DEPARTMENT OF ENVIRONMENT, HOUSING
AND COMMUNITY DEVELOPMENT

# THE STATUS OF KANGAROOS AND WALLABIES IN AUSTRALIA

**REPORT OF THE WORKING GROUP ON MACROPOD HABITAT OF THE STANDING COMMITTEE OF THE COUNCIL OF NATURE CONSERVATION MINISTERS**

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# CONTENTS

# PREFACE

This publication contains the report of the Working Group on Macropod Habitat of the Standing Committee of the Council of Nature Conservation Ministers. The report was adopted by Standing Committee in June 1974, and endorsed by Council in July 1974.

The Working Group consisted of representatives of each Australian State and mainland Territory. After initial correspondence and preparation of background documents the Working Group met in Perth on 9 and 10 August 1973. In 1975 the report was updated by correspondence and verbal agreement.

The members of the Working Group were:

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Mr Bolton was represented by Mr D. Stevens at the meeting. Dr H. J. Frith and Mr J. Calaby of the Division of Wildlife Research, CSIRO, gave valuable advice to the Working Group.

# INTRODUCTION



Recently, with a world-wide awakening of the need for conservation, there has been much public interest in Australia in the conservation of the native fauna. Much of this interest has been directed towards moves to increase protection of the large kangaroos, especially the Red Kangaroo. Petitions to the Australian Parliament led initially to the setting up of the House of Representatives Select Committee on Wildlife Conservation and more recently to a ban on the export of kangaroo products, even though the Select Committee did not recommend such a ban.

That most public feeling has been directed toward protecting the large kangaroos is a measure partly of their size and status in the Australian landscape; it is also a measure to some degree of the ignorance of the general public regarding which species are actually in danger. The lack of support for conservation programs for many of the smaller species of kangaroos, wallabies and other animals is partly due to people not being able to see these species and identify with them, but it is also due to the lack of authoritative statements as to where real needs lie.

This report is intended to clarify the situation and to state the true position of macropod conservation in Australia.

# THE MACROPODIDAE OF AUSTRALIA

The family Macropodidae includes all the kangaroos and wallabies. Although the taxonomy of some groups, such as the rock-wallabies and potoroos, is not too clear at present, the total picture of the family is fairly well accepted. Ride (1971) in his book *A Guide to the Native Mammals of Australia* (Oxford University Press, Melbourne) recognised 46 species and the Working Group has largely followed his list. The 'large kangaroos' account for only five species of this total.

The causes of depletion or extinction of many of the smaller macropods are not well understood. They probably include such factors as the introduction of predators, competitors and disease by European man and his stock, as well as habitat destruction. Nothing can be done where a species is extinct and little can be done to extend the range of very rare species without considerable research. The main aim at present must be to prevent further deterioration in the existing situation. Probably much of the native fauna has reached an equilibrium with the species introduced by European man, leaving the clearing of land for agricultural and urban use as the most obvious continuing deleterious change. Hunting has probably had little effect; those species which have been hunted continuously are still quite common while many species which are now rare have never been hunted to any extent. Thus it is the policy of State and Territory Fauna Authorities to conserve species chiefly by preserving habitat by the reservation of land in the form of national parks, nature reserves or similarly named areas.

There are exceptions to this. While it is ideal to have reserves for all species of the Australian flora and fauna, it is often possible and desirable to both protect and manage animal populations outside reserves as well. It is especially desirable to do this in the case of wide-ranging species such as the Red Kangaroo. The Working Group emphasises that this fact should be borne in mind during any examination of the quality of the reserve system.

However, in many cases it is not possible for species to survive outside their unaltered native habitat and for these species preservation of natural lands is essential. This may require reservation specifically for wildlife or it may be achieved in conjunction with other land uses such as forestry, water conservation or recreation.

# OBJECTIVES OF THE RESERVE SYSTEM

The aim of the reserve system is to protect sufficient habitat to conserve viable, representative populations of all species over as much of their geographic range as possible.

The number of reserves needed for each species varies depending on their original range, their range today and competing land usage. Some species, such as some of the rock-wallabies, have always had quite small ranges and for them one or two adequate reserves would suffice. Other species have had, and still have, extensive ranges and require a number of reserves scattered throughout their ranges. Still others, although widespread in the past, are now restricted to small areas and in these cases it is essential that as much of the remaining habitat as possible should be protected.

Ideally, reserves should be large enough to support viable populations of each species in the face of natural pressures such as predators and bushfires and without extensive manipulation of the habitat by man. Little work has been done to define a minimum reserve or population size but from what is known it appears that most macropods must have sufficient habitat to contain a population of at least 250 to 300 individuals (Main and Yadav, 1971, *Biological Conservation* **3**, 123–33). To be safe and to allow for natural catastrophes such as fire it would be wise to multiply this figure by two or three.

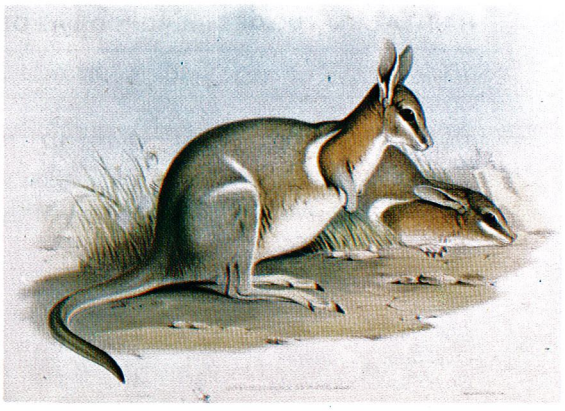
For some species this ideal has been, or can still be, met. For others it is too late, competing land uses having left insufficient land in its natural state. Where small populations still occur under such a situation intensive management is probably required.

For ease of description the Working Group devised a table (below) showing for each species the States and Territories in which it occurred or occurs and its current status in each State and in Australia overall. In the Table data for the Australian Capital Territory have been included under New South Wales. The key to the numbers and letters is:

1. Common; range either little changed or increased since European settlement.
2. Range reduced but plentiful in remaining habitat which is fairly extensive.
3. Range and numbers greatly reduced, remaining only in a few isolated places.
4. Very rare or extinct.

A. Occurs in good numbers outside reserves.
B. Adequately provided for in reserves.
C. Occurs on a very few reserves only. In need of further reservation and/or intensive management of existing reserves.
D. Does not occur on reserves. In need of survey, reserve acquisition and intensive management.

Thus, 1AB means a species is common and still found over all its original range; its habitat is adequately protected both on and off reserves. At the other end of the spectrum a species listed as 4D is extremely rare but there are indications it is still extant and surveys need to be made, while a listing of 4 means that it is probably extinct. A dash (—) means that the species is not known to have occurred in the State or Territory.



*Onychogalea lunata* (After Gould)

*Potorous platyops* (After Gould)

**HABITAT STATUS OF MACROPODIDAE OF AUSTRALIA**

| *SPECIES* | *QLD* | *N.S.W.* | *VIC.* | *TAS.* | *S.A.* | *W.A.* | *N.T.* | *AUSTRALIA* |
|---|---|---|---|---|---|---|---|---|
| *Megaleia rufa* | 1A | 1AB | 2A | — | 1AB | 1A | 1A | 1A |
| *Macropus giganteus* | 1AB | 2AB | 2A | 3D | 3D | — | — | Mainland 1AB, Tasmania 3D |
| *Macropus robustus* | 1AB | 1AB | 1A | — | 1AB | 1AB | 1AB | 1AB |
| *Macropus fuliginosus* | — | 2AB | 2AB | — | 2AB | 2AB | — | 2AB |
| *Macropus antilopinus* | 1A | — | — | — | — | 1A | 1AB | 1A |
| *Macropus agilis* | 1A | — | — | — | — | 1A | 1AB | 1A |
| *Macropus rufogriseus* | 1AB | 2AB | 2A | 1AB | 2AB | — | — | 1AB |
| *Macropus dorsalis* | 2A | 3C | — | — | — | — | — | 2AC |
| *Macropus parryi* | 2A | 2C | — | — | — | — | — | 2AC |
| *Macropus irma* | — | — | — | — | — | 2B | — | 2B |
| *Macropus greyi* | — | — | 4 | — | 4 | — | — | 4 |
| *Macropus bernardus* | — | — | — | — | — | — | 1AB | 1AB |
| *Macropus eugenii* | — | — | — | — | 3C | 3C | — | Mainland 3C (good island populations) |
| *Macropus parma* | — | 3C | — | — | — | — | — | 3C |
| *Wallabia bicolor* | 1AB | 1AB | 1AB | — | — | — | — | 1AB |

**HABITAT STATUS OF MACROPODIDAE OF AUSTRALIA** *(continued)*

| *SPECIES* | *QLD* | *N.S.W.* | *VIC.* | *TAS.* | *S.A.* | *W.A.* | *N.T.* | *AUSTRALIA* |
|---|---|---|---|---|---|---|---|---|
| *Thylogale billardierii* | — | — | 4D | 1AB | 4 | — | — | Mainland 4, Tasmania 1AB |
| *Thylogale thetis* | 2AB | 2AB | — | — | — | — | — | 2AB |
| *Thylogale stigmatica* | 2AB | 2AB | — | — | — | — | — | 2AB |
| *Setonix brachyurus* | — | — | — | — | — | 3C | — | Mainland 3C (good island populations) |
| *Onychogalea unguifera* | 2D | — | — | — | — | 2D | 2C | 2D |
| *Onychogalea lunata* | — | — | — | — | 4 | 4D | 4 | 4D |
| *Onychogalea fraenata* | 3D | 4D | 4 | — | — | — | — | 3D |
| *Lagorchestes conspicillatus* | 2D | — | — | — | — | 3C | 3C | Mainland 3C (population on Barrow Island) |
| *Lagorchestes hirsutus* | — | — | — | — | 4 | 3C | 4D | Mainland 4D (populations on Bernier and Dorre Islands) |
| *Lagorchestes leporides* | — | 4 | — | — | 4 | — | — | 4 |
| *Lagorchestes asomatus* | — | — | — | — | — | — | 4 | 4 |
| *Lagostrophus fasciatus* | — | — | — | — | — | 3C | — | Mainland 4 (populations on Bernier and Dorre Islands) |
| *Petrogale penicillata* | 2AB | 2C | 3C | — | 3D | 2C | 2C | 2BC (good island populations) |
| *Petrogale rothschildi* | — | — | — | — | — | 2D | — | 2D |
| *Petrogale purpureicollis* | 2D | — | — | — | — | — | — | 2D |
| *Petrogale godmani* | 2D | — | — | — | — | — | — | 2D |
| *Petrogale brachyotis* | — | — | — | — | — | 1B | 1C | 1C |
| *Petrogale xanthopus* | 3D | 3D | — | — | 2C | — | — | 3C |
| *Peradorcas concinna* | — | — | — | — | — | 1C | 1B | 1C |
| *Dendrolagus lumholtzi* | 2B | — | — | — | — | — | — | 2B |
| *Dendrolagus bennettianus* | 2B | — | — | — | — | — | — | 2B |
| *Hypsiprymnodon moschatus* | 2B | — | — | — | — | — | — | 2B |
| *Caloprymnus campestris* | 4D | — | — | — | 4D | — | — | 4D |
| *Aepyprymnus rufescens* | 2AC | 2C | 4 | — | — | — | — | 2AC |
| *Bettongia penicillata* | — | 4 | 4 | — | 4 | 3C | — | 3C |
| *Bettongia gaimardi* | — | 4D | 4 | 2C | — | — | — | Mainland 4, Tasmania 2C |
| *Bettongia tropica* | 2D | — | — | — | — | — | — | 2D |
| *Bettongia lesueur* | — | 4 | — | — | 4D | 3C | 4D | Mainland 4 (good island populations) |
| *Potorous tridactylus* | 2C | 2B | 3D | 2C | 4 | 4 | — | Eastern States 2C, Western Australia 4 |
| *Potorous platyops* | — | — | — | — | — | 4 | — | 4 |

*Megaleia rufa*
**Red Kangaroo**

Range: Australia, mid-latitudes; wherever there are extensive grassy plains, mulga or savannah woodlands.

While this species occurs on many large reserves in the arid region of Australia these are not considered of vital significance for the conservation of *M. rufa*. The most important populations of the species occur in arid and semi-arid grazing areas. The widespread conservation of the species is most effectively promoted by management of kangaroo populations on grazing properties at levels which do not cause excessive economic loss to pastoralists.

*Macropus giganteus*
**Eastern Grey Kangaroo, Forester**

Range: Tasmania, Victoria, eastern and central Queensland and New South Wales, Australian Capital Territory; in forests, woodlands and savannah.

The species is secure in all States within its range except in Tasmania where, because of the encroachment of agriculture and consequent loss of habitat, further reserves are urgently required. The Tasmanian population has been introduced to Maria Island (10 000 ha).

An isolated population of *M. giganteus* which occurs near Robe in the south-east of South Australia is in need of protection. This is the present western limit of its range.

*Macropus robustus*
**Euro, Wallaroo, Hill Kangaroo**

Range: All States and Territories except Tasmania; in gullies, rocky outcrops and ranges. The range barely extends into Victoria.

This species, as classified by Ride, is a very variable species. It is common over most of its original range and does not require habitat reserves. A sub-species, *M. r. isabellinus* which occurs on Barrow Island, is of smaller stature than mainland populations.

*Macropus fuliginosus*
**Western Grey Kangaroo**

Range: Western New South Wales, western Victoria, South Australia, Kangaroo Island and southern Western Australia; in forests, woodlands, heath or scrub.

The Kangaroo Island and mainland subspecies are common both on and off reserves.

*Macropus antilopinus*
**Antelope Kangaroo**

Range: Northern Queensland, Northern Territory and north Kimberley of Western Australia; in plains and broad valleys with open savannah woodlands.

This species is in need of study. However, because its range covers a wide area which has not been greatly changed by land development it is not considered to be immediately in need of reserves.

*Macropus agilis*
**Sandy Wallaby, Agile Wallaby, River Wallaby**

Range: Kimberley, Northern Territory and Queensland; in river country.

This species is very common and has been declared vermin in Western Australia and the Northern Territory. In Queensland the species has been removed from the Sugar Bureau pest list, but it is likely that the present year-round open season will be continued to permit taking of the species. Habitat reservations are not immediately required.

*Macropus rufogriseus*
**Red-necked Wallaby, Scrub Wallaby, Bennett's Wallaby**

Range: Eastern Queensland, New South Wales, Australian Capital Territory, Victoria, south-eastern South Australia and Tasmania; in woodland, forest edges and coastal scrub.

The range of this species has not been greatly reduced and it has secure habitats both on and off reserves.

*Macropus dorsalis*
**Black-striped Wallaby**

Range: North-eastern New South Wales and eastern Queensland as far north as Cairns; in rain forest and scrubby thickets.

The range of this species has been significantly reduced, especially in New South Wales. It appears to be secure off reserves but nevertheless further habitat reservations are desirable particularly in New South Wales where it does not occur on reserves. It is still abundant in central Queensland.

*Macropus parryi*
**Whiptail Wallaby**

Range: North-eastern New South Wales and eastern Queensland; in *Eucalyptus* woodland with grasses, usually on slopes and hill tops.

The range of this species has been significantly reduced, especially in New South Wales. As in the case of *M. dorsalis* the species seems secure off reserves but nevertheless further habitat reservations are desirable.

*Macropus agilis* (T. Kirkpatrick photo)

*Macropus irma*
**Western Brush Wallaby**

Range: South-west of Western Australia; in sclerophyll forests, woodlands, scrub and heath.

The range of this species has been reduced by clearing but it is still widespread and is secure on reserves and in State Forest.

*Macropus greyi*
**Toolache**

Range: South-eastern South Australia and western Victoria.

Generally regarded as extinct throughout its range.

*Macropus rufogriseus* (M. Morcombe photo)

*Macropus bernardus*
**Woodward's Wallaroo**

Range: Interior of Arnhem Land, Northern Territory; in rocky country.

Well provided for both on and off reserves within its range.

*Macropus eugenii*
**Tammar**

Range: South-west of Western Australia (including Garden Island, Houtman Abrolhos, Recherche Archipelago), South Australia (mainland and some off-shore islands, including Kangaroo I.); in dense thickets within sclerophyll forest or woodland, also in thick scrub.

This species is common only on Kangaroo Island and several islands off the south-west coast where it has secure habitat both on and off reserves.

Its range on the mainland has been drastically reduced. It is therefore urgently in need of reserves.

*Macropus parma*
**Parma Wallaby**

Range: Eastern New South Wales; in rain forest, wet sclerophyll forest and some heath types.

After having been regarded as an extremely rare species for many years there have recently been numerous sightings which indicate that *M. parma* is more numerous and has a wider range than previously believed. Its prime habitat requirement appears to be the wet sclerophyll–rain forest interface.

*Wallabia bicolor*
**Swamp Wallaby**

Range: Eastern Queensland, eastern New South Wales, Australian Capital Territory and Victoria; in dense moist thickets and gullies.

There has been no significant reduction of the range of this species. A sub-species, *W. b. welsbyi*, which occurs on North and South Stradbroke Islands, could be threatened with extinction if its habitat was destroyed by sand mining.

*Thylogale billardierii*
**Tasmanian Pademelon**

Range: Tasmania, islands of Bass Strait, Victoria and south-eastern South Australia; in low scrub.

This species is secure in Tasmania but is very rare or extinct on the mainland.

*Thylogale thetis*
**Red-necked Pademelon**

Range: Eastern Queensland and New South Wales; in rain forest and wet sclerophyll forest.

The range of this species has been reduced but it has secure habitats both on and off reserves.

*Thylogale stigmatica*
**Red-legged Pademelon**

Range: Eastern Queensland and New South Wales; in rain forest and wet sclerophyll forest.

The range of this species has been reduced but it has secure habitats both on and off reserves.

*Setonix brachyurus*
**Quokka**

Range: South-west of Western Australia; in densely vegetated swamps amidst sclerophyll forest.

Secure populations occur on Rottnest and Bald Islands. Its range has been greatly reduced on the mainland but it still occurs in scattered pockets, especially in State Forest.

*Onychogalea unguifera*
**Northern Nail-tailed Wallaby, Karrabul**

Range: Northern Western Australia, Northern Territory and Queensland; in savannah between rocky ranges and along rivers.

This species has not been well studied (probably because of the remoteness of its habitat). It is therefore in need of survey and acquisition of reserves.

*Onychogalea lunata*
**Crescent Nail-tailed Wallaby, Wurrung**

Range: Southern half of Western Australia and central South Australia; in thick scrub or dense thickets amid open country.

This species was reasonably common in the wheat-belt area of the south-west of Western Australia in the early 1900s but declined catastrophically shortly thereafter. A specimen was found in the Warburton Range area in 1964. The species is in need of survey.

*Onychogalea fraenata*
**Bridle Nail-tailed Wallaby, Merrin**

Range: North-western Victoria, interior of New South Wales and southern Queensland; in scrub including brigalow country.

This species was once apparently relatively common in the western slopes and plains of northern New South Wales and the southern half of Queensland. Until recently it was thought to be extinct but in 1974 a small colony was discovered in an area of brigalow regrowth in central Queensland; further search in the immediate vicinity and in similar country in southern Queensland is in progress. Much of the habitat of this species may have been destroyed with the introduction of sheep and rabbits, and the extensive clearing of the brigalow.

*Lagorchestes conspicillatus*
**Spectacled Hare-Wallaby**

Range: Western Australia (southern Kimberley, Pilbara and Barrow I.), north central Australia (to approximately 24°S), Queensland (western central and north coastal); in spinifex grasslands.

There is a good population of this species on Barrow Island but its range has been greatly reduced on the mainland. It is still relatively common both east and west of Charters Towers in Queensland. In need of survey.

*Lagorchestes conspicillatus* (M. Morcombe photo)

*Lagorchestes hirsutus*
**Western Hare-Wallaby**

Range: Central Western Australia (including islands of Shark Bay), central Australia; in spinifex grasslands or heaths.

Good populations of this species exist on Dorre and Bernier Islands in Shark Bay, Western Australia but no populations are known to occur on the mainland. It is possible it still occurs in the Northern Territory and is in need of survey.

*Lagorchestes leporides*
**Eastern Hare-Wallaby**

Range: Western New South Wales, eastern South Australia and possibly north-east Victoria along the Murray; in grassy plains.

This species was last collected in 1890 and is apparently extinct.

*Lagorchestes asomatus*
**Desert Hare-Wallaby**

This species is known only from one skull collected near Lake Mackay, on Western Australia–Northern Territory border, probably in 1932 or 1933.

*Lagostrophus fasciatus*
**Banded Hair-Wallaby**

Range: South-west of Western Australia, including islands of Shark Bay, southern South Australia; in open woodland and scrub.

Originally this species was reported to be reasonably abundant in the central and southern agricultural areas of Western Australia. It is now only known from Bernier and Dorre Islands.

*Petrogale* spp.
**Rock-Wallabies**

The taxonomy of this genus is poorly understood. There are many local colour variations and it is quite possible that there are more or fewer species than as currently defined. Therefore, rock-wallabies should be conserved over as much of their present range as possible.

Rock-wallabies inhabit rock piles and cliff faces which provide suitable caves and cav-

ities to act as a refuge from heat and predators. The most important requirements for the conservation of *Petrogale* spp. are the exclusion of sheep and goats and the reservation of habitats in areas where disturbance by man is likely.

*Petrogale penicillata*
**Brush-tailed Rock-Wallaby**

Range: Widely distributed on mainland Australia in rocky hills, cliffs, etc.

A variable species, with considerable colour differences between local populations in different parts of the country. The status of populations in northern Australia is not clear.

This species is secure in Queensland and probably in the Kimberley area of Western Australia. Elsewhere it is greatly reduced in range and requires habitat reservation. Approximately eight secure populations exist on islands off the coast of Western Australia and South Australia.

*Petrogale penicillata* (M. Morcombe photo)

*Petrogale rothschildi*
**Rothschild's Rock-Wallaby**

Range: North-west Western Australia (Hamersley Range and Dampier Archipelago).

There are good populations of this species on some islands of the Dampier Archipelago which the Western Australian Department of Fisheries and Wildlife is endeavouring to acquire as Nature Reserves.

*Petrogale purpureicollis*
**Purple-necked Rock-Wallaby**

Range: North-western Queensland in the vicinity of Mt Isa.

This species is in need of survey and habitat reservation.

*Petrogale godmani*
**Godman's Rock-Wallaby**

Range: Cape York peninsula in the vicinity of Cooktown.

This species is in need of survey and habitat reservation.

*Petrogale brachyotis*
**Short-eared Rock-Wallaby**

Range: North Kimberley in Western Australia and northern Northern Territory.

The area in which this species occurs has been very little altered by man. It is believed that the species is common but it is in need of survey and habitat reservation.

*Petrogale xanthopus*
**Yellow-footed Rock-Wallaby**

Range: South Australia (Gawler and Flinders Ranges), western New South Wales, south-western Queensland.

This species occurs on large reserves in South Australia. It is very rare in New South Wales and surveys are at present being undertaken in the Grey Range in Queensland to determine its status there. The species requires further investigation and habitat reservation.

*Peradorcas concinna*
**Little Rock-Wallaby**

Range: North Kimberley, northern Northern Territory.

The area in which this species occurs has been very little changed by man. It occurs on a number of islands and it is believed to be

reasonably common on the mainland but it requires survey and habitat reservation, especially in Western Australia.

*Dendrolagus lumholtzi*
**Lumholtz's Tree-Kangaroo**

Range: North-east Queensland around Cairns; in rain forest.

The range of this species has been reduced but it is plentiful and well provided for in reserves.

*Dendrolagus bennettianus*
**Bennett's Tree-Kangaroo**

Range: North-eastern Queensland in the vicinity of Cooktown; in rain forest.

The range of this species has been reduced but it is plentiful and well provided for in reserves.

*Hypsiprymnodon moschatus*
**Musk Rat-Kangaroo**

Range: North-eastern Queensland; in rain forest.

The range of this species has been reduced but it is plentiful and well provided for in reserves.

*Caloprymnus campestris*
**Desert Rat-Kangaroo**

Range: North-east South Australia and south-west Queensland; in sand-ridge desert.

No populations are known but it still may survive in the uninhabited parts of the centre. It is in need of survey.

*Aepyprymnus rufescens*
**Rufous Rat-Kangaroo**

Range: North-eastern Victoria, eastern New South Wales and eastern Queensland; in sclerophyll woodland with dense grass.

The range of this species is reduced but it is reasonably common except in Victoria. It requires distribution study and further habitat reservation.

*Bettongia lesueur* (E. Slater photo)

*Bettongia penicillata*
**Woylie, Brush-tailed Rat-Kangaroo**

Range: South-western Western Australia, southern South Australia, south-western Victoria, central New South Wales; in thick scrub in sclerophyll woodland.

This species is considered extinct except in Western Australia. The only populations known are on reserves or in State Forest. Habitat acquisition is of high priority if other populations are located.

*Bettongia gaimardi*
**Eastern Rat-Kangaroo**

Range: South coastal Queensland, coastal New South Wales, southern and south-eastern Victoria and Tasmania; in scrub in sclerophyll forest.

The species appears to be extinct on the mainland but has secure habitat in Tasmania.

*Bettongia tropica*
**Northern Rat-Kangaroo**

Range: Eastern Queensland.

Little is known of this species; it therefore requires survey.

*Bettongia lesueur*
**Boodie, Burrowing Rat-Kangaroo**

Range: Western Australia, except northern parts (including islands off the west coast), South Australia, southern Northern Territory, western New South Wales; in spinifex, heath and sclerophyll woodland.

Secure populations of this species occur on Barrow, Bernier and Dorre Islands off the Western Australian coast. It also occurs on Boodie Island, a small island near Barrow Island. On the mainland this once widely occurring species is probably extinct.

*Potorous platyops*
**Broad-faced Potoroo**

Range: South-west of Western Australia.

This species is probably extinct.

*Potorous tridactylus*
**Potoroo** (including *P. apicalis*)

Range: South-eastern Queensland, coastal New South Wales, eastern and southern Victoria, south-eastern South Australia, Tasmania, islands of Bass Strait, south-western corner of Western Australia; in tall grass or thick scrub in damp situations.

This species is common in Tasmania but its range has been reduced and it requires habitat reservation. Its range in Victoria has been fragmented but it is still common in several pockets of state-owned land. Permanent reserves are needed. It has secure habitats in Queensland and New South Wales, but is probably extinct in Western Australia.

# DISCUSSION

Examination of the Table and Notes shows that some species of macropod are widespread, common and well protected both on and off reserves. The Working Group particularly draws out the comparison between the five large kangaroos and most of the smaller wallabies. With the exception of the Antelope Kangaroo, about which little is known but which is not in conflict with the pastoral industry nor commercially exploited, the other four species are comparatively well off. It is true that more reserves could be created and the Working Group supports this but when considering these wide-ranging species it is possible to have a much broader aim than the mere protection of a few small populations on reserves. We believe that it is both desirable and practical to conserve these species over almost their entire range. Where conflict exists between kangaroos and pastoral pursuits this can only be achieved by means of kangaroo management programs which effectively provide for multiple land use and protect the pastoralist against excess numbers.

Some species of macropods are in urgent need of further habitat reservation, especially where more intensive land use and clearing threatens to destroy remaining habitats. Those species for which habitat reservation is urgently required are classified either 3 or 4, C or D in the Table.

To clarify the situation the Working Group has divided such species into two lists: 1. those species for which populations are known to exist; and 2. those species for which there are no known populations on the mainland of Australia.

## 1. LIST OF SPECIES, WITH KNOWN POPULATIONS, REQUIRING HABITAT RESERVATIONS

In order of priority

1. *Onychogalea fraenata* Bridle Nail-tailed Wallaby
2. *Macropus giganteus* Forester (Tasmania only)
3. *Bettongia tropica* Northern Rat-Kangaroo
4. *Petrogale xanthopus* Yellow-footed Rock-Wallaby
5. *Bettongia penicillata* Woylie

6. *Lagorchestes conspicillatus* Spectacled Hare-Wallaby
7. *Macropus parma* Parma Wallaby
8. *Macropus eugenii* Tammar
9. *Setonix brachyurus* Quokka
10. *Bettongia gaimardi* Eastern Rat-Kangaroo
11. *Potorous tridactylus* Potoroo
12. All *Petrogale* spp. in settled areas Rock-Wallabies
13. *Onychogalea unguifera* Northern Nail-tailed Wallaby

*Macropus eugenii* (E. Slater photo)

## 2. LIST OF SPECIES WITH NO KNOWN POPULATIONS ON THE AUSTRALIAN MAINLAND, REQUIRING HABITAT RESERVATIONS IF REDISCOVERED

This list has been subdivided as follows:

A. **Species which it is believed could be rediscovered by systematic survey**

1. *Caloprymnus campestris* Desert Rat-Kangaroo

*Potorous tridactylus* (M. Morcombe photo)

B. **Species for which populations exist on islands (including Tasmania) but which are very rare or extinct on the mainland**

2. *Lagorchestes hirsutus* Western Hare-Wallaby
3. *Lagostrophus fasciatus* Banded Hare-Wallaby
4. *Thylogale billardierii* Tasmanian Pademelon
5. *Bettongia gaimardi* Eastern Rat-Kangaroo
6. *Bettongia lesueur* Boodie

C. **Species which are either very rare or extinct**

7. *Macropus greyi* Toolache
8. *Onychogalea lunata* Crescent Nail-tailed Wallaby
9. *Lagorchestes leporides* Eastern Hare-Wallaby
10. *Lagorchestes asomatus* Desert Hare-Wallaby
11. *Potorous platyops* Broad-faced Potoroo

D. **Sub-species which are either very rare or extinct**

12. *Potorous tridactylus gilberti* Gilbert's Potoroo

# RESERVE ACQUISITION



Reserve acquisition problems fall into two categories depending on whether the land concerned is privately owned or held by the Crown. In the latter case there is no purchase price involved, but surveys and evaluations of competing land usage are often required.

In the case of private land the problems of acquisition are involved and often costly. Negotiations for the purchase of land can take several years but when completed require prompt settlement. The first requirement of a program of land acquisition is, therefore, a trust fund into which an annual allocation is paid and from which payments can be made at short notice. Any system of grants made on an annual basis and which must be used within a financial year will be much less efficient.

Policies of reserve acquisition should be flexible and, while noting the priorities listed above, should not be tied to them.

This would enable Fauna Authorities to purchase land as it comes on the market rather than to be seen as anxious buyers who would pay an excessive price. Many other species of plants and animals would, of course, be protected if a reserve were purchased and the status of other species should be taken into account.

From their experience in land acquisition the Working Group has estimated the cost of providing satisfactory habitats for some species as an example of the amounts of money needed.

1. *Macropus giganteus* — Tasmania—8 000 ha at $125 — $1 000 000
2. *Petrogale xanthopus* — South Australia—100 000 ha at $7.50 = $750 000
3. *Bettongia penicillata* or *Macropus eugenii* — Western Australia—2000 ha at $100 = $200 000
4. *Megaleia rufa* — Western Australia—200 000 ha of pastoral lease = $400 000

# NEEDS OF SURVEY

For those species for which no known mainland populations exist (List 2) there would be obvious benefit to be gained from their rediscovery. However, in the past, Fauna Authorities have not considered it practicable to use what little funds and experienced staff they have to search for 'lost' species. The surveying of existing and proposed reserves and the management of known animal populations is seen as a task of greater importance. Added to this is the fact that most of the 'lost' species, if they are not extinct, are most likely to occur in remote areas where they are not immediately endangered by habitat destruction. There are, however, two species, *Macropus greyi* and *Potorous platyops*, and the sub-species *Potorous tridactylus gilberti*, the main ranges of which occur in areas of intensive agricultural and grazing use, and search for these species should be made before further changes in land use make their extinction virtually certain.

The Fauna Authorities recognise the desirability of major reconnaissance wildlife surveys in Australia, realising that these will provide long-term answers on the status and fluctuations of wildlife populations. However, searches for the species listed above must be intensive and short term.

The Working Group noted that the cost of maintaining a survey team of one scientist and an assistant is about $30 000 per annum.

# RESERVE MANAGEMENT

Providing reserves to protect the habitat of an animal is only the first step; unless the reserve is managed much of the wildlife may be lost and the original investment partly wasted.

Management required is of two main types—management in relation to people and the management of habitat. The former includes control of public access, the provision of recreational facilities, public relations and education, policing of regulations etc., while the latter is concerned with ensuring that the habitat remains suitable for the animals concerned, that no species of plants or animals are lost, that exotic plants and animals do not become established and that natural factors such as fire are properly used.

There is little information available on the basic habitat requirements of many macropods and techniques for manipulating habitat are not well developed. Much research in this area needs to be done. Some idea of the complexity of the situation can be gained from the following notes on the habitat requirements of some species.

*Macropus giganteus* Forester (in Tasmania)

Maintenance of vegetation as an open, sub-climax woodland. Populations need to be monitored and culled to prevent overgrazing and degradation of the habitat and damage to surrounding agricultural lands.

*Macropus eugenii* Tammar

Several vegetation types are required—dense thickets for shelter and low scrub or open woodland for grazing. These conditions are best provided by infrequent burning of successive portions of the habitat and the prevention of frequent wildfires.

*Macropus parma* Parma Wallaby

Maintenance of significant areas of rain forest—wet sclerophyll ecotone.

*Setonix brachyurus* Quokka

Maintenance of thick swamp vegetation by prevention of too frequent burning. Control of predators on islands.

*Lagorchestes conspicillatus* Spectacled Hare-Wallaby

Exclusion of introduced grazing animals and maintenance of large thick spinifex tussocks or long, thick grass for nesting sites by exclusion of frequent burning.

*Lagorchestes hirsutus* Western Hare-Wallaby and
*Lagostrophus fasciatus* Banded Hare-Wallaby

The only known populations of these two species are on Bernier and Dorre Islands in Shark Bay, Western Australia. *L. fasciatus* requires a hedge-type vegetation for shelter while *L. hirsutus* digs a trench under a low, spreading spinifex or heath-type shrub. Management centres around protection of the islands from undue interference and the introduction of predators, and preventing frequent or extensive fires.

*Petrogale* spp. Rock-Wallabies

Protection from grazing competition by sheep and goats, preventing build-up of introduced predators and disturbance by man.

*Dendrolagus* spp. Tree-Kangaroos

These species require a climax rain forest habitat and the only management required is that of forest protection.

*Hypsiprymnodon moschatus* Musk Rat-Kangaroo

As for *Dendrolagus* spp.

*Bettongia penicillata* Woylie

Similar to *Macropus eugenii* but requires even thicker, special types of vegetation as a place to construct the nest which acts as its diurnal refuge.

*Bettongia gaimardi* Eastern Rat-Kangaroo and
*B. tropica* Northern Rat-Kangaroo

Probably similar to *B. penicillata* but further research is required.

*Bettongia lesueur* Boodie

This is the only macropod to live in a burrow. It is probably extinct on the Australian mainland, surviving only on four islands off the Western Australian coast. Here management requirements are chiefly the exclusion of predators or competitors.

*Potorous tridactylus* Potoroo

Climax and sub-climax sclerophyll or rain forest maintained by infrequent burning.

Reviewing the requirements for reserve management the Working Group considers that the species in greatest need of funds, staff and equipment are, in order of priority:

1. (a) *Lagorchestes hirsutus* Western Hare-Wallaby
   (b) *Lagostrophus fasciatus* Banded Hare-Wallaby
   (c) *Bettongia penicillata* Woylie
   (d) *Bettongia lesueur* Boodie
   (e) *Bettongia tropica* Northern Rat-Kangaroo
2. (a) *Macropus eugenii* Tammar
   (b) *Lagorchestes conspicillatus* Spectacled Hare-Wallaby
3. (a) *Macropus parma* Parma Wallaby
   (b) *Setonix brachyurus* Quokka
   (c) *Bettongia gaimardi* Eastern Rat-Kangaroo
   (d) *Potorous tridactylus* Potoroo
   (e) *Aepyprymnus rufescens* Rufous Rat-Kangaroo
4. (a) *Petrogale* spp. Rock Wallabies

The costs of management depend on a number of factors, e.g.

(a) the size of the reserve,
(b) human pressures exerted on it,
(c) the variety and rarity of the biota within it,
(d) how much is known of the biology and habitat requirements of the main animal species, and
(e) how much the animals and plants are affected by fire and whether the reserve is in an area of high fire risk.

It is clear that some reserves need intensive management, particularly those which harbour rare species and which are too small to hold a large population. Such reserves should be controlled by a resident ranger or rangers, backed up by an organisation with both operations staff and equipment and professional expertise in habitat management.

The ability of the various Fauna Authorities to finance reserve management depends both on the size of the State and the number and quality of reserves as well as the size of the human population. It is clear that the larger

*Megaleia rufa* (E. Slater photo)

States have more wildlife and more reserved land but fewer people to pay for management. It should be noted that in the above list of management priorities four of the five species in the first priority are found only in Western Australia while the fifth occurs in Queensland.

While the States control land use under the Constitution, they have a responsibility to manage the parks and reserves they set aside. However, reserves are of value to the whole nation, not only to one State, and the Working Group believes that the Australian Government should assist with financing reserve management. While research could be undertaken directly by the Australian Government, operations work, the crux of the problem, can only be done by the bodies actually responsible for controlling the reserves, i.e. the State and Territory Fauna Authorities and National Park Services. A State like Western Australia which has many conservation reserves covering a large area, some containing rare and unique wildlife now extinct elsewhere in the country, but which has a relatively low ability to provide funds from its own revenues, should be given assistance.

The actual costs of management are usually small by comparison with the price of purchasing a reserve but they are a continuing cost and in the long run may account for much more than the purchase price. Some examples are as follows:

(1) Tutanning Nature Reserve, Western Australia (contains both *Bettongia penicillata* and *Macropus eugenii*)

| | |
|---|---|
| A. Resident ranger | |
| Capital costs (house, vehicles, etc.) | $30 000 |
| Annual recurring expenses (salary, etc.) | $10 000 |
| Prescribed burning, fire control, etc. | $5 000 |
| B. Research—annually | $5 000 |

(2) Bernier and Dorre Islands, Western Australia (only known populations of *Lagorchestes hirsutus* and *Lagostrophus fasciatus*, also has *Bettongia lesueur*)

| | |
|---|---|
| A. Resident ranger | |
| Capital, including boat | $60 000 |
| Annual recurring expenses | $15 000 |
| B. Research—annually | $5 000 |

# COMMENTS

The Working Group decided to make comment on two aspects of macropod habitat acquisition and management which it considers important.

## 1. **Fencing**

Because of the increasing pressures in some States to fence reserves the Working Group emphasises that fences to keep wildlife in reserves are most inadvisable since they prevent normal population movements and population control through the action of predators on surrounding cleared land. This often leads to overcrowding and degradation of the habitat. Fences with one way gates can further aggravate the problem. In these situations it is preferable to cull the surplus animals on adjoining land if they are causing damage. Fences are desirable only to exclude stock and, possibly, predators.

## 2. **Islands**

Throughout this report indications have been given of the importance of island populations especially where certain species are now very rare or extinct on the mainland. Also, insular populations frequently exhibit characteristics peculiar to them and are of considerable scientific interest in their own right.

There are a number of cases on record where island populations have become extinct following disturbance; frequently this is due to the introduction of predators, especially the cat, but grazing, fire, etc., can also have adverse effects. Where stock can be excluded or predators controlled the reintroduction of species to islands should be considered, since islands usually offer a much better chance of retaining populations of the smaller macropods than reserves on the mainland.

The reverse case, reintroduction to the mainland from islands, should not be attempted without considerable research because of a number of factors, such as:

(a) the difficulty of proving the species extinct on the mainland at this stage of knowledge; and

(b) the special adaptations of island populations, which often are found in very different habitats from those originally used on the mainland.

Attempts in recent years to introduce *Macropus parma* from New Zealand, and its subsequent rediscovery in relative abundance in Australia, illustrates one of the problems above.

Because of the small size of most islands and their attraction to people the habitats thereon must be regarded as vulnerable to disturbance and special management is needed.

# CONCLUSIONS

The species of the Macropodidae in most urgent need of habitat reservation are, in order of priority:

1. *Onychogalea fraenata* Bridle Nail-tailed Wallaby
2. *Macropus giganteus* Forester (Tasmania only)
3. *Bettongia tropica* Northern Rat-Kangaroo
4. *Petrogale xanthopus* Yellow-footed Rock-Wallaby
5. *Bettongia penicillata* Woylie
6. *Lagorchestes conspicillatus* Spectacled Hare-Wallaby
7. *Macropus parma* Parma Wallaby
8. *Macropus eugenii* Tammar
9. *Setonix brachyurus* Quokka
10. *Bettongia gaimardi* Eastern Rat-Kangaroo
11. *Potorous tridactylus* Potoroo
12. All *Petrogale* spp. in settled areas Rock-Wallabies
13. *Onychogalea unguifera* Northern Nail-tailed Wallaby

*Petrogale xanthopus* (M. Morcombe photo)

Species of macropods for which there are no known mainland populations but which will require immediate habitat reservation if rediscovered are:

1. *Caloprymnus campestris* Desert Rat-Kangaroo
2. *Lagorchestes hirsutus* Western Hare-Wallaby
3. *Lagostrophus fasciatus* Banded Hare-Wallaby
4. *Thylogale billardierii* Tasmanian Pademalon
5. *Bettongia gaimardi* Eastern Rat-Kangaroo
6. *Bettongia lesueur* Boodie
7. *Macropus greyi* Toolache