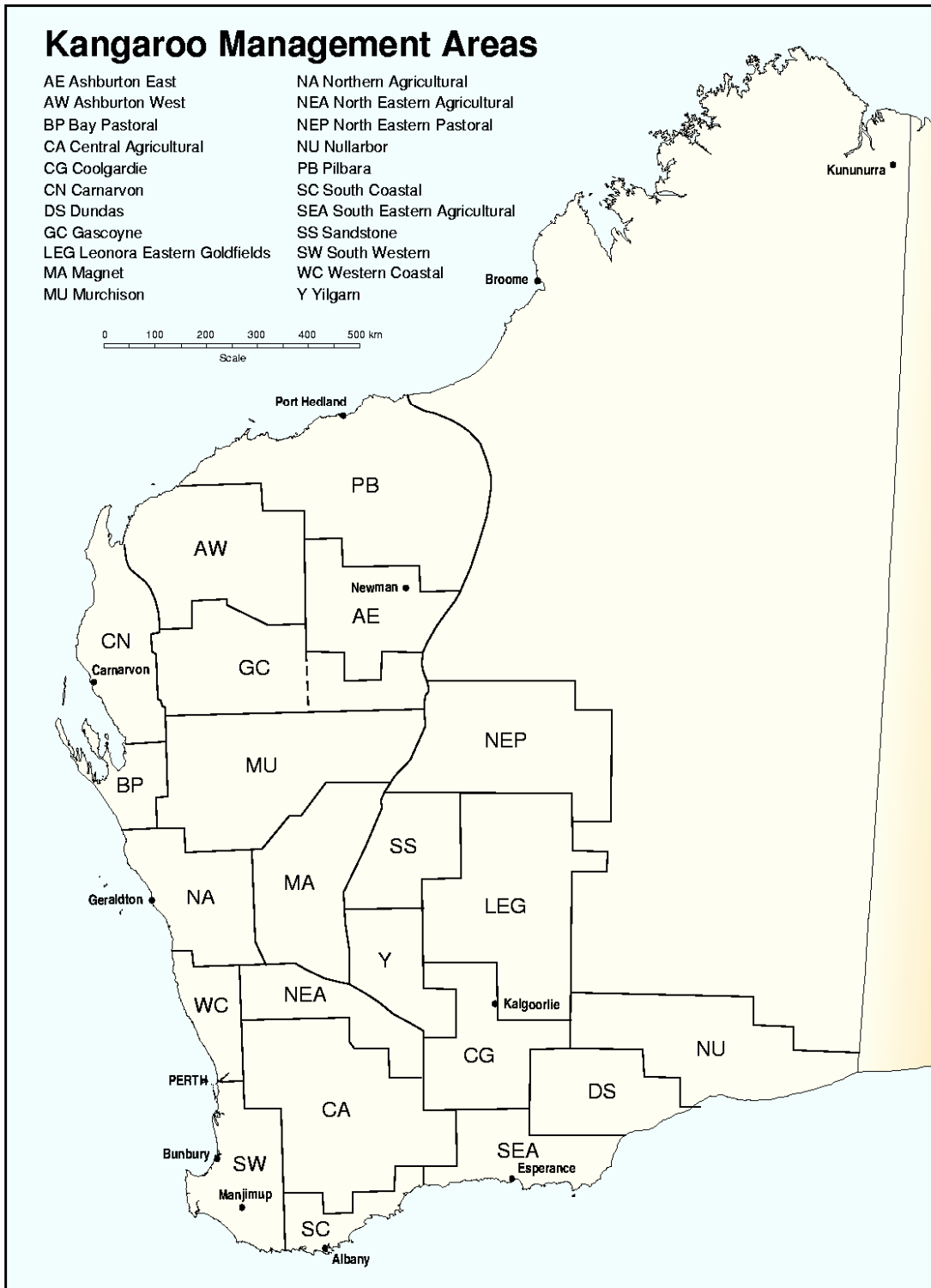
As an integral part of this WTO, the DEC will continue the broad-scale annual aerial survey of one zone as part of the triennial system of full aerial surveys over the survey zones, with a focus on Euros as well as red and western grey kangaroos. The DEC will also undertake additional meso-scale aerial surveys over at least a series of eleven one half-degree latitude by one half-degree longitude monitor blocks (a total of at least 14,666km² in area) across the three zones to encompass the entire range of the Euro within the survey area. Where possible, the DEC will fly full one degree blocks in this monitoring. As far as is possible, the same series of Euro

monitor blocks will be flown each year during the life of this WTO to give an annual update on trends in Euro populations.

Figure 1. Aerial survey monitoring zones (Note, these are coincident with Euro management regions)



Figure 2. Kangaroo Management Areas



It is generally accepted that aerial surveys used for red and grey kangaroos are not necessarily appropriate for accurately estimating Euro populations. This is related to difficulties in sighting Euros, particularly in habitats with more dense ground cover. Therefore, other methods such as ground or helicopter surveys have been employed, particularly in eastern Australia. Euros are currently commercially harvested in South Australia, New South Wales and Queensland. The survey methods employed for Euros in these States consist of ground-transects and/or helicopter monitoring blocks. Not all Euro habitat in Western Australia is directly comparable to that occurring elsewhere and further study is required to determine the relationships between ground and aerial counts for the species in the various habitats occurring in Western Australia.

Under this plan, the DEC will conduct small-scale ground (vehicle) surveys of representative areas of the monitor blocks surveyed by fixed-wing aircraft to establish the relationship between the aerial survey counts with those derived from ground surveys. Ground surveys will be conducted during the same season as the aerial surveys. It is the intention that the calculated correction factors for Western Australian conditions and Euro habitat will then be applied to overall population estimations. The proposed monitor blocks are listed in Table 2, below. These may be changed during the implementation of this plan if they are found to be unsuitable in practice. However, any changes will not result in a decrease of coverage of the surveys. Both the ground and the aerial surveys of the monitor blocks will start from 2007. The DEC will submit the proposed ground and aerial survey areas to the Department of Environment and Water Resources (DEW) by 30 June ahead of the ground surveys.

Population estimates are prepared for survey zones on an annual basis, taking into account the direct survey results in each zone and adjacent areas, as well as rainfall patterns for the preceding months and years. It is generally accepted that rainfall in the crucial 6-9 months before survey is a good indicator of likely kangaroo populations into the next year (with impacts from subsequent rainfall). The available information is also analysed to provide an indication of likely forward trends across harvest areas, for assistance in commercial quota setting.

The annual population estimates for each zone are based on the survey data and will be set in the following manner:

1. For zones where broad-scale fixed-wing survey has been undertaken then the population estimate is calculated from the survey results using the approved correction factor. (2004: Northern Zone; 2005: Southern Zone; 2006: Central Zone; 2007: Northern Zone; 2008: Southern Zone)
2. For zones where only monitor blocks have been flown then the population estimates will be either:
 - a. based on the population estimates of the last broad-scale survey plus a conservative adjustment for each year since the last broad-scale survey. The conservative adjustment will be calculated in accordance with the following table:

If Population Estimates for Monitor Blocks:	and overall Rainfall for a zone is:	Then the adjustment to previous population estimate for the zone can be:
Increase	Above Average	Increased by up to 50 % of the indicated Monitor Block increase
Increase	Below Average	Increased by up to 20 % of the indicated Monitor Block increase
Decrease	Above Average	Decreased from 100% to 50% of the indicated Monitor Block decrease
Decrease	Below Average	Decreased by the same percentage as the Monitor Block decrease

or;

- b. limited to the population estimate for the monitor blocks surveyed in the current year for that region.

The quota setting system used in this WTO will use a standard fixed-wing aerial survey correction factor of 4.8 (from Pople *et al* 1998). Correction factors for the population estimate based on aerial survey data will initially be 4.8 but will be revised downwards if the ground survey data indicates that this is an overestimate. Correction factors will only be revised upwards during the life of this WTO, if there is clear evidence from the aerial and ground survey data to show that a different local correction factor is warranted. If DEC is considering changing the correction factor it will provide DEW with a report that analyses the survey data and explains the reason for the proposed change. DEW must consider any proposed upward changes to the correction factor and advise DEC whether it approves of the proposed change so that DEC can incorporate this in the proposed quota proposal for Euros. DEC will pursue Euro quotas based on correction factors endorsed by DEW.

Survey results for comparison areas will be used to confirm population trend information indicated by rainfall records. In any case where there is a major divergence between rainfall trends and the aerial and ground survey monitoring indications a conservative population estimate will be used for quota calculations.

Table 2: Euro monitor blocks for aerial and ground surveys in Western Australia. (Note: Ground surveys will only be conducted where safe vehicle access is possible.)

Northern Region	Central Region	Southern Region
ES7 (25° 15'S, 115° 30' E to 115° E) ES8 (21° 45'S, 118°E to 118° 30' E) ES9 (21° 45'S, 117°E to 116° 30'E) ES10 (21° 15'S, 116° 30' E to 116° E) ES11 (20° 45'S, 117°E to 116° 30'E)	ES4 (27° 45'S, 120° 30'E to 120° E) ES5 (27° 15'S, 120°E to 120°30'E) ES6 (26° 15'S, 120° 30'E to 121° E)	ES1(29° 45'S, 121° E to 121° 30'E) ES2 (29° 15'S, 121° E to 121° 30'E) ES3 (28° 15'S, 121° E to 120° 30'E)

Key Actions:

- Annually monitor one full survey zone by air and a standard series of eleven monitor blocks across the entire State harvest area by air and ground;
- Estimate populations in accordance with the procedures set out in this wildlife trade operation;
- Conduct ground surveys and compare results of the ground surveys to the fixed-wing surveys to determine the reliability of fixed-wing surveys for determining Euro population estimates; and
- If it is determined that survey results are sufficiently reliable then develop reliable aerial survey correction factor for Euros in Western Australian habitats.

Performance Measures:

- Regional Euro populations described and quantified in a manner that conforms with this wildlife trade operation and allows for informed management decisions to be made on an annual basis. Measured via:
 - Number of kangaroo management zones monitored and reported in quota document.
 - Survey results analysed and the analysis used in developing the next management plan. The surveys to be undertaken under the new management plan should provide for a precision of population estimates that is sufficient to satisfy the requirements for an Approved Wildlife Management Plan for Euros.

Should the development work and investigations conducted during the current wildlife trade operation not give satisfactory certainty of population estimates then DEC may seek approval for a further Wildlife Trade Operation for 2010-2012.

1.2 RESEARCH

Objective: Support research into key areas specified for Euros.

Along with regular monitoring, the promotion and completion of strategic research is an integral component of successful wildlife management. Research improves scientific knowledge of a species and its interaction with its environment, and can allow for the experimental testing of management strategies. Results of research can be used to guide and prioritise future management decisions and actions.

DEC will base involvement in Euro research on a number of key research areas, which are currently considered most important and relevant to Euro conservation and management in Western Australia.

Research projects are currently focused within one of the following key areas:

1. Population dynamics, distribution and abundance of Euros in Western Australia;
2. The relationship between Euro abundance and that of introduced herbivores (domestic and feral) across the rangelands in Western Australia; and
3. An Australian Research Council Linkage Grant Project. LP0668879 Avoiding Environmental Bankruptcy: the grazing impacts of red kangaroos and sheep. University of Sydney, Department of Environment and Conservation NSW, Department for Environment and Heritage SA, Department of Environment and

Conservation WA, Department of Primary Industries NSW. Budget \$259,340 over four years.

The DEC may also support or promote future research in other relevant areas (e.g. animal welfare).

The DEC will endeavour to maintain a current understanding of kangaroo research being conducted in government departments, industry and universities within Western Australia. Worldwide trends in wildlife management will also be assessed. Literature surveys of kangaroo and wildlife management research will be completed regularly, with key findings and results disseminated to staff as appropriate and included within current practices when necessary.

Key Actions:

- Conduct periodic literature reviews of current research;
- Maintain regular contact with university and industry partners conducting research on Euros; and
- Incorporate research findings into current techniques where appropriate.

Performance Measures:

- Networks established and maintained with university and industry research partners allowing the DEC to maintain a current understanding of Euro research developments and issues. Measured via:
Number of active Euro research projects with DEC endorsement or involvement; number of industry and university research partners; and
- Attendance and involvement of DEC staff at scientific conferences and workshops relevant to Euros.

1.3 REGIONAL CONSERVATION

Objective: Facilitate the conservation of Euros across their natural range.

In Western Australia, large areas of land have been reserved as national parks and nature reserves for the purpose of conserving native fauna and flora and natural ecosystems. The area of land reserved for national parks, nature reserves and conservation parks at 30 June 2006 was 5,593,536 hectares, 10,860,832 hectares and 843,151 hectares respectively. These areas are reserved for the conservation of flora and fauna, giving a total area reserved for conservation of 17,297,519 hectares, or 6.8% of Western Australia. The identification and acquisition of parks and reserves is an ongoing process and updates of the areas of land reserved are published in DEC's annual reports (see http://www.naturebase.net/about_calm.html).

Parks and reserves contribute directly to the conservation of Euros throughout their natural range. Considering only those parks and reserves larger than 10,000 hectares in area, as at June 2006, there were more than 20 such conservation areas, totalling in excess of 10 million hectares, which are inhabited by Euros. Within these areas commercial harvesting of Euros is not permitted.

Over the period 1999 to 2006, considerable areas of the rangelands were purchased to add to the conservation reserve system. Under the State Government's

“Gascoyne Murchison Strategy” and with considerable financial assistance from the Australian’s Natural Heritage Trust, over 5.1 million hectares of pastoral lease has been purchased for this purpose. Progressively, these areas will be incorporated into the formal conservation reserve system. In the interim, they will be managed for biodiversity conservation.

The conservation of Euros in Western Australia is maximised by focusing efforts at the regional level for Euro populations. By focusing at the regional level the wide diversity of natural landscapes within Western Australia are incorporated into the conservation of Euros. In addition, community involvement in Euro conservation will be maximised by focusing communities and interest groups on their own region. A regional conservation approach is also consistent with the regional approach applied to the management of the commercial Euro harvest.

Regular population monitoring includes monitoring of Euro populations in parts of the State outside of the commercially harvested region (e.g. National Parks and other lands vested in the Conservation Commission of Western Australia and lands under Aboriginal management). These surveys provide a more complete picture of Euro density and distribution in Western Australia, and ensure that the regional conservation of Euros covers regions with both high and low densities of Euros.

Key Actions:

- Map public and privately owned nature reserves, including the extent of suitable Euro habitat; and
- Ensure population monitoring includes survey of Euros outside the current commercially harvested zone.

Performance Measures:

- Regional conservation of Euros is facilitated by determining the extent and distribution of available habitat for Euros. Measured via:
Number of regions supporting Euros and the density of Euros in each region.

Aim 2. Sustainable Commercial Harvest

Manage kangaroo populations as a sustainable commercial harvest

Commercial harvest allows for a specified number of Euros to be taken on an annual basis for commercial utilisation. Commercial quotas will be set annually by the DEC and specify the maximum number of Euros that can be harvested for commercial utilisation in a calendar year.

The commercial harvest of Euros in Western Australia is managed by the DEC at the regional level, through the release of regional quota allocations and a system of licensed field kangaroo shooters operating on one or more individual properties.

Commercial harvest quotas are set at a regional level, using the Kangaroo Management Regions (see Table 3 and Figure 1) and the involvement of the Kangaroo Management Advisory Committee (see Appendix 1). Only selected parts of the State are available for commercial harvest.

Table 3: Western Australian Euro Management Regions and Management Areas (*Management areas not subject to standard aerial survey).

Region	Northern Region Management Areas	Central Region Management Areas	Southern Region Management Areas
Management	Pilbara	Murchison	Leonora-Eastern Goldfields
Areas Included In the Region	Ashburton West	North-East Pastoral	Coolgardie
	Ashburton East	Gascoyne (east)	Dundas
	Carnarvon	Magnet	Nullarbor
	Gascoyne (west)	Northern Agricultural	North Eastern* Agricultural
		Bay Pastoral	South Eastern Agricultural
		Sandstone	Central Agricultural*
		Yilgarn	South Western
		Western Coastal	South Coastal

Commercial harvest allows for landholders to manage Euros as a component of total grazing pressure, and for Euros to be promoted and used as a resource (see text box on page 19). Within the life of this WTO, the DEC will promote and/or support further research investigating the Euro component of total grazing pressure, and the impact of Euro density on rangeland biodiversity and condition.

2.1 QUOTA SETTING

Objective: Determine the number of Euros to be taken for commercial harvest through a best practice quota setting system that takes account of regional priorities and the conservation status of Euros.

The total number of Euros that can be taken for commercial harvest within Western Australia in a calendar year is the *commercial Euro harvest quota*. A quota proposal document will be submitted annually to DEW under this WTO.

A best practice quota setting system will be used to set variable harvest quotas, based on a percentage of direct estimates of population size.

Commercial Harvest Quota

The commercial harvest quota is the maximum number of animals that can be taken commercially in a calendar year. It is allocated to allow for a long-term sustainable harvest of Euros from each region. A standard harvest quota approach tracking populations will be employed, with variations possible in response to rapid population growth or population decline. Quotas will be set at the regional (aerial survey zone) level as a proportion of the aerial survey population estimate. Quotas will be set at 10% or less of the conservative population estimate (see Section 1.1), with a

maximum of 15% to be considered in special circumstances. [Note: Standard Euro harvest rates in other States are: 15% in South Australia, 15-17% in NSW and 10-20% in Queensland.] The proposed WA Euro harvest levels are well within the range that is considered sustainable for Euro populations harvested at a constant rate (Caughley, 1987). Populations harvested at these levels are expected to fluctuate primarily in response to seasonal conditions such as rainfall and pasture biomass. The lower rate of 10% is used because of the uncertainty in using fixed-wing surveys. If the ground surveys demonstrate that fixed-wing surveys give an accurate estimate then higher quotas may be possible. Quotas above 10% will require approval by DEW.

As a management action, harvest returns by kangaroo shooters will be analysed regularly to check for the presence of sudden or severe shifts in the sex ratio or harvest weights of the commercial harvest, or the regional or State-wide harvest rate. Where these shifts are detected, further population monitoring may be conducted, and/or commercial harvest in a region may be restricted, and/or a region may be closed to commercial harvest. This management action serves as a safeguard during adverse environmental conditions such as drought, to ensure that commercial harvest does not negatively impact on the sex or size structure of Euro populations to their long-term detriment.

An annual quota document will be submitted to DEW by 30 November of the preceding year. The Quota Report will contain the following information:

- population estimates including standard error for each zone;
- summary of monitoring procedures;
- quotas for the year calculated as proportion of population estimate as per the approved Commercial Kangaroo Harvest Management Plan;
- charts showing trends in population/quota/take; and
- rainfall and drought maps.

Key Actions:

- Use proportion of the population estimate quota setting system to set annual quota; and
- Review and refine quota setting procedures as required.

Performance Measures:

- No change to the statewide conservation status of Euros due to the commercial Euro harvest;
- All commercial Euro harvest quotas are set in accordance with the provisions of the wildlife trade operation; and
- The Commonwealth Government is advised of commercial harvest quotas for the following calendar year by 30 November.

Adaptive Management

Adaptive management is currently being suggested as more appropriate for natural systems than traditional management approaches (e.g. Johnson, 1999; Olsen and Braysher, 2000; Pople and McLeod, 2000). Adaptive management (“learning by doing”) addresses the inherent uncertainty and complexity of natural systems by directly manipulating management actions, and using the results to obtain an optimal management capacity. It promotes the use of information gained from the successes and failures of management actions, instead of the sole use of detailed scientific studies.

Adaptive management is appropriate for a socially complex system such as *kangaroo* management, as the conflicting goals and desired outcomes of all user-groups will be considered in the development of future management strategies.

The actions covered by this management plan will incorporate the use of adaptive management principles and

Kangaroos as a Resource

Kangaroos can be so numerous in rural areas they are considered as pests, due to fears of competition with domestic stock for pasture and water. In the latter part of the 19th century, kangaroos were considered vermin and bounty payments and organised drives were common.

Over the last 34 years, management plans for kangaroos and the scientific literature have suggested that kangaroos should be considered as a resource and not a pest. The Western Australian Kangaroo Management Program has promoted this ideal for the past 13 years, and continues the promotion of resource use within this management plan.

The nature of competition between domestic stock and kangaroos is frequently debated, and greater scientific evidence is required to qualify the extent and type of competition. It is generally acknowledged that at high densities kangaroos can cause unwanted impacts to a number of competing land uses including conservation of biodiversity.

This management plan does not promote the pest status of Euros by allowing for commercial harvest solely to mitigate the impacts that may be caused by Euros at high densities. Rather, this management plan promotes the use of Euros as a sustainable resource. Allowing for this land management component of the commercial quota promotes the commercial utilisation of Euros, and should minimise the number of kangaroos that are shot and left in the field (either illegally or under non-commercial destruction permits).

Kangaroos have the potential to be a significant economic resource to rural communities. Commercial harvest may enable landholders to generate an economic return from kangaroo harvest from their property, either indirectly through reduced grazing pressure, or through direct involvement in the industry.

Kangaroo meat is recognised as high quality game meat, being both low in fat and cholesterol. Kangaroo meat has been approved for human consumption in Western Australia since 1993 and kangaroo meat products for human consumption are sold within Australia and exported overseas. Kangaroo skins provide a high quality and durable leather for a number of uses. Harvest of kangaroos in Western Australia is permitted for whole carcasses with the skin attached or skin only, and shooters are encouraged to take whole carcasses ensuring that maximum use is obtained from each carcass.

Management of total grazing pressure is now recognised as a land management practice by pastoralists and government agencies. Along with this comes the recognition that kangaroos represent only a *component* of the total grazing pressure, and that domestic stock and feral herbivores need to be managed in combination with the control of kangaroos. Grigg (e.g. 1987, 1989, 1995) has long maintained that “sheep replacement therapy” may be necessary to reduce land degradation, by encouraging farmers to reduce sheep numbers and shift focus to the harvest of kangaroos. Yet, such a mixed-farming enterprise may only result when kangaroos are a resource with a notable monetary value and landholders have some property rights in the kangaroos existing on their properties.

2.2 LICENSING AND COMPLIANCE

Objective: Maintain effective regulation of the commercial kangaroo industry through licence and tag procedures, and monitoring of compliance.

Licences and Tags

The commercial Euro industry in Western Australia will be closely regulated via a number of licence and tag procedures. An Open Season Notice has been gazetted for Euros pursuant to section 14(2)(a) of the *Wildlife Conservation Act 1950* and has been declared for parts of Western Australia. Within the areas defined in that Open Season Notice, licensed kangaroo shooters may harvest Euros so long as they have prior written authorisation from the owner or manager of the lands from which the kangaroos are to be taken. A copy of that written authorisation must be provided to the DEC and the properties to which the authorisation(s) apply must have been endorsed on each kangaroo shooter's licence. No changes can be made to the shooting venues without the authorisation of the Director General of the DEC.

Kangaroos may only be shot by a licensed kangaroo shooter pursuant to Regulation 6 of the *Wildlife Conservation Regulations 1970*. Conditions attached to that licence stipulate that all shooting is to be carried out in accordance with the *Code of practice for the Humane Shooting of Kangaroos*, and that only kangaroos killed in accordance with the Code of Practice may be delivered to a kangaroo processor. Only high-powered centrefire rifles of at least .222 calibre and licensed under the Western Australian *Firearms Act 1973* may be used to harvest kangaroos.

All carcasses taken under each shooter's licence must be directed either to an approved chiller facility owned by the shooter and that must be located at a registered venue specified on the shooter's licence, or to an approved chiller facility owned by a licensed kangaroo processor and is located at a registered venue specified on the processor's licence.

All carcasses or skins taken in the field must have an approved tag attached to them at all times when in transit to authorised chillers, to licensed processors and while on the premises of licensed processors and until immediately before processing commences.

Licensed kangaroo shooters, processors and skin dealers are all required to submit monthly returns in an approved format. Non-compliance may result in prosecution and or the cancellation of the relevant licence.

KANGAROO SHOOTER

Licence issued under *Wildlife Conservation Regulations 1970*

Regulation 6

Allows:

The licence holder to take kangaroos by means of a firearm on a property that falls within the area described in the *Open Season Notice for Euros*, and to sell the carcasses or skins to a *Kangaroo Processor*.

Relevant detail:

- The licence holder must comply with all relevant provisions of the Act and Regulations.
- The licence holder must also hold a current Firearms Licence pursuant to the *Firearms Act 1973* and only use firearms that are of a centrefire type and greater than .222 calibre.
- The licence holder may only take Euros in accordance with the conditions of the Open Season Notice for Euros published in the Government Gazette.
- The licence holder may only shoot Euros on a property for which they have received written authorisation from the property owner or manager and those property details are endorsed on their current shooter's licence.
- All *kangaroos* must be shot in accordance with the *Code of Practice for the Humane Shooting of Kangaroos*.
- The licence holder must affix to each carcass an approved tag. The tag must be valid for the species.
- The licence holder must not deliver to a processor a kangaroo that has killed with a shot to any part of the body other than the brain.
- The licence holder must carry their licence on them at all times while operating in the field and provide the licence to any authorised officer on request.
- The licence holder must supply returns to DEC in the approved format and at specified dates.

KANGAROO PROCESSOR

Licence issued under *Wildlife Conservation Regulations 1970*

Regulation 7

Allows:

The licence holder to process Euro meat products and skins.

Relevant detail:

- Licence holder must comply with all relevant provisions of the Act and Regulations.
- The licence holder must only accept kangaroo carcasses from a licensed *Kangaroo Shooter*.
- The licence holder must only accept kangaroo carcasses that have an approved tag affixed.
- The licence holder must supply returns to the DEC in the approved format and at the specified dates.
- The licence holder must not accept any carcass that has not been taken with a single shot to the brain.

KANGAROO SKIN DEALER

Licence issued under *Wildlife Conservation Regulations 1970*

Regulation 10

Allows:

The licence holder to keep and sell kangaroo skins.

Relevant detail:

- The licence holder must only purchase and tan skins that have an approved tag affixed and that have been purchased from a person licensed to take or sell such skins.

IMPORT OR EXPORT LICENCE

Licence issued under *Wildlife Conservation Regulations 1970*

Regulations 18 (Export) and 19 (Import)

Allows:

The licence holder to export or import kangaroo products.

Relevant detail:

- Every consignment of kangaroo products must be accompanied by an import or export licence issued by the DEC.
- Licences are only valid for single consignments and for the date(s) specified on the licence.
- Licences to export kangaroo products will only be issued if the relevant authority in the State or Territory to which the consignment is destined approves the importation of the fauna to that State or Territory.

NB: Export of kangaroo products from Australia requires a separate permit issued by the Australian Department of the Environment and Water Resources.

Monitoring of Compliance

The DEC is responsible for overseeing enforcement and monitoring of compliance with the *Wildlife Conservation Act 1950* and *Wildlife Conservation Regulations 1970* and specified conditions of licences. Specialist investigations and compliance staff, may be involved in compliance or enforcement issues that relate to Euro management. At least six DEC Wildlife Officers are involved in compliance and enforcement issues within the commercial Euro industry in regional areas on a regular basis, and a further 13 Wildlife Officers are available to assist them and to also monitor compliance by licensees located in the Perth metropolitan area.

Non-specialist operational and administration staff that operate within the Kangaroo Management Program of the DEC are involved in compliance checks on a regular basis. All serving Western Australian Police Officers and Fisheries Inspectors are *ex officio* Wildlife Officers under the Act and may also conduct compliance checks and operations on behalf of the DEC.

DEC officers will conduct regular and random checks of Euros stored at registered field chillers and kangaroo processing works. Each approved kangaroo tag carries a unique identification number, and is valid for a particular species (colour coded) and is registered to a Kangaroo Shooter or Kangaroo Processor. This number can be used to track a carcass detailing when and where it was taken, by which Kangaroo Shooter, and to which Kangaroo Processor it was sold.

Carcasses are inspected for compliance with the *Code of Practice for the Humane Shooting of Kangaroos*. Ensuring compliance with the Western Australian *Health Act* and the relevant regulations relating to game meat is the responsibility of officers of the Western Australian Health Department.

Kangaroo Shooters and Kangaroo Processors are required to submit returns to the DEC on a monthly basis. The DEC maintains a computerised database that stores this return information along with all licence details. Regular reports will be compiled and checked for compliance, and reports on potential offenders will be provided to field-based compliance staff in a timely manner.

The DEC will regularly review its kangaroo management compliance strategy and operations, to ensure that compliance efforts are strategically targeted and cost-efficient, are adequate to detect non-compliance incidents, and are adequate to promote and enforce compliance with relevant legislation.

Key Actions:

- Maintain effective licence and tag issue procedures for the commercial Euro industry (e.g. Kangaroo Shooters, Kangaroo Processors, Kangaroo Skin Dealers);
- Maintain an up-to-date database and produce reports for regular compliance checks; and
- Conduct regular and random unannounced compliance checks at field chillers and kangaroo processing plants.

Performance Measures:

- Compliance program, including maintenance of database and field monitoring, are adequate to evaluate levels of compliance within the commercial Euro industry.

Measured via:

Number of compliance checks at field chillers and processing plants.

Number of staff involved in compliance that relates to commercial Euro harvest; and

Extent and type of compliance reports produced by database.

- Levels of compliance with legislation (*Wildlife Conservation Act*, Regulations under this Act, Conditions of Licences) maintained above 90% and approach 100% within the commercial Euro industry in Western Australia. Measured via:
Number of non-compliance incidents and explanations.

2.3 IMPACTS OF COMMERCIAL HARVEST ON EUROS

Objective: Improve understanding of the impacts of sustainable commercial harvest on Euros, their habitat and the ecosystems of which they form part.

Monitoring and minimising the potential negative impacts of the activities covered by this plan are classed as high priorities among regular management actions, particularly for the activity of commercial harvest. This is consistent with the requirements of Australian and State legislation that oversee harvesting of native species, and the precautionary approach that is used for management actions covered by this plan.

Monitor Harvest Levels and Reporting

The commercial harvest data for Euros from each region will be collated quarterly. This information will be submitted in annual harvest reports to DEW and presented to stakeholders and the public in the [DEC's annual report](#) or a suitable alternative publicly available product. Harvest figures will also be considered in combination with numbers removed through other methods (e.g. non-commercial destruction), and with environmental conditions that may impact on population size or structure (e.g. drought).

Information on the demographics of the Euro harvest (currently sex and weight) will be obtained through harvest returns submitted by Kangaroo Shooters. Long-term datasets of harvest returns from South Australia, New South Wales and Queensland are currently being analysed as part of a collaborative research project between the Government agencies responsible for the management of kangaroos and external scientists. These datasets have previously been researched in Western Australia and the results published (see Prince 1984b). Potential exists to repeat that research using datasets collected since 1979 and to conduct comparisons between the two periods.

Identify Potential Impacts of Harvest

Potential positive and negative impacts of harvest on Euro populations, habitat and ecosystems are discussed in Appendix 3. Within Western Australia, these impacts are likely to vary both spatially and temporally.

The following recommendations are given to improve understanding of the impacts of commercial harvest:

1. Identify all potential positive and negative impacts to Euros, their habitat and ecosystems. Expand on current knowledge through regular perusal of scientific literature, results of previous actions, and consultation with key stakeholders and community.
2. Develop ways to monitor the presence of the impacts identified in (1).
3. Identify or develop management controls that can be implemented to minimise or prevent negative impacts.

Information to assist this process may be obtained through an adaptive management approach or through current research projects which are taking place in other parts of Australia.

Key Actions:

- Record and analyse number and sex of Euros taken through commercial harvest;
- Submit annual reports to DEW by 31 March detailing numbers removed in the preceding year through commercial harvest and other methods (e.g. non-commercial destruction under the provision of damage mitigation permits) as well as carcass weight and harvest sex ratios;
- Submit annual compliance and special situation reports to DEW in terms of compliance investigations conducted, the results of these and any significant results from ongoing compliance checks and premises/business inspections, as well as special investigations conducted and any unusual occurrences of significance in terms of disease, pests, floods, drought etc.
- Use literature survey and consultative techniques to identify all potential impacts of harvest on Euros, their habitat and ecosystems.

Performance Measures:

- Potential impacts of harvest documented and monitored in a way that allows for the development of management controls to minimise the potential negative impacts of harvest on Euros, habitat and ecosystems. Measured via:
 - Number of regions with documented totals of commercial destruction and other methods (e.g. non-commercial destruction under the provision of damage mitigation permits);
 - Annual compliance and special circumstances report prepared and submitted, and;
 - A report submitted on the extent and type of monitoring conducted to detect potential Euro population impacts.
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Aim 3. Animal Welfare

Adhere to best practice animal welfare standards in conservation and management programs for kangaroos

Minimisation of animal suffering is a key aim of the management of Euros in Western Australia. All reasonable efforts will be made to ensure management actions covered within this management plan are humane and minimise animal suffering.

Regular reviews of the humaneness of Euro management policy and practice will be conducted, and modifications to existing practice will be made as required. Any research on kangaroos conducted by the DEC requires approval from the DEC's Animal Ethics Committee and any research conducted by external parties requires the approval of properly constituted independent animal ethics committee and a scientific purposes licence (Regulation 17) issued by the DEC.

3.1 MAXIMISE COMPLIANCE WITH ANIMAL WELFARE LEGISLATION

Objective: **Maximise compliance with the *Code of Practice for the Humane Shooting of Kangaroos* and the *Western Australian Animal Welfare Act 2002*.**

All Euros taken in Western Australia under the *Wildlife Conservation Act* must be killed in accordance with the *Code of Practice for the Humane Shooting of Kangaroos* (published by Environment Australia, Second Edition, revised 1990 and last reprinted in 1998, or any subsequent nationally-endorsed code that replaces that document. This requirement is enforced for all licences that allow for destruction of kangaroos.

To maximise compliance with the *Code*, a copy of this document is distributed to Kangaroo Shooters upon receipt of their initial licence, and upon every occasion the *Code* is revised, or whenever a Kangaroo Shooter requests a copy. All regional staff that may issue destruction licences will be informed of the *Code* and its requirements.

It is a licence condition in Western Australia that all kangaroos taken for the commercial industry are taken humanely, as identified in the *Code*. It is also a licence condition that no kangaroos may be accepted for processing unless they have been killed by a single shot to the brain. There will be zero tolerance with variations from these licence requirements, with enforcement action taken where breaches are detected.

Since January 1, 2006 it has been mandatory for any licensed shooter or prospective shooter to have successfully completed both a training course for commercial shooters of kangaroos for human consumption and pet food currently run by the Western Australian Department of Health [this course is the same course offered by the Open Training Education Network (OTEN) of TAFE New South Wales] and a shooting accuracy test that has been developed by the Professional Shooters Association of Western Australia and endorsed by the DEC.

A recent report investigating the extent of compliance with the *Code* found that 95.1% (95% confidence interval: 90.7%-97.5%) of carcasses from commercially harvested kangaroos in Western Australia were head-shot (RSPCA Australia, 2002). This result was comparable to the National average of 95.9% and a considerable improvement from the 1985 State average of 81.0%. The DEC will continue to strive to improve these figures through regular examination and review of compliance and enforcement strategies.

As of 1 January 2001 the DEC has made it a licence condition that prohibited kangaroo shooters from selling, and kangaroo processors from accepting, carcasses from animals that had not been killed with a single shot to the brain. This zero tolerance policy will be continued and will be enforced during the life of this plan.

The DEC is participating in the review of the *Code*, and will distribute and enforce any revised version of the *Code* (once completed) to all kangaroo shooters and kangaroo processors.

Administration of the newly established Western Australian *Animal Welfare Act 2002* is not the responsibility of the DEC. However, steps will be taken to ensure that all licensed kangaroo shooters are made aware of the existence of this new piece of legislation and appreciate those sections of the Act that have relevance to their commercial harvest activities.

Compliance with animal welfare legislation is a priority for DEC staff conducting checks of field chillers and meat processing plants. DEC officers will routinely check for compliance with the requirements of the *Code of Practice for the Humane Shooting of Kangaroos* and the *Animal Welfare Act 2002*. Most DEC Wildlife Officers are also authorised as general inspectors under the *Animal Welfare Act* and are able to investigate and prosecute breaches of the *Animal Welfare Act*.

Key Actions:

- List compliance with the *Code of Practice for the Humane Shooting of Kangaroos* as a condition of licence for all licences that allow for destruction of Euros;
- Distribute *Code of Practice for the Humane Shooting of Kangaroos* as part of licence issue processes;
- Participate in the review of the *Code of Practice for the Humane Shooting of Kangaroos*;
- Require the satisfactory completion of a competency test a mandatory prerequisite for new licence applicants and a requirement for licence renewal for current licensees involved in the shooting of Euros; and
- Include animal welfare checks as part of routine compliance inspections.

Performance Measures:

- Levels of compliance with animal welfare legislation maintained at or near 100% for all actions detailed within this management plan. Measured via:
 - Number of non-compliance incidents and expiations;
 - Extent of monitoring and compliance activities;
 - Extent and type of anecdotal reports and public concerns; and
 - Results of commissioned reviews and reports.

Aim 4. Communication and Education

Ensure effective communication and education throughout the community

The public profile of Euro management in Western Australia is low-moderate, in part due to the politic nature of specific management objectives, in part due to the modest number of stakeholders involved in the commercial Euro industry. The maintenance of effective communication links between the DEC, industry stakeholders, regional land management and conservation groups, and the wider community is considered an important component to the success of the program. The DEC will also focus on the development of strong links with other kangaroo and wildlife management organisations within Australia.

Effective communication structures are essential for adaptive management experiments, which require high levels of stakeholder involvement. Both industry and community are likely to benefit from their involvement, by the incorporation of their feedback into future management policies and practices for Euros.

4.1 PROMOTE KANGAROO MANAGEMENT PROGRAM

Objective: **Promote the Western Australian Kangaroo Management Program through public education and consultation with stakeholders and the community.**

The Western Australian Euro WTO will be promoted to the commercial kangaroo industry and the general public. Promotion may include the use of radio and print media, and attendance at scientific conferences and rural field days. A copy of this management plan will be placed on the DEC's website (see http://www.naturebase.net/about_calm.html) and hard copies will be made available to anyone requesting them. Annual quota allocations and harvest data for previous years and the current year's quota will also be made available to the public via these mechanisms. Annual reports on the program will also be provided to DEW.

The DEC will develop factual information sheets for the major stakeholders in the commercial kangaroo industry, including landholders, regional Natural Resource Management (NRM) groups, kangaroo shooters and kangaroo processors. Information sheets will cover background information on commercial harvest and detail current legislation, licence procedures and conditions. Fact sheets will also be developed for the general public, schools and interest groups, providing an easy-to-read synopsis of Euro management in Western Australia. Fact sheets will promote the need to control total grazing pressure, including that of Euros, to assist conservation of biodiversity. For the purpose of public education, these fact sheets will be provided in combination with material detailing the conservation of threatened macropod species.

Key Actions:

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- Promote the Western Australian Kangaroo Management Program, and particularly this WTO, through radio and print media and attendance at scientific conferences and field days;
 - Maintain information on relevant to this plan on the DEC website as a point of access for the general public; and
 - Develop fact sheets for major stakeholders in the commercial Euro industry and the general public.

Performance Measures:

- Western Australian Kangaroo Management Program promoted and explained in a manner that provides opportunities for both the commercial kangaroo industry and the general community to be adequately informed on Euro management issues and practices. Measured via:
 - Number of media submissions and requests;
 - Extent and type of feedback received by the DEC; and
 - Amount of consultation and communication with targeted groups.

4.2 INDUSTRY REFERENCE GROUP

Objective: Continue to promote and support an industry group to guide the development of the commercial *kangaroo* industry in Western Australia.

The DEC has supported a reference group for the commercial kangaroo industry since 1971, when the Kangaroo Management Advisory Committee (KMAC) was formed. The KMAC provides an opportunity for all stakeholder organisations to actively participate in directing the future development of the commercial Euro industry in Western Australia.

The current terms of reference of KMAC include:

1. Provision of a forum for discussion and policy development between key industry and regulatory groups;
2. Identification of key opportunities and threats to the development of the kangaroo industry;
3. Identification of issues relating to product marketing and to research and development efforts; and
4. Development of clear communication structures between decision-making groups and participants in all sectors of the industry.

Members are appointed following nomination by their respective organisations and stakeholder groups. As at November 2006, membership of KMAC was comprised of representatives from each of the following groups:

Department of Environment and Conservation (2);
Department of Agriculture and Food (2);
Pastoralists and Graziers Association of Western Australia (Inc) (2);
The Western Australian Farmers Federation (Inc) (2);
Kangaroo shooters (2); and

Kangaroo processors (2).

The DEC provides secretarial and executive officer support to the group. Terms of office are currently appointed for a period of three years. Meetings are convened annually, or more often if required, and non-government members qualify for sitting fees and reimbursement for travel at standard rates approved for use within the Government of Western Australia. The group currently reports to the Western Australian Minister for Environment.

Key Actions:

- Convene annual (or more often as required) meetings of the Kangaroo Management Advisory Committee; and
- Provide executive officer and secretarial support for the Kangaroo Management Advisory Committee.

Performance Measures:

- Annual meetings of the Kangaroo Management Advisory Committee allow for the investigation of key kangaroo management issues, and facilitate the adoption of revised management procedures within the Western Australian Kangaroo Management Program. Measured via:
 - Extent and type of issues covered by the Kangaroo Management Advisory Committee;
 - Number of recommendations from Kangaroo Management Advisory Committee to the Western Australian Kangaroo Management Program; and
 - Extent of correspondence between Kangaroo Management Advisory Committee and other parties.

4.3 PROMOTE RELEVANT LEGISLATION AND POLICY

Objective: Promote legislation, policy and guidelines relevant to conservation and management of kangaroos.

Kangaroo management in Western Australia is influenced and regulated by a number of pieces of Australian and State legislation and policy (Appendix 1). This legislation includes the *Wildlife Conservation Act 1950*, which provides for protection of native species (Section 14), the taking of protected species (Section 15) and hunting and food gathering by Aborigines for non-commercial purposes (Section 23[1]). Other key guidelines or legislation for kangaroo management in Western Australia include: the *Conservation and Land Management Act 1984* as amended, the *Land Administration Act 1997*, the *Agriculture and Related Resources Protection Act 1976* and the *Native Title Act 1983*, the *Animal Welfare Act 2002* and the *Code of Practice for the Humane Shooting of Kangaroos*.

The DEC will aim to promote relevant legislation, policy and guidelines to the commercial Euro industry and the wider community, through one or more of the following measures:

1. Distribution of relevant legislation/policy as part of a licence issue process;
2. Inclusion of legislation/policy details and requirements on fact sheets for industry and community; and

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3. Promotion of legislation/policy during media submissions and correspondence.

All staff that work on the Western Australian Kangaroo Management Program will maintain a current awareness of relevant legislation and policy through regular information transfer or training.

Key Actions:

- Distribute legislation/policy as part of licence issue process where necessary;
- Incorporate promotion of relevant legislation/policy in fact sheets for stakeholders and community; and
- Promote legislation/policy wherever possible through involvement with media and on the DEC website.

Performance Measures:

- Legislation promoted in a manner that provides an opportunity for all stakeholders in the commercial Euro industry and interested members of the community to maintain awareness of relevant legislation. Measured via:
 - Extent of distribution of legislation/policy with licences and fact sheets; and
 - Number of times legislation/policy promoted in media submissions and correspondence.

Glossary

Approved Tag

A tag issued for attachment to the skin or carcass of a kangaroo taken for commercial use.

Commercial Euro Quota

The total number of Euros that can be taken for commercial utilisation in a calendar year.

Ecologically Sustainable Development

Uses the definition of the Australian Government (1990), that ecologically sustainable development is “using, conserving and enhancing the community’s resources so that ecological processes on which life depends are maintained, and the total quality of life now and in the future can be increased”.

Euro

The kangaroo species to which this management plan applies: Euro (*Macropus robustus erubescens*).

Kangaroo Shooter

The shooter who is allowed by licence, to take kangaroos by means of a firearm, and sell carcasses to a Kangaroo Processor.

Kangaroo Processor

The holder of a Kangaroo Processor licence, allowing them to process kangaroo carcasses, and sell whole carcasses, meat products and skins.

Kangaroo Skin Dealer

The holder of a Kangaroo Skin Dealer licence, allowing them to buy, tan and sell kangaroo skins.

Landholder

The owner or occupier of specified lands.

Precautionary Principle

Uses the definition of the Rio Conference on Environment and Development (1992), that the precautionary principle is “where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”. This is recognised as a principle of Ecologically Sustainable Development.

Quota Proposal Document

A document prepared by the Western Australian Department of Environment and Conservation outlining proposed commercial quotas for Euros for the upcoming year will be submitted to Australian Department of the Environment and Water Resources as a requirement under the *Environment Protection and Biodiversity Conservation Act 1999*.

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Appendix 1. Western Australian Kangaroo Management Advisory Committee and Conservation Commission structure and function.

The State Kangaroo Management Advisory Committee (KMAC) was established in 1971. It provides advice to the Minister for the Environment who is responsible for the *Wildlife Conservation Act 1950*. The KMAC membership, including deputies consists (as at November 2006) of representatives of each of the following:

Department of Environment and Conservation (2);
Department of Agriculture and Food (2);
Pastoralists and Graziers Association of Western Australia (Inc) (2);
The Western Australian Farmers Federation (Inc) (2);
Kangaroo shooters (2); and
Kangaroo processors (2).

The Conservation Commission of Western Australia is established by the *Conservation and Land Management Act 1984*. The Commission's functions include the provision of advice to the Minister responsible for the Act on the development of policies for the conservation and management of the flora and fauna of the State, whether on public land or private land. Its membership, as stipulated by S.21 of the Act (in force at September 2002), comprises:

Nine persons appointed by the Governor on the nomination of the Minister for the Environment who, in the opinion of the Minister -

- (a) have knowledge and experience in :
 - (i) the conservation or management of biodiversity;
 - (ii) environmental management, including the management of the natural environment for use for recreational purposes; or
 - (iii) the sustainable use of natural resources; or
- (b) have a particular function or vocational interest relevant to the functions of the Conservation Commission;
and who, in the opinion of the Minister, are able to make a contribution to the functions of the Conservation Commission.

One member is to be a person who, in the opinion of the Minister –

- (i) has knowledge of and experience in Aboriginal cultural and Aboriginal heritage matters relevant to the functions of the Conservation Commission; and,
- (ii) is able to make a contribution to the functions of the conservation Commission.

Appendix 2:

Policy and Legislative Framework for Kangaroo Management in Western Australia

There are a broad range of policies, legislation and guidelines that set a framework for the conservation and management of Euros in Western Australia. Legislation and policy exists at both the Australian (National) and State level, and in addition, there are many plans that operate at the regional or local level which incorporate kangaroo issues, such as regional natural resource management plans.

Key legislation and policy in place at the Australian and State level are shown below.

AUSTRALIAN

- ✦ *Environment Protection and Biodiversity Conservation Act 1999*
- ✦ *Export Control Act 1982*
- ✦ *National Residue Survey Administration Act 1992*
- ✦ *National Residue Survey (Excise) Levy Act 1998*
- ✦ *Native Title Act 1983*
- ✦ *Code of Practice for the Humane Shooting of Kangaroos 1990*
- ✦ *National Kangaroo Management Guidelines (draft)*

STATE

- ✦ *Wildlife Conservation Act 1950*
- ✦ *Conservation and Land Management Act 1984*
- ✦ *Land Administration Act 1997*
- ✦ *Agriculture and Related Resources Protection Act 1976*
- ✦ *Animal Welfare Act 2002*

Appendix 3:

Assessment of the Impacts of this Wildlife Trade Operation

BACKGROUND INFORMATION FOR THIS WILDLIFE TRADE OPERATION

Current Conservation Status of Kangaroos, Distribution and Extent of Habitat

The species of kangaroo covered by this Wildlife Trade Operation is listed as common in both Western Australia and Australia. In addition, this species is not listed on threatened species schedules for Australia or any of the States.

The distribution of Euros in Western Australia is detailed in Pople and Grigg (1999). Information on the annual distribution of Euros in Western Australia will be presented in the quota document submitted to DEW. The current distribution of Euros generally reflects the extent of suitable habitat for this species. The extent of suitable habitat for Euros will be mapped at a finer scale as part of an objective of this WTO (Aim 1: Objective 3).

Background information to Euro populations

The reproductive biology of Euros has been extensively studied (see review in Dawson, 1995). Female Euros are polygamous. Breeding of Euros can occur year round, except under very poor environmental conditions. Euros have a short gestation. Embryos are born at an early stage of development, with further development occurring in the pouch. Under good seasonal conditions, Euros can have three young simultaneously at different stages of development.

Euro populations fluctuate primarily in response to seasonal conditions, such as rainfall and pasture biomass (Caughley, 1987). Survival rates of juveniles and adults are highly variable, with much lower survival of *kangaroos* during drought conditions.

History of Commercial Harvest

The commercial harvest of Euros in Western Australia has been managed by the DEC at the regional level since the early 1971. Historically, commercial harvest was restricted to a commercial utilisation zone, divided into three management regions, and further divided into 20 management areas.

Availability of the Restricted Parts of the State for Harvest

An Open Season Notice for Euros has been declared under the provisions of section 14(2)(a) of the *Wildlife Conservation Act 1950*. Under the provisions of this Notice Euros may only be taken from certain parts of the State, excluding all National Parks, Nature Reserves, Conservation Reserves and lands vested in the Western Australian Conservation Commission and that are managed for the conservation of biodiversity.

Dynamics of Kangaroo Harvest

Recent commercial harvest levels (prior to 2003) in Western Australia have fluctuated around a mean of 4,928 carcasses per annum (range 646-9,879). These

harvest levels represent a mean utilisation of 48.85% of the annually approved commercial harvest quotas. The greatest harvest of Euros in Western Australia has been from Kangaroo Management Regions situated in the northern and central pastoral rangelands of Western Australia.

Commercial harvest is biased towards larger Euros as Kangaroo Shooters are paid on a per kilogram basis. The size dimorphism between the sexes means that more male Euros are harvested than females. Red kangaroos are taken preferentially over Western Grey Kangaroos and Euros, due to their easier accessibility and their larger size. Economic factors and climatic factors both influence Euro harvest in Western Australia. Low commodity prices for kangaroo products can result in a reduced incentive to harvest Euros, relative to the incomes that kangaroo shooters could derive from other species of kangaroo or from working in other industries. Heavy seasonal cyclonic rains can result in limited or no access to large tracts of land that support populations of Euros that would otherwise be subject to harvest. The period of exclusion due to local flooding events can be lengthy (3-5 months).

Economic considerations result in a commercial Euro harvest that is patchy within management regions. Greatest harvest levels occur around easily accessible tracks and terrain. Timbered or rocky areas that are typically occupied by Euros can remain inaccessible to commercial harvest, and act as refuges (along with conservation estate) for Euro populations.

Management of Total Grazing Pressure

This management plan promotes the management of Euros as part of the management of total grazing pressure on pastoral leases in Western Australia. Excessive herbivore (native and introduced) grazing pressure can lead to negative impacts on biodiversity and land condition.

Experience from areas that have had domestic stock removed [e.g. east of Carnarvon in the Central Management Zone; Gardiner (1986a, b); Norbury and Norbury (1993); Norbury *et al.* (1994)] suggest that effective regulation of grazing pressure requires the control of all sources of grazing pressure acting on the land, including domestic stock, feral herbivores such as rabbits and goats, and management of free-ranging kangaroos.

LEGISLATIVE REQUIREMENTS

This WTO for Euros is required to satisfy the requirements of the legislation specified in Section 303FN of the Australian *Environment Protection and Biodiversity Conservation Act 1999*. These requirements include ensuring that this WTO must not be detrimental to the survival of the species covered by this plan, or any relevant ecosystem. In addition, the legislation requires that the impacts covered by this plan on the species and the species habitat are properly assessed, that the plan is ecologically sustainable, and that the plan includes measures to monitor any potential environmental impact(s).

Information to address these issues for Euro management and the activities of this plan are covered below.

Potential Threats to Kangaroo Species

Reviews by Pople and Grigg (1999) and Olsen and Braysher (2000) have detailed potential threats or impacts to kangaroo populations. A summary of these impacts is provided below.

◆ **Environmental impacts**

Drought is likely to be the greatest environmental impact on Euro populations. The rate of increase of Euro populations is strongly linked to rainfall through its impact on pasture availability. Declines of Euro populations during drought are likely to have occurred since prior to European settlement, as Euros were restricted to habitat around permanent waters. The increased availability of water points across the pastoral rangelands means that food resources are now the major limiting factor of Euro populations during drought. Mortality during drought is highest amongst adult males and juveniles (Ealey 1967). Euro populations have high rates of increase when conditions improve.

Flooding may impact on Euro populations through increasing the chances of localised epizootics (see Disease below).

◆ **Habitat loss and modification**

Since European settlement, large tracts of native habitat have been cleared to make way for agricultural land uses. Native vegetation remains in remnant patches and in National Parks and reserves and in a modified form in pastoral rangelands. Euros have generally benefited from these changes to land use, although heavily cleared areas are thought to be detrimental (Pople, 1989).

◆ **Disease**

Disease outbreaks have been reported as causes of mortality in kangaroo populations. Speare *et al.* (1989) have reviewed the diseases of kangaroos. Irregular localised population crashes have been associated with lumpy jaw, arbovirus infection, coccidiosis and choroid blindness. Disease by itself is not considered an important mortality factor, but may have a compensatory effect in combination with stressful conditions such as over-crowding, lack of food, or periodic flooding.

◆ **Predation**

Predators of large macropods such as Euros include dingoes, wedge-tailed eagles, foxes and humans. Robertshaw and Harden (1989) have identified dingoes and humans as major sources of predation. Mortality due to dingo predation is likely to be low in areas protected by wild dog fences and or where dingo numbers are controlled. More recently foxes have been shown to be significant predators of newly emerged joeys for a number of the larger kangaroo species (Arnold *et al.* 1991; Dawson 1995; Banks *et al.* 2000). Non-human predators generally focus on juvenile kangaroos. Predation on *kangaroos* may be influenced by other factors that increase vulnerability, such as poor seasonal conditions. Predation by man on kangaroo populations includes commercial harvest, non-commercial destruction and traditional Aboriginal hunting practices. Current commercial harvest levels are considered sustainable for kangaroo populations (Caughley, 1987). Population monitoring suggests that rainfall remains the main influence on kangaroo populations.

POTENTIAL IMPACTS OF THIS WILDLIFE TRADE OPERATION

Potential impacts of this management plan are considered below for the activities of commercial harvest and management of Euros on National Parks and Nature Reserves. Management controls in place to minimise or monitor these impacts are also detailed.

Impacts on Kangaroos

Commercial harvest could potentially impact on Euros directly via harvest at unsustainable levels, or via demographic or genetic impacts on harvested populations. Animal welfare concerns are a potential impact for all types of destruction.

◆ **Sustainability of Commercial Harvest**

The following factors promote the sustainability of commercial harvest in Western Australia:

1. Commercial harvesting quotas are based on direct monitoring data of Euro populations.
2. Conservative species correction factors are used (see Pople and Grigg, 1999).
3. Commercial harvest quotas are set at levels that are considered ecologically sustainable for Euro populations (Caughley, 1987).
4. Commercial harvest is patchy within Kangaroo Management Regions and individual properties, leaving many areas of (unharvested) refuge habitat.
5. The size of the region harvested is modest in comparison to the large geographic distribution of *kangaroos*.

Management controls are in place within the commercial quota setting system to ensure that harvest levels remain sustainable and to maintain Euro populations within or above specified threshold densities. Annual monitoring allows for any other mortality agents acting on Euro populations to be accounted for in the

setting of annual commercial harvest quotas (e.g. animals lost through drought, disease, or road kill).

Where higher harvest levels are requested as part of an adaptive management strategy, they must be sustainable at the level of regional Euro populations. Full details on harvest levels and strategies will be included in the annual quota document.

Numbers removed through non-commercial destruction are low compared to that taken through commercial harvest. These figures are monitored and compiled regionally in quarterly harvest reports to DEW.

◆ **Demographic impacts of harvesting**

Commercial Euro harvest in Western Australia is biased towards large kangaroos, and more males are taken than females due to size dimorphism. Potential changes to the sex and age structure of harvested kangaroo populations could result, such as harvested populations having a female bias or a lower average age compared to unharvested populations.

Intensive harvesting may change the age structure of Euro populations at particular localities. However, the patchy nature of the harvest will decrease the demographic impacts of harvesting on Euro populations, due to rapid recolonisation of harvested areas by immigrating kangaroos, and the presence of refugia for kangaroos in unharvested areas. Demographic impacts of commercial harvest are mirrored in unharvested Euro populations following drought (e.g. female-bias, less large adults).

Pople and McLeod (2000) have shown that harvesting a kangaroo population going into a drought is likely to have population impacts that are quickly lost as the population recovers from drought. This is because harvesting at the onset of drought removes animals that would otherwise be lost from the population as the drought progresses.

Potential demographic impacts of commercial harvest on Western Australian Euro populations are monitored through carcass sex and weight data provided on harvest returns. There is a management control in place to ensure that there are no irreversible negative impacts on the sex or size structure of harvested Euro populations.

◆ **Genetic impacts of harvesting**

There are concerns that selective harvesting of large macropods such as Euros will lead to impacts on the genetic diversity and fitness of harvested populations. Research (see review by Hale, 2000; report to NSW National Parks and Wildlife Service) suggests that commercial harvesting at current levels has negligible impacts on the genetic diversity and fitness of kangaroo populations, due to:

1. The size of kangaroo populations in relation to the numbers removed through harvesting;
2. Large geographic ranges of genetic kangaroo populations relative to the size of the harvested area. This is in part due to the migration of individuals across large distances; and

-
3. Patchiness of the commercial harvest, and immigration of new individuals into harvested areas.

◆ **Animal Welfare Concerns**

Allowing for a commercial harvest and non-commercial destruction of Euros from the wild has potential impacts on animal welfare. Animal welfare concerns are considered unlikely for actions conducted as part of this WTO, due to:

1. The presence of Australian and State legislation for animal welfare, include the *Code of Practice for the Humane Shooting of Kangaroos*;
2. The enforcement of legislation as a condition of licence for Kangaroo Shooters;
3. The mandatory requirement for training requirements for Kangaroo Shooters to raise standards above those already reported on (RSPCA 2002); and
4. The presence of a compliance program to maximise and monitor compliance with Euro management legislation.

Impacts on Habitat

Impacts on habitat due to actions detailed within this management plan are more likely to be positive than negative. Reduced Euro grazing pressure on palatable vegetation species may lead to an increase in regeneration of these species, and an increase in biodiversity. Regeneration of native vegetation may lead to a reduction in the amount of non-palatable weed species.

Vegetation recovery following Euro management would be most likely in combination with the management of total grazing pressure (i.e. where domestic stock have been removed or stocking rates lowered and numbers of feral herbivores are closely controlled). Ability to achieve the desired vegetation response is likely to depend on the extent of the reduction in Euro grazing, and the length of time of reduced grazing pressure (see Norbury *et al.* 1993; Norbury and Norbury 1993).

Potential negative impacts on habitat include damage to vegetation caused by Kangaroo Shooters driving off tracks. These disturbance events are considered minimal in Western Australia as Kangaroo Shooters tend to operate off already-formed tracks, and the area affected relative to the extent of pastoral rangelands is minute. The impacts of disturbance events to vegetation may vary according to the type of vegetation.

Impacts on Ecosystems or Other Species

There are few potential ecosystem impacts of commercial Euro harvest. There is a potential positive impact on feral species such as foxes and cats, through the presence of Euro carcasses left in the field as a food resource. Commercial destruction is likely to have less impact than animals that are shot and left in the field, as most of the carcass is removed for processing.

There are no likely trophic level impacts of Euro harvest, given the position of Euros in the food chain. The only prey of kangaroos that is likely to increase through reduced Euro numbers is native vegetation. The only native predator that might be

disadvantaged through a reduction of Euro numbers is the dingo, and this is unlikely as dingoes are largely excluded from the main harvest region by the dog baiting programs.

Appendix 4:

Code of Practice for the Humane Shooting of Kangaroos

Endorsed by the Council of Nature Conservation Ministers

The Council of Nature Conservation Ministers (CONCOM) was composed of all Australian, State and Territory Ministers having responsibility for national parks and wildlife. In July 1991 the CONCOM was amalgamated with the Australian and New Zealand Environment Council to form the Australian and New Zealand Environment and Conservation Council (ANZECC).

Addresses of government nature conservation agencies are found on page 5.



Department of the Environment and Heritage

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PREFACE

The Council of Nature Conservation Ministers (CONCOM) is composed of all Australian, State and Territory Ministers having responsibility for national parks and wildlife. CONCOM is advised by a Standing Committee consisting of the Heads of Australian, State and Territory Authorities responsible for national parks and wildlife matters.

This 'Code of Practice for the Humane Shooting of Kangaroos' has been prepared by the CONCOM Special Working Group on Cruelty Aspects of the Taking and Holding of Native Fauna. During the course of its preparation, drafts of the Code were circulated widely for public comment.

The Code sets an achievable standard of humane conduct and is the minimum required of persons shooting kangaroos.

Endorsed in principle by Council on 30 May 1985, the Code is intended to be implemented through education and State and Territory legislation as appropriate. This Code is based on the knowledge and technology available at the time of publication and may need to be varied in the light of new knowledge.

PREFACE TO THE SECOND EDITION

Since the code was originally published, there have been numerous comments on its value and suggestions on its improvement. In particular, the RSPCA and the National Advisory Committee on Kangaroos have recommended a number of changes. An ad hoc Working Group on the Code of Practice for the Humane Shooting of Kangaroos was formed to consider these suggestions and revise the code. The revised code was endorsed by CONCOM on 20 September 1990. Further comments are welcome, and should be forwarded to the Wildlife Management Section, Environment Australia - Biodiversity Group, GPO Box 787, CANBERRA ACT 2601.

INTRODUCTION

This Code of Practice has been produced to ensure that all persons intending to shoot a free-living kangaroo are aware of the welfare aspects pertinent to that activity. In this Code the term 'kangaroo' means all species of the family Macropodidae within the superfamily Macropodoidea and so applies to kangaroos, wallaroos or s, wallabies and pademelons.

All shooting of kangaroos, whether on public or private land, is subject to law. The laws may differ between localities and the Government Wildlife Authority in the state or territory in which the shooting will occur can advise on the relevant provisions. Except where specifically exempted by law, states and territories will require the shooter to have a licence or permit issued by the Government Wildlife Authority and this Authority will specify any conditions or restrictions applying to that licence or permit.

When shooting a kangaroo the primary objective must be to achieve instantaneous loss of consciousness and rapid death without regaining consciousness. For the purposes of this Code, this is regarded as a sudden and painless death. Commonsense is required to assess the prevailing conditions. Where the conditions are such as to raise doubts about achieving a sudden and painless kill, shooting must not be attempted.

The Code is divided into three sections covering the method of shooting, despatch of injured Euros and pouch young and shooting for scientific purposes, and has three schedules specifying firearms, ammunition and points of aim. In each section an introduction provides background to the conditions which must be adhered to by all persons shooting kangaroos.

METHOD OF SHOOTING

The species of kangaroos which are shot differ in size and there is enormous variation in the terrain and prevailing weather conditions at the time of shooting. The combinations of firearms and ammunition are considered adequate to ensure a sudden and painless death for the target animal under most environmental conditions, provided that the shooting is done in accordance with the other conditions set out in this Code. However, it is the shooter's responsibility to ensure a sudden and painless death for target animals, and under unusual conditions firearms and ammunition that exceed the minimum requirements may have to be used.

With a centrefire rifle a sudden and painless death is consistently achieved by the projectile striking the brain of the target animal. Thus the brain is the required point of aim for this class of weapon. Centrefire rifles are specified for all kangaroo shooting except where the smaller wallabies are to be shot in or adjacent to forest or scrub. Such shooting is often carried out in daylight; the animals are flushed at close quarters and are unlikely to be stationary. In these cases the licence or permit issued by the Government Wildlife Authority may authorise the use of shotguns. At ranges up to the maximum specified in Schedule 1 a shotgun will cause a sudden and painless death if the pattern is centred on the head, neck or chest of the target animal. The shooter must be able to place a clear shot into one of these target areas whether the animal is moving or stationary.

Firearms

Conditions

- (i) The minimum specifications for firearms and ammunition are set out in Schedule 1. Kangaroos shall only be shot with a combination of firearms and ammunition that complies with or exceeds those minimum specifications.
- (ii) In the environmental conditions in which the shooter operates the combination of firearm and ammunition selected must ensure the sudden and painless death of each target animal. Evidence of compliance with the minimum specifications in Schedule 1 is no defence in administrative and/or legal proceedings concerning a breach of this Code if the combination used by the shooter has not achieved a consistently sudden and painless kill.
- (iii) Kangaroos must be shot using a centrefire rifle unless use of a shotgun is specifically allowed by the licensing authority.
- (iv) A rifle must be sighted in against an inanimate target before commencing each day's shooting.

Shooting platform

Conditions

- (i) Kangaroos must not be shot from a moving vehicle or other moving platform.

Target animal

Conditions

- (i) The target kangaroo must be clearly visible.
- (ii) When a rifle is used the target kangaroo must be stationary and within a range that permits accurate placement of the shot.
- (iii) When a shotgun is used the target kangaroo must be within the range specified in Schedule 1 and in a position where a clear shot can be fired at the head, neck or chest.

Point of aim

Conditions

- (i) A shooter using a rifle must aim so as to hit the target kangaroo in the brain (see diagram in Schedule 2), except in the case of an injured or wounded animal where a brain shot may be impractical.
- (ii) A shooter using a shotgun must aim so that, whether the target kangaroo is stationary or mobile, it will be hit in the head, neck or chest by the centre of the pattern.

INJURED KANGAROOS AND POUCH YOUNG

No matter how carefully the shooter aims, some kangaroos will not be killed outright. Wounded kangaroos must be dispatched as quickly and humanely as possible.

When killing a wounded animal a brain shot may be impractical. For example, the accurate placement of a shot in the brain may require capture and restraint of the animal; this would increase suffering and be inconsistent with the objective of sudden and painless death. In such circumstances a heart shot may be the most humane means of dispatch. In some special circumstances, where a wounded kangaroo is encountered, it may not be practicable to shoot the animal, as at a practical range the acceptable points of aim may be obscured, and at a close range the use of a high powered rifle may be unsafe. In these special circumstances a heavy blow to the skull to destroy the brain may be the most appropriate and humane means of dispatch. Kangaroo shooters often shoot more than one kangaroo out of a group before driving to the carcasses to retrieve them. This is acceptable provided that where an individual kangaroo is wounded no further kangaroos are shot until all reasonable efforts have been made to dispatch the wounded animal.

Shot females must be examined for pouch young and if one is present it must also be killed. Decapitation with a sharp instrument in very small hairless young or a properly executed heavy blow to destroy the brain in larger young are effective means of causing sudden and painless death.

Larger young can also be dispatched humanely by a shot to the brain, where this can be delivered accurately and in safety.

Conditions

- (i) The shooter must be certain that each animal is shot dead before another is targeted.
- (ii) If a kangaroo is thought to be alive after being shot, every reasonable effort shall be made immediately to locate and kill it before any attempt is made to shoot another animal.
- (iii) When located, wounded animals must be killed by a method that will achieve a rapid and humane death, where practical by a shot to the brain.

- (iv) Under circumstances where a shot to the brain of an injured animal is impractical or unsafe, a shot to the heart is permissible (see Schedule 3).
- (v) In circumstances where, for dispatch of a wounded kangaroo, a shot to either the brain or heart is impractical or unsafe, a very heavy blow to the rear of the skull to destroy the brain (see Schedule 2) is permissible. To ensure a humane kill, a suitably hard and heavy blunt instrument must be used (e.g., metal pipe, billet of wood etc., carried for this purpose).
- (vi) If a female has been killed, the pouch must be searched for young as soon as the shooter reaches the carcass.
- (vii) The pouch young of a killed female must also be killed immediately, by decapitation or a heavy blow to the skull to destroy the brain, or shooting.

SHOOTING FOR SCIENTIFIC PURPOSES

Permits to shoot kangaroos for scientific purposes are sometimes requested. Because of the circumstances and locations in which such shooting may take place, and because of specific research requirements (e.g. to obtain anatomical items such as intact skulls for diagnostic examination and museum reference collections), it may be necessary to allow exemptions from the general conditions such as point of aim and shooting platform.

Such variations must never detract from the primary responsibility of the shooter to provide a sudden and painless death for the target animals.

Conditions

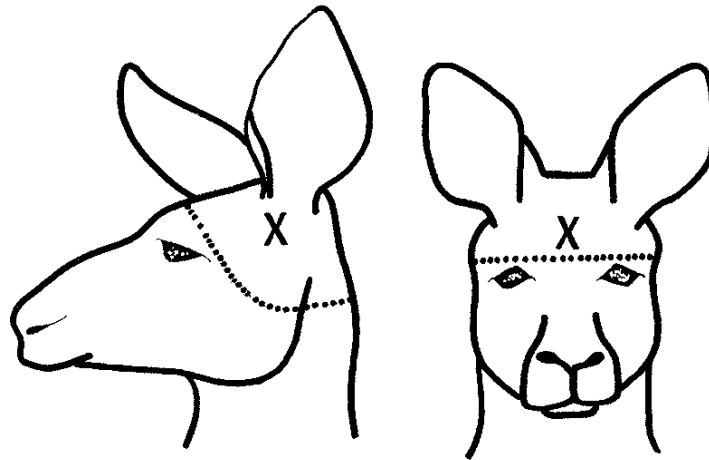
- (i) The provisions of this Code shall apply to the shooting of kangaroos for scientific purposes except where express provision to the contrary is included in the permit/licence under which the animals are shot.
- (ii) The licensing authority should only issue such a permit/licence if it is satisfied that;
 - (a) the Animal Care and Ethics Committee (or equivalent) at the relevant institution has examined and approved the proposal; and
 - (b) the method of shooting will result in sudden and painless deaths for the animals authorised to be killed.
- (iii) The waiving of any requirements of this code shall not relieve the shooter of the absolute requirement to provide a sudden and painless death for the target kangaroos.

SCHEDULE 1: Minimum Specifications for Firearms and Ammunition

(Note: Ammunition must be loaded to at least the specifications shown to ensure a sudden and painless death for the target animals).

Species	Prescribed firearm and firearm/ammunition combinations
Group 1	
Red kangaroo (<i>Macropus rufus</i>), Eastern grey kangaroo (<i>M. giganteus</i>)	A centrefire rifle, fitted with a telescopic sight. Nominal bore size 0.569cm (0.224”) and centrefire case capacity of at least .222 Remington.
Western grey kangaroo (<i>M. fuliginosus</i>) or wallaroo (<i>M. robustus</i>)	Ammunition shall have an expanding projectile (soft or hollow point) of not less than 324 mg (50 grains) and provide a minimum muzzle energy of 1542 Joules (1137 foot-pounds).
Agile wallaby (<i>M. agilis</i>) Whiptail wallaby (<i>M. parryi</i>)	[.222 Remington with 50 grain projectile must be loaded to achieve a muzzle velocity of 975 m/sec (3200 ft/sec) to achieve this minimum muzzle energy].
Group 2	
All members of the family Macropodidae other than those listed in Group 1.	<p>a) A centrefire rifle fitted with a telescopic sight. Calibre and ammunition sufficient to achieve at least a minimum muzzle energy of 975 Joules (720 foot-pounds) {e.g. .22 Hornet; 45 grain projectile and loaded to achieve muzzle velocity (m.v.) of at least 2690 ft/sec, or .17 Remington; 25 grain projectile loaded to achieve m.v. of at least 3610 ft/sec}.</p> <p>or</p> <p>b) Shotguns of 12 gauge or larger, using No.2, 1, BB or larger shot. Maximum range for shotguns of 30 metres.</p> <p>Shotgun cartridges must be loaded to provide a dense and random pattern (e.g. 12 gauge cartridge requires a shot load no less than 36g = 1.25 oz = 63 BB shot pellets).</p>

SCHEDULE 2: Point of Aim (X) for a Shot to the Brain and Location of the Brain. (All kangaroos).



Note: A shot to the side of the head is preferred as it is a larger target area.

SCHEDULE 3: Point of Aim (+) for a Shot to the Heart. (Applicable only as described for injured Euros and specified shotguns).



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