

DRAFT ACTION PLAN No. 22

In accordance with section 38 of the *Nature Conservation Act 1980*, the **Brush-tailed Rock-wallaby (*Petrogale penicillata*)** was declared an **endangered** species on 4 September 2003 (Instrument No.265 of 2003). Section 40 of the Act requires the Conservator of Flora and Fauna to prepare an Action Plan in response to each declaration. This is the Action Plan for:

Brush-tailed Rock-wallaby *Petrogale penicillata*

Preamble

This Action Plan constitutes version two of Action Plan 22 for the Brush-tailed Rock-wallaby. Since the first version (19 October 1999) was completed (ACT Government 1999) considerable work has been achieved against the actions in that plan and new information about the conservation needs of the species have come to light. Much of this new information has come from more research into the species ecology and management (Eldridge 2011). Version two seeks to encompass this broader understanding of the science surrounding the recovery of this species.

During this intervening period, the ACT has contributed greatly to the conservation of the species through animal production efforts at Tidbinbilla Nature Reserve (TNR). Tidbinbilla has successfully bred animals for reintroduction in Victoria and provided an important venue for research that includes physiological, behavioural and reproductive biology studies. It is envisaged that the ACT will continue to play a pivotal role in the conservation of the species through contributions to state and national recovery teams in the provision of continued breeding facilities as well as providing expertise in the ecology and management of the species.

The *Nature Conservation Act 1980* establishes the ACT Flora and Fauna Committee with responsibilities for assessing the conservation status of the ACT's flora and fauna and the ecological significance of potentially threatening processes. Where the Committee believes that a species or ecological community is threatened with extinction or a process is an ecological threat, it is required to advise the responsible Minister, and recommend that a declaration be made accordingly.

Flora and Fauna Committee assessments are made on nature conservation grounds only and are guided by specified criteria as set out in

Disallowable Instrument DI2008-170 "*Nature Conservation (Criteria and Guidelines for Declaring Threatened Species and Communities) Determination 2008*".

In making its assessment of the Brush-tailed Rock-wallaby, the Committee concluded that it satisfied the criteria indicated below.

An Action Plan is required in response to each declaration. It must include proposals for the identification, protection and survival of a threatened species or ecological community, or, in the case of a threatening process, proposals to minimise its effect.

This Action Plan was prepared by the Conservator of Flora and Fauna in accordance with the requirements of the *Nature Conservation Act 1980*, in consultation with the Flora and Fauna Committee and after the statutory period for public comment.

While the legal authority of this Action Plan is confined to the Australian Capital Territory, management considerations are addressed in a regional context.

Criteria Satisfied

1.2 The species is observed, estimated, inferred or suspected to be at risk of premature extinction in the ACT region in the near future, as demonstrated by:

1.2.1 Current severe decline in population or distribution from evidence based on:

1.2.1.1 Direct observation, including comparison of historical and current records.

1.2.1.5 Severe threats from herbivores, predators, parasites, pathogens or competitors

Conservation Status

International

IUCN - The species is listed as Near Threatened due to its continued decline at a rate of less than 30% over 10 years (Taggart *et al.* 2008).

National

Vulnerable - Declaration under s178, s181, and s183 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Australian Capital Territory

Endangered - Section 38 of the *Nature Conservation Act 1980*,

Instrument No. DI2012-11 (formerly Instrument No. 192 of 1998 and originally Instrument No. 1 of 1997)

Special Protection Status Species. - Section 33 of the *Nature Conservation Act 1980*, Instrument No. DI3012-111.

New South Wales

Endangered – Part 1, Schedule 1 of the *Threatened Species Conservation Act 1995*.

Queensland

Vulnerable - *Nature Conservation Act 1992*.

Victoria

Threatened - *Flora and Fauna Guarantee Act 1988*

Critically Endangered - Advisory List of Threatened Vertebrate Fauna in Victoria (DEPI 2013).

Species description and ecology

DESCRIPTION

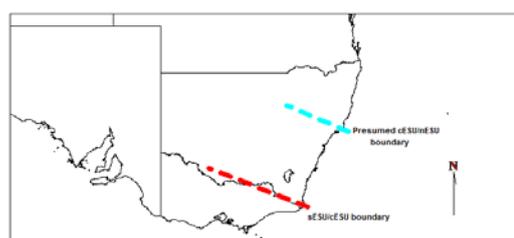
The Brush-tailed Rock-wallaby, *Petrogale penicillata* (Figure 1) is a member of the kangaroo family Macropodidae and one of 16 known rock-wallaby species. Browning *et al.* (2001) found considerable genetic divergence between populations across the range of the species and suggested that the species be managed as three distinct Evolutionarily Significant Units (ESU's). These ESU's are geographically defined and termed as northern, central and southern (nESU, cESU and sESU). The boundaries of these ESU's were more recently defined by Paplinska *et al.* (2011) using DNA recovered from museum specimens. This work placed the ACT to the south of the central ESU (see Figure 2).

Figure 1. *Petrogale penicillata* (W. Byatt).



As the common name suggests, the species possesses a long tail (regularly exceeding the body length) with a prominent brush on the distal third of its length (Eldridge and Close 2008). The pelage is brown above, tending to grey on the shoulders and reddish on the rump and hind quarters (Eldridge and Close 2008). Adult males have an average mass of 7.9 kg and an average length of 557mm, while adult females are slightly smaller with an average mass of 6.3 kg and an average length of 536mm (Eldridge and Close 2008). Like other rock-wallaby species, brush-tailed rock-wallabies exhibit a number of morphological features that are adaptations for living in rugged terrain. These include extensive muscular development in the hind quarters and intricately granulated patterns on the soles of their feet for moving through steep, rocky habitats (Eldridge and Close 1983).

Figure 2. *Petrogale penicillata* Evolutionarily Significant Unit boundaries (after Paplinska *et al.* 2011).



HABITAT

A study by Murray *et al.* (2008) found that at a landscape scale the strongest predictor for contemporary presence of the species across 200 sites in northern NSW and south east Queensland was erodible geological formations. They also found that at a site level the primary determinant of presence was high rock complexity. The work highlighted the need for multi scale approaches to conservation of habitat specialist species. The study also promoted the consideration of both

patch scale conservation measures that maximise food and shelter resources as well as broader scale management of landscape threats such as fox predation and fire.

Several studies (e.g. Lobert 1988, Short 1982, Waldgrave-Knight 2002) have examined the site specific attributes of preferred Brush-tailed Rock-wallaby habitat. They generally conclude that the important features include, an abundance refugia in the form of caves and overhangs, basking sites such as rock ledges and general northerly aspects. Connolly (1995), Reside and Martin (1996) and Ormay (1996) surveyed sites of historic distribution in Namadgi National Park (NNP) and TNR finding that sites in the ACT had similar values to those in other parts of the species range.

BREEDING

Adult female brush-tailed rock-wallabies produce an average of 1.2 young per year over their reproductive period, around 2-10 years of age (Taggart, *et al.* 1997). Hazlitt, *et al.* (2004) found that the species forms female based family groups that are closely related and usually number between 4-10 animals. They form close, polygynous bonds with a single male whose range is slightly larger than that of the females'. Like other members of the Macropodidae, they exhibit embryonic diapyses.

DIET

Tuft (2010) examined the diet of the species over 2 years and in 3 colonies across NSW, finding it broadly employed a generalist strategy across populations, and a more specialised strategy at finer geographic scales. Both Short (1989) and van Eeden, *et al.* (2011) found that the species is predominantly a grazer, that also makes use of forbs, browse and herbs to supplement their diet.

DISTRIBUTION AND ABUNDANCE

FORMER DISTRIBUTION

The species was originally distributed throughout the temperate zone of the Great Dividing Range from the Grampians in western Victoria to the range west of Brisbane in Queensland. The former range extended across the western fall of the GDR as far as Cobar NSW and Injune in Queensland (Short and Milkovits 1990).

In the ACT, the species is presumed to be extinct, with the last confirmed sighting occurring at Wallaby Rocks in the TNR in 1959 (Ormay 1996). However, the discovery of Rock-wallaby skeletal material in NNP suggest a more recent occurrence

of the species (Reside and Martin 1996). The nearest known extant colonies to the ACT are at Nattai National Park (156 km NNE of Canberra) and in Kangaroo Valley, NSW (187 km ENE of Canberra).

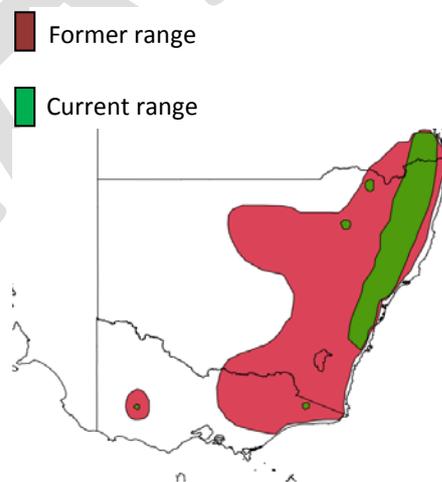
PRESENT DISTRIBUTION

There has been a dramatic decline in the distribution and abundance of the species, especially in Victoria, and in western and southern NSW, where its range has been severely reduced (Short and Milkovits 1990). Except for populations in the Warrumbungle Ranges, the species is now absent from the western slopes and plains of NSW. The geographic range since European settlement is estimated to have been reduced by 50-90% (Short and Milkovits 1990), see Figure 3. The species is considered to be locally common only in the north-eastern part of its range (Hill 1991).

Aside from a very small reintroduced colony in western Victoria only 1 other colony of around 25 animals is now known to exist in that state (Bluff *et al.* 2011).

Introduced populations are present in Hawaii and New Zealand (Short 1982).

Figure 3. Former and current distribution of the species (redrawn from Eldridge and Close 2008).



Threats

Several authors have examined the decline of this species across its range (e.g. Wakefield 1954, 1961, 1963, 1971, Hill 1991, Short and Milkovits 1990, Lunney *et al.* 1996), finding a range of human induced factors contributed to the deterioration of its range and abundance.

The species is restricted to rugged rocky terrain, with suitable foraging habitat nearby (Short 1982, Murray *et al.* 2008) that has a functional value of providing protection from attack by predators. The species is thought to be sensitive to relatively low population densities of the introduced red fox (*Vulpes vulpes*).

Hunting

Arguably the single most important, initial cause of decline for this species was the indiscriminate hunting for the commercial fur trade in the late 19th and early 20th centuries (Lunney *et al.* 1996). These authors found that as many as 144,000 skins were sold from NSW in the 1890's and many thousands more up until hunting ceased around 1927. This large scale hunting pressure reduced colony numbers significantly and left remaining colonies vulnerable to other threatening processes (Short and Milkovits 1990, Lunney, *et al.* 1996).

Introduced predators

The introduced red fox (*Vulpes vulpes*) has commonly been cited as an important agent for the decline of the species (e.g. Wakefield 1954, Short 1982) although until recently the only direct evidence for predation on rock wallabies comes from a study by Kinneer, *et al.* (1988), examining the species impact on *P. lateralis*. Recent data from a reintroduction of *P. penicillata* into the Grampians National Park in western Victoria indicates that foxes have most likely been associated with at least 50% of the mortalities experienced during the period 2008-2013 (D. Schultz personal communication October 2013).

Introduced herbivores

Rabbits (*Oryctolagus cuniculus*) and goats (*Capra hircus*) have both been considered as competitors for the Brush-tailed Rock-wallaby however goats appear to be more important, able to compete effectively in rocky, precipitous habitat (Short and Milkovits 1990).

Wildfire and drought are considered potentially serious threats to the survival of small isolated populations. Either could be the ultimate cause of extinction (Hill 1991). Norris and Belcher (1986) suggest that a change in fire regime may reduce the quantity of preferred forage of the species and that a shorter fire interval may be preferable.

Uncontrolled human disturbance effects to colonies are undefined, although a cautious approach should be adopted (Lobert and Waters 1988; Wakefield 1971). Reside and Martin (1996) considered that uncontrolled human usage of

historic Rock-wallaby sites in the ACT would severely jeopardise any attempts at re-introduction.

Disease

Hydatid disease (*Echinococcus granulosus*) has been found to be an important cause of mortality in some populations of the species in southern Queensland (Barnes, *et al.* 2008). While sylvatic occurrences of this disease are known for the ACT region, its importance as a threatening process for this species locally is not understood.

Major conservation objectives

The objective of this Action Plan is to contribute to the maintenance of long term, viable wild populations of the species across its former range including the ACT. At this time all known wild populations are extralimital to the ACT.

The objective is to be achieved through the following strategies:

1. Survey, Monitoring and Research
Promoting and participating in a program of survey, monitoring and research, aimed at better understanding of the ecology of the species and identifying and managing causes of population decline.
2. Protection
Identifying and protecting habitat critical to survival of the species in the ACT.
3. Regional Co-operation
Co-operating with state and local government agencies in formulating and implementing conservation measures.
4. Community Engagement
Increasing community awareness of the need to protect the species and its habitat, and supporting related community-based conservation action.

Conservation issues and intended management actions

As the species is considered likely to be extinct in the ACT, the issues for conservation in the ACT relate to:

1. Supporting the extralimital conservation of the species through involvement in state and national recovery teams.

2. Research into the processes that led to the eventual local extinction of the species in the ACT and region within the context of a potential reintroduction

The ACT through the captive colony at TNR has contributed a significant number of animals for reintroduction in Victoria and NSW. Continued involvement in this program provides useful knowledge for reintroductions of other mammal species in the ACT and may ultimately be beneficial for a reintroduction of the species into the ACT should the complex, local threatening processes become ameliorated. The ACT has also contributed significant scientific and technical expertise to the recovery of the species in other jurisdictions.

SURVEY, MONITORING AND RESEARCH

While substantial survey of formerly occupied sites within the ACT has been completed (Connolly 1995, Reside and Martin 1996, Ormay 1996), recent methods for habitat modelling using Geographic Information Systems could be applied to data already collected. Such an approach would allow for targeted appraisal of potential reintroduction sites in the ACT.

Reintroduction of the species into suitable habitat within the ACT may become possible in the longer term. Plans for reintroduction of the species into the ACT should consider the key questions in reintroduction biology proposed by Armstrong and Seddon (2008) and be consistent with the IUCN Guidelines for Reintroductions and Other Conservation Translocations (IUCN 2013). Recent experience from NSW and Victorian agencies indicates that the species is highly sensitive to low densities of foxes and that stress amongst introduced individuals appears to contribute to mortality of those animals (D Ashworth, personal communication August 2013). Significant research effort is required to elucidate the causes of extinction of this species in the ACT prior to serious consideration of reintroduction. Reintroduction would be considered where a landscape level, multi species recovery approach is considered viable. Any reintroduction will require substantial resources to research habitat suitability and a long term commitment to introduced predator control.

Objective

Continue to survey NNP for the distribution and population attributes of pest predator species.

Action

Continue to support vertebrate pest surveys undertaken by Conservation Planning and Research and the ACT Parks and Conservation Service

Indicators

Data relating to the distribution and population attributes of pest predator species is available and suitable for analysis.

Objective

Ascertain the effectiveness of pest predator species control programs in NNP and TNR.

Action

Measure and report the efficacy and efficiency of current pest predator control programs in NNP and TNR.

Indicators

Data relating to the efficacy and efficiency of pest predator control programs are available and suitable for analysis.

Objective

A better understanding of the mechanisms that caused local and regional extinctions of the species is developed and used to ascertain the steps necessary for a potential reintroduction program.

The captive colony at TNR has been utilised for several research projects that have contributed to a greater understanding of reproduction, mate choice and genetics in the species. This colony has the capacity to continue to be used in this manner, further contributing to the conservation of the species.

Actions

Several directions for research are required including:

1. An assessment of the relative importance of the threatening processes leading to the local extinction of the species.
2. Ecologically and economically sustainable abatement measures for introduced predators such as foxes and cats.
3. A better understanding of the most appropriate fire regime to maximise resources for the species.
4. Habitat modelling to ascertain the best habitat for the species locally.

5. The interactions between top predators (dingoes and wild dogs) and introduced predators (foxes and cats).
6. Reintroduction biology – optimal methodologies for the species.

Such research would not only benefit the recovery efforts for this species, but would provide useful information for a range of vertebrate taxa currently threatened or extinct in the ACT.

Indicators

An improved understanding of the ecology of the species in a local context, especially in the area of continued threat processes is documented.

Objective

Through collaboration with researchers in other jurisdictions and institutions, maximise experience and learning for application to a potential reintroduction in the ACT.

Action

Continue to collaborate with local and interstate researchers on reintroduction projects.

Indicators

An improved and contemporary understanding of the requirements for a reintroduction of the taxon locally is documented.

REGIONAL CO-OPERATION

TNR has highly regarded breeding facilities that have been used to very successfully produce animals for wild release in NSW and Victoria. It is envisaged that the ACT Parks and Conservation Service will maintain this high quality facility in association with the specialised skill set developed by staff at TNR to continue to support these programs.

Objective

Through engagement with the National and State recovery teams, continue to contribute to the conservation of the taxon across its current and former range.

Actions

1. Encourage and support scientific and technical staff to maintain positions on the National and Victorian Brush-tailed Rock-wallaby Recovery Teams.
2. Maintain contact with the NSW Brush-tailed Rock-wallaby Recovery Team and seek opportunities to assist with the recovery of the taxon in southern NSW.

3. The ACT Government, through TNR will continue to support the breeding programs for the species across its range, particularly the sESU. Opportunities to be more actively involved in the cESU recovery effort will be pursued with NSW agencies.

Indicators

1. Scientific and technical staff are members of the National and State Recovery Teams.
2. The ACT Government through its agencies has regular dialogue with the NSW Recovery Team and assists with conservation efforts in southern NSW.
3. TNR has the facilities and skilled staff to continue to breed animals for release into the wild.

COMMUNITY ENGAGEMENT

As the species is believed to be extinct in the ACT, the most appropriate focus for community engagement in the short term is through education programs offered at TNR.

If, in the future a reintroduction of the species is considered to be feasible, early engagement of the community is essential for the long term support of such an initiative. Community engagement will be a central planning requirement for any future reintroduction.

The captive colony at TNR provides an excellent opportunity for public education focussed on the plight of the species and the anthropogenic causes of its local extinction.

Objective

Continue to provide public education programs that illuminate the plight of the species and the agents of its demise.

Action

Making use of the captive colony and interpretive material continue to deliver and develop an education program.

Indicators

A public education program that elucidates the issues surrounding the local extinction of the brush-tailed rock wallaby and its dramatic decline elsewhere is in place.

Socio-economic issues

No significant adverse social - economic impacts are envisaged from implementation of this action plan. The long term objective of reintroduction would trigger a planning process that would consider any social - economic impacts of that action.

Legislative Provisions

The following legislation is relevant to conservation of flora and fauna in the ACT region:

AUSTRALIAN CAPITAL TERRITORY

Nature Conservation Act 1980

The *Nature Conservation Act 1980* provides a mechanism to encourage the protection of native plants and animals, the identification of threatened species and ecological communities, and the management of Public Land reserved for nature conservation purposes. Specified activities are managed via a licensing system.

Native plants and animals may be declared in recognition of a particular conservation concern and increased controls and penalties apply. Species declared as endangered must also be declared as having special protection status (SPS), the highest level of statutory protection that can be conferred.

Petrogale penicillata is listed as a SPS species and any activity affecting such a species is subject to special scrutiny. Conservation requirements are a paramount consideration and only activities related to conservation of the species or serving a special purpose are permissible.

The Conservator of Flora and Fauna may only grant a licence for activities affecting a species with SPS where satisfied that the act specified in the licence meets a range of stringent conditions. The public display at TNR complies with specified licence conditions for SPS species.

The Conservator must also approve a management plan for the keeping of animals for public display. A species management plan has been approved for keeping the captive population of the species at TNR.

Planning and Development Act 2007

The object of this Act is to provide a planning and land system that contributes to the orderly and sustainable development of the ACT. The Act establishes the Territory Plan; provides for the identification, reservation and management of Public Land; and outlines requirements for environmental impact assessment.

Heritage Act 2004

This Act establishes a system for the recognition, registration and conservation of natural and cultural heritage places and objects. A list of these places is maintained on the ACT Heritage Register.

COMMONWEALTH LEGISLATION

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation for environment protection. Under the EPBC Act, an action will require approval from the (Commonwealth) Environment Minister if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance and it is not subject to certain specified exceptions. Matters of national environmental significance are: World Heritage and National Heritage properties, Ramsar wetlands of international importance, nationally listed threatened species and ecological communities, migratory species protected under international agreements, Commonwealth marine environment and nuclear actions.

The species is listed as threatened s178, s181, and s183 of the EPBC Act and therefore any actions that may be considered as having a significant impact to the conservation of the species must be referred to the Commonwealth Minister for the Environment.

NEW SOUTH WALES

Threatened Species Conservation Act 1995

The Act came into effect on 1 January 1996 and requires the preparation of recovery plans for endangered species (other than those presumed extinct), endangered populations, endangered ecological communities and vulnerable species. Threat abatement plans are required to manage key threatening processes with a view to their abatement, amelioration or elimination.

A Species Impact Statement is required when a development application is made on land which

contains areas declared to be critical habitat under Part 3 of the Act or which is likely to significantly affect threatened species, populations or ecological communities or their habitats.

The preparation of a Recovery Plan for *P. penicillata* is mandatory as the species has been listed as vulnerable.

The NSW Scientific Committee has approved both the Recovery Plan for the Brush-tailed Rock-wallaby (*Petrogale penicillata*) (2008) and the Warrumbungle Brush-tailed Rock-wallaby Endangered Population Recovery Plan (2003).

Implementation and review

The ACT Government (Environment Planning Directorate) has responsibility for coordinating implementation of this Action Plan. Some actions will involve collaboration between government agencies, research organisations and the community.

The Flora and Fauna Committee will review implementation of this Action Plan after three years. The review will comprise an assessment of achievement of the objectives of the Action Plan, recognising that the timeframe for achieving some objectives are necessarily longer than the duration of this Action Plan. Assessment of progress will be based on achieving the relevant indicator for each Action.

The review will provide an opportunity for both the Flora and Fauna Committee and relevant sections of the ACT Government to assess progress; take account of new knowledge of the species and threats; consider new developments in policy and administration; and review directions and priorities for future conservation actions.

Actions will be implemented in consultation with the National, NSW and Victorian recovery teams, and will be consistent with regional programs. The ACT Parks and Conservation Service will be responsible for the on-ground implementation in areas under its control.

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