

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to REJECT a proposal to list the Common Wallaroo *Macropus robustus* Gould 1841 as a Vulnerable species in Part 1 of Schedule 2 of the Act. Rejection of nominations is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. *Macropus robustus* Gould 1841 (family Macropodidae), known as the Common Wallaroo in eastern Australia and Euro in inland and western Australia, is a large, stocky, highly sexually dimorphic macropod. Head-body to 1085 mm (males), 831 mm (females); tail to 901 mm (males), 749 mm (females); weight to 60 kg (males), 28 kg (females). The fur is long and shaggy. Highly variable in colouration across range although males are typically darker than females. Generally paler ventrally and on lower limbs and tail, although digits are dark. Ear margins and eye-lids pale. Muzzle black and hairless. Males vary from black or dark grey through reddish brown to bright brick-red. Females vary from grey through brown to reddish-brown (Menkhorst and Knight 2001; Johnson 2006; Clancy and Croft 2008).
2. *Macropus robustus* is endemic to Australia and widely distributed across the continent apart from Tasmania, southern Western Australia and most of Victoria. Four subspecies are recognised: *M. r. robustus* from eastern Australia, *M. r. erubescens* from inland and western Australia, *M. r. woodwardi* from tropical northwestern Australia and the diminutive *M. r. isabellensis* from Barrow Island, Western Australia (Menkhorst and Knight 2001; Clancy and Croft 2008). *Macropus robustus* is found throughout most of New South Wales (NSW); *M. r. robustus* from the coast to the western slopes of the Great Dividing Range, and *M. r. erubescens* on the western slopes and plains. Although *M. robustus* is most common on escarpments, steep slopes, rocky hills and ridges within eucalypt forest and woodland, it can also occur in flat terrain in woodland, shrubland or grassland often near watercourses (Menkhorst and Knight 2001; Clancy and Croft 2008; Dawson 2012).
3. *Macropus robustus* is largely nocturnal or crepuscular, spending the day resting in a cave or in the shade of rocks or dense vegetation. Individuals become active in the late afternoon or early evening and often move into more open grassy areas to feed throughout the night (Croft 1981; Clancy and Croft 2008; Dawson 2012). *Macropus robustus* is primarily a grazer, with a variety of grasses comprising the vast majority of the diet, although some forbs and browse are also consumed (Ealey and Main 1967; Ellis *et al.* 1977; Taylor 1983; Clancy and Croft 2008).
4. *Macropus robustus* is mostly solitary, although small fluid groups of 2-3 are also observed (Croft 1981; Dawson 2012). Home ranges are ~100-300 ha, and larger in males than females (Jarman and Taylor 1983; Clancy and Croft 1990; Croft 1991). Most individuals appear to be largely sedentary, although dispersal up to 15 km has been observed (Ealey 1967a; Jarman and Taylor 1983; Croft 1991; Clancy and Croft 1992; Dawson 2012). Some individuals may also move larger distances in response to temporary changes in resource abundance (Clancy and

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Croft 1992). Local population sizes are known to fluctuate widely with seasonal conditions, with densities reaching as high as 80 per km² (Clancy and Croft 1992, 2008; Dawson 2012).

5. *Macropus robustus* is monovular and polyoestrus (Tyndale-Biscoe and Renfree 1987). Breeding is continuous and occurs throughout the year, although births may be reduced or cease during drought (Ealy 1967b; Russell and Richardson 1971; Poole and Merchant 1978). A single young, born after a gestation period of about 33 days, spends around 8-8.5 months in the pouch and is weaned at 15-17 months (Poole and Merchant 1978). Females come into oestrus and mate shortly after giving birth (post-partum oestrus) with the resultant blastocyst held in suspended animation (i.e. embryonic diapause) until the suckling stimulus of the incumbent young is reduced. Development of the blastocyst then recommences with a young being born about the time the incumbent young is permanently evicted from the pouch (Poole and Merchant 1978; Tyndale-Biscoe and Renfree 1987). Females reach sexual maturity from 14 months and males from 18 months (Poole and Merchant 1978). The generation time is estimated to be 7-10 years (Dawson 2012).
6. Of the four *Macropus robustus* subspecies, only the insular *M. r. isabellensis* is listed as threatened under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999. *Macropus robustus* is listed as 'least concern' by the IUCN (2013) due to its wide distribution, large population, occurrence in protected areas and lack of major threats (IUCN 2013). In some areas *M. robustus* is regarded as an agricultural pest and periodic local culling is undertaken (Calaby and Grigg 1989; DOE 2012). The species is also commercially harvested in NSW, Queensland and South Australia (DOE 2012).
7. Due to the preference of *Macropus robustus* for rugged terrain and their secretive nature, obtaining accurate population estimates is more difficult than for the other three large macropod species in NSW (Clancy and Croft 1992; Southwell and Sheppard 2000; Dawson 2012) and typically result in substantial under-estimates. For example, in one study, density estimates using helicopter surveys were found to be 2-3 times lower than ground-based estimates (Clancy *et al.* 1997). Also there are no widespread aerial survey data for *M. robustus* in NSW collected by the Office of Environment and Heritage (OEH) as part of the Kangaroo Management Program (KMP) to be used as an index of abundance. Triennial helicopter survey data are available from 2001 for the three Kangaroo Management Zones (KMZ) on the Northern Tablelands (Payne 2011) which represent <10% of the distribution of *M. robustus* in NSW (Clancy and Croft 2008). However, the usefulness of these data in detecting long-term population trends is somewhat compromised by the changes to survey methodology that have occurred over this period and the data's low precision (Cairns *et al.* 2008, 2011). Overall the data appears to show a decline in *M. robustus* abundance on the Northern Tablelands in all three zones, which in 2010 then plateaued in the Armidale and Glen Innes zones but continued to decline in the Upper Hunter zone. Population densities of *M. robustus* are known to fluctuate in response to seasonal conditions and animal movement (Clancy and Croft 1992; Pople 2006). For example, over a four year period, at a site in western NSW densities of *M. robustus* varied between 2 and 20 per km² (Clancy and Croft 1992). Therefore,

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the decline apparent in the OEH data may be the result of seasonal factors since NSW has received below average rainfall for most of the last decade (2001-2010). There are insufficient data to establish any long-term trend in the abundance of *M. robustus* in NSW.

8. Location records for *Macropus robustus* from the Atlas of Living Australia (ALA May 2013) may give a guide to changes in geographic distribution over the last three generations. However, for *M. robustus*, some 10% of records are pre-1982 and these records only cover a subset of the current distribution. 90% of records are post-1982 and these cover the full extent of the distribution of *M. robustus* in NSW. Consequently, there are not sufficient records to form a baseline for inferring any change in the last three generations. Hence no inference about changes in geographic distribution of *M. robustus* in NSW can be made.
9. Due to the preference of *Macropus robustus* for hilly and rocky terrain (which is usually unsuitable for intensive agriculture), it is likely to have been less impacted by European settlement than the other large kangaroo species (Dawson 2012). In some areas habitat is likely to have been lost to urbanisation and infrastructure construction, while in other areas *M. robustus* appear to have benefitted from the provision of watering points, forest/woodland fragmentation and the establishment of improved pasture (Dawson 2012). For example, in the NSW Northern Tablelands the density of *M. robustus* was 54 per km² in an area with improved pasture but 7 per km² in an unimproved area (Taylor 1984). The provision of water points for domestic livestock may have also increased the density of *M. robustus* in some areas (Ealey 1967a). However, there are insufficient data for the last three generations to infer changes to habitat quality across the range of *M. robustus* in NSW.
10. There is no evidence of a reduction in genetic diversity within *Macropus robustus* in NSW. Hale (2004) found no evidence harvesting resulted in loss of diversity in *M. robustus*, although this study had limited sampling in NSW and examined a small number of loci.
11. The geographic distribution of *Macropus robustus* in NSW is not considered to be moderately restricted. Based on ALA (May 2013) records, the extent of occurrence (EEO) for *M. robustus* was estimated to be approximately 848,000 km² covering the distribution of the species in NSW. The EEO is based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2011), and extending this to the South Australia border in line with a continuation of the distribution into that state. The area of occupancy (AOO) of *M. robustus* was estimated to be at least 4,480 km², based on 1120 2 x 2 km grid cells, the scale recommended for assessing AOO by the IUCN (2011). This estimate only included cells placed over known ALA records and is hence an underestimate of actual AOO as the species will also occur in areas between known records.
12. The estimated total number of mature individuals of *Macropus robustus* in NSW is considered to not be low or moderately low. The triennial helicopter surveys conducted by OEH for the KMP have estimated that in the three north-eastern NSW Kangaroo Management Zones (which represents <10% of the species'

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state-wide distribution) the *M. robustus* population size exceeded 85,000 between 2001-2010 (Payne 2011). In addition, a helicopter line transect survey in the Barrier Ranges, western NSW during the late 1990s estimated the *M. robustus* population to be 18,000 individuals (Southwell and Shepherd 2000). Even allowing for the presence of immature animals, sampling uncertainty and experimental error, it is highly likely that the total number of mature *M. robustus* individuals is not low or moderately low.

13. In view of the above the Scientific Committee is of the opinion that the Common Wallaroo *Macropus robustus* Gould 1841 does not meet any of the criteria for listing of Vulnerable species in the *Threatened Species Conservation Regulation* 2010, and therefore is not eligible to be listed as a Vulnerable species in Schedule 2 of the Act.

Dr Mark Eldridge
Chairperson
Scientific Committee

Exhibition period: 01/05/15 – 26/06/15

Proposed Gazettal date: 01/05/15

References:

- ALA (Atlas of Living Australia) (2013) <http://www.ala.org.au/> (accessed 13 May 2013)
- Cairns SC, Lollback GW, Bearup D (2011) Kangaroo monitoring: Northern Tablelands Harvest Zones – Redesign and analysis of helicopter surveys. Report to the NSW Office of Environment and Heritage, Sydney.
- Cairns SC, Lollback GW, Payne N (2008) Design of aerial surveys for population estimation and the management of macropods in the Northern Tablelands of New South Wales, Australia. *Wildlife Research* **35**, 331–339.
- Clancy TF, Croft DB (1990) Home range of the Common Wallaroo, *Macropus-robustus erubescens*, in far western New South Wales. *Australian Wildlife Research* **17**, 659–673.
- Clancy TF, Croft DB (1992) Population dynamics of the common wallaroo (*Macropus robustus erubescens*) in arid New South Wales. *Wildlife Research* **19**, 1–16.
- Clancy TF, Croft DB (2008) Common wallaroo *Macropus robustus*. In ‘The mammals of Australia (3rd edn).’ (Eds S Van Dyck, R Strahan) pp. 346–348. (New Holland: Sydney)
- Clancy TF, Pople AR, Gibson LA (1997) Comparison of helicopter line transects with walked line transects for estimating densities of kangaroos. *Wildlife Research* **24**, 397–409.

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- Croft DB (1981) Social behaviour of the euro, *Macropus robustus* (Gould), in the Australian arid zone. *Australian Wildlife Research* **8**, 13–49.
- Croft DB (1991) Home range of the euro *Macropus robustus erubescens*. *Journal of Arid Environments* **20**, 99–112.
- Dawson TJ (2012) ‘Kangaroos (2nd edn)’ (CSIRO Publishing: Melbourne)
- DOE (Department of Environment) (2012) ‘Wild harvest of Australian native animals.’
<http://www.environment.gov.au/topics/biodiversity/wildlife-trade/australian-native-plants-and-animals/wild-harvest> (accessed 2 April 2014)
- Ealey EHM (1967a) Ecology of the euro, *Macropus robustus* (Gould), in north-western Australia. II. Behaviour, movements, and drinking patterns. *CSIRO Wildlife Research* **12**, 27–51.
- Ealey EHM (1967b) Ecology of the euro, *Macropus robustus* (Gould), in north-western Australia. IV. Age and growth. *CSIRO Wildlife Research* **12**, 67–80.
- Ealey EHM, Main AR (1967) Ecology of the euro, *Macropus robustus* (Gould), in north-western Australia. III. Seasonal changes in nutrition. *CSIRO Wildlife Research* **12**, 53–65.
- Ellis BA, Russell EM, Dawson TJ, Harrop CJF (1977) Seasonal changes in diet preferences of free-ranging red kangaroos, euros and sheep in Western New South Wales. *Australian Wildlife Research* **4**, 127–144.
- Hale P (2004) Genetic effects of kangaroo harvesting. *Australian Mammalogy* **26**, 75–86.
- IUCN Standards and Petitions Subcommittee (2011) Guidelines for Using the IUCN Red List Categories and Criteria. Version 9.0. Prepared by the Standards and Petitions Subcommittee.
- IUCN (2013) Red List of Threatened Species. Version 2013.2. www.iucnredlist.org. IUCN, Gland, Switzerland.
- Jarman PJ, Taylor RJ (1983) Ranging of Eastern Grey Kangaroos and Wallaroos on a New England pastoral property. *Australian Wildlife Research* **10**, 33–38.
- Johnson PM (2003) ‘Kangaroos of Queensland.’ (Queensland Museum: Brisbane)
- Menkhorst PW, Knight F (2001) ‘A field guide to the mammals of Australia.’ (Oxford University Press: Melbourne)
- Payne N (2011) 2012 Kangaroo Quota Report New South Wales. NSW Office of Environment and Heritage, Sydney.

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- Poole WE, Merchant JC (1987) Reproduction in captive wallaroos: the eastern wallaroo, *Macropus robustus robustus*, the euro *M. r. erubescens* and the antilopine wallaroo, *M. antilopinus*. *Australian Wildlife Research* **14**, 225–242.
- Pople AR (2006) Modelling the spatial and temporal dynamics of kangaroo populations for harvest management. Report to Department of Environment and Heritage: Canberra.
- Russell EM, Richardson BJ (1971) Some observations on the breeding, age structure, dispersion and habitat of populations of *Macropus robustus* and *Macropus antilopinus* (Marsupialia). *Journal of Zoology, London* **165**, 131–142.
- Southwell CJ, Sheppard N (2000) Assessing harvested populations of the euro (*Macropus robustus erubescens*) in the barrier ranges of western NSW. *Australian Mammalogy* **21**, 165–171.
- Taylor RJ (1983) The diet of the eastern grey kangaroo and wallaroo in areas of improved and native pasture in the New England Tablelands. *Australian Wildlife Research* **10**, 203–311.
- Taylor RJ (1984) Foraging in the eastern grey kangaroo and the wallaroo. *Journal of Animal Ecology* **53**, 65–74.
- Tyndale-Biscoe H, Renfree M (1987) 'Reproductive physiology of marsupials.' (Cambridge University Press: Cambridge)