

Action Statement

Flora and Fauna Guarantee Act 1988

No. 79

Brush-tailed Phascogale

Phascogale tapoatafa

Description and Distribution

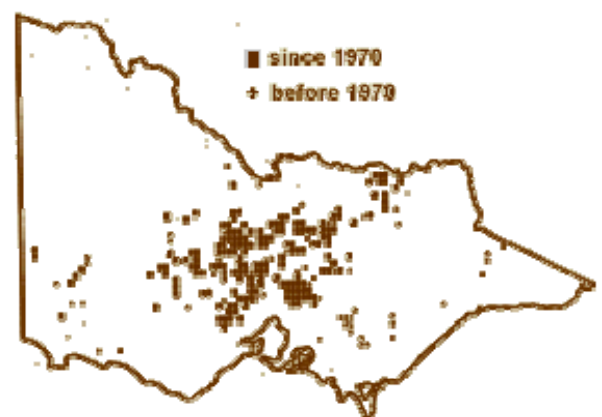
The Brush-tailed Phascogale (*Phascogale tapoatafa*), or Tuan, is a small, nocturnal, arboreal, carnivorous marsupial of the Family Dasyuridae. It is a uniform deep grey on the head, back and flanks, pale cream underneath with large naked ears and has a conspicuous, intensely black 'bottle-brush' tail up to 230 mm long. Adults may grow to over 400 mm in total length; males average 231 g in weight, and females 156 g, with an upper limit of 311 g (Cuttle 1983; Traill and Coates 1993; Soderquist 1995b; Strahan 1996). It is found in a variety of treed habitats having a reliable annual rainfall between 500 and 2000 mm (Cuttle 1983) but prefers open dry foothill forest with little ground cover.

The Brush-tailed Phascogale has a disjunct distribution in Australia. Two subspecies are recognised: *P. tapoatafa tapoatafa*, which is found in southern Queensland, coastal New South Wales, southern Victoria and the Eyre Peninsula in South Australia (at which locality it is apparently extinct) and south-west Western Australia; and *P. t. pirata* from northern Australia, above 18°S, including Cape York Peninsula.

In Victoria the Brush-tailed Phascogale's distribution is fragmented. The species occurs in the foothills to the east and north-east of Melbourne; central Victoria around Ballarat, Heathcote and Bendigo; north-eastern Victoria from Broadford to Wodonga; the Brisbane Ranges north-east of Geelong; and far western Victoria from Mt Eccles to Apsley. There have been no records from Gippsland for over 25 years (Atlas of Victorian Wildlife, Department of Natural Resources and Environment (NRE)) despite many



Brush-tailed Phascogale (*Phascogale tapoatafa*),
Illustration by Alexis Beckett



Distribution in Victoria
[source – Atlas of Victorian Wildlife 1997]

fauna surveys including Norris et al. (1983) and other surveys in the 'assessment of biological significance' series carried out by the Department of Conservation and Natural Resources (CNR) and its predecessors.

However, Belcher (1994) reported finding Brush-tailed Phascogale hair in the scats of Spot-tailed Quoll (*Dasyurus maculatus*) at Mt Stradbroke, west of Suggan Buggan in East Gippsland. There are no records of the species from the Otway Ranges or the Grampian Ranges in the Atlas of Victorian Wildlife, despite apparently suitable habitat in those areas.

Female Brush-tailed Phascogales forage over home ranges of 30–60 ha that do not overlap, while males forage over areas greater than 100 ha. Male home ranges overlap extensively with both females and other males (Traill and Coates 1993; Soderquist 1995a). Observations by Traill and Coates (1993) indicate that Brush-tailed Phascogales are primarily arboreal, and forage for their diet, which is predominantly large insects, spiders and centipedes, on the trunks and major branches of rough-barked trees and fallen logs. Eucalypt nectar may be taken when ironbarks or boxes are flowering (Traill and Coates 1993, Soderquist pers. comm.).

Brush-tailed Phascogales nest in as many as 30 different sites each year (Soderquist pers. comm.). Nests may be in hollows in dead or live trees, under flaking bark, or in tree stumps. Nursery nests require large, secure cavities with small openings; competition for these cavities from other species is often intense. Where natural hollows are scarce, Brush-tailed Phascogales will use nest boxes as shelter and nursery sites (Soderquist et al. 1996, Humphries pers. obs.). Mating occurs in early winter and most males die after the breeding season at an age of 11–12 months. Litters of seven or eight young are born between late June and early August after a gestation period of approximately 30 days. Young remain in the pouch for seven weeks and are thereafter left in the maternal nursery nest while the mother forages at night. Juveniles disperse in early summer (Soderquist and Lill 1995). Females seldom survive a second year and usually only raise one litter. Further information on the biology of the species is given by Cuttle (1983), Halley (1992) and Soderquist (1993a,b; 1995a,b).

Conservation Status

Current Status

CNR (1995)	Rare in Victoria
Kennedy (1992)	Potentially Vulnerable
SAC (1991)	Threatened

Maxwell et al. (1996) classified both subspecies as Lower Risk (near threatened) under the new IUCN guidelines, indicating that these taxa do not qualify as threatened but are close to qualifying as 'Vulnerable'.

The Brush-tailed Phascogale has been listed as a threatened taxon in Schedule 2 of the Flora and Fauna Guarantee Act 1988.

Reasons for Conservation Status

The decline of the Brush-tailed Phascogale in Victoria was first noted by the former Fisheries and Wildlife Department in about 1965 (Dempster pers. comm.) but was not formally documented until Ahern (1982) reported an apparent decline of the species over much of its range and indicated that its status warranted further investigation. The precise cause of the Brush-tailed Phascogale's decline in Victoria is not known, although widespread clearing of its preferred habitat of open dry sclerophyll forest for agriculture; modification of remnant habitat through timber and firewood production, grazing and mining activities have been suggested (Menkhorst and Gilmore 1979). Fragmentation of remnant habitat, loss of hollows and inappropriate fire regimes affect habitat quality and are thought to be contributing factors in their decline, as is predation by the introduced Red Fox (*Canis vulpes*) and Cat (*Felis catus*).

In New South Wales, the Brush-tailed Phascogale's range has been halved and it is considered extinct in South Australia (T. Soderquist pers. comm.).

The Atlas of Victorian Wildlife has over 500 records of the species. These records indicate that the Brush-tailed Phascogale has recently disappeared over much of its former range. It has not been recorded from the LaTrobe Valley since 1969 (Atlas of Victorian Wildlife) and there is only one record (Belcher 1994) from Gippsland since that time, despite the potential availability of suitable habitat. The major factor in the decline of the Brush-tailed Phascogale in these areas is not loss of forest habitat per se, but a reduction in the quality of the habitat. Soderquist (pers. comm.) found that foraging success in Gippsland was poor due to lower flowering success by Silvertop (*Eucalyptus sieberi*) compared with that of box or ironbark species.

Habitat degradation and fragmentation is still occurring in the species' remaining range as a result of timber and firewood production, grazing, mining activities and clearing of private land. The relative impact of each of these activities on the species is difficult to assess because the Brush-tailed Phascogale is cryptic and shy, occurs at low densities and is difficult to detect by traditional trapping techniques.

Poisoning campaigns using 1080 are targeted at introduced predators such as the Red Fox, which are potential predators of, and competitors with, Brush-tailed Phascogales. The predominantly arboreal foraging behaviour should minimise the likelihood of accidental poisoning, particularly as baits are buried, as required by the NRE Code of Practice.

The Scientific Advisory Committee (SAC 1991) commented that, in their opinion, 'it is particularly disturbing that the precise cause of the species' decline is not known'.

In its final recommendations, the SAC (1991) determined that the Brush-tailed Phascogale is:

- in a demonstrable state of decline which is likely to lead to extinction; and
- significantly prone to future threats which are likely to result in extinction.

Major Conservation Objectives

The Major Conservation Objectives Are:

- to maintain viable populations of the Brush-tailed Phascogale across its range; the short-term aim (3–5 years) is for the maintenance of at least 1000 breeding females in specified areas (this target is based on a population size that is likely to persist in the short to medium-term (Shaffer 1981; Soulé 1987));
- to determine the distribution and abundance of the Brush-tailed Phascogale in Victoria within five years; and
- to determine the critical threatening processes and implement remedial action within 5 years;
- A longer-term aim is to re-establish viable populations within the species' former range, particularly in eastern Victoria.

Management Issues

Ecological Issues Specific to the Taxon

The Brush-tailed Phascogale is a shy, cryptic species that occurs in low densities. It is difficult to detect using traditional trapping techniques. The threats to the species are not necessarily clearly defined, and some factors that are now thought to be threats may be found not to be so in the future. It is therefore difficult to determine the severity and relative importance of threats.

For an animal of its size, the Brush-tailed Phascogale forages over very large home ranges and only small populations can exist in quite large areas of habitat. Chiltern Box-Ironbark National Park (4200 ha), for example, only supports 35–50

breeding females, a density equivalent to about one female per square kilometre (Soderquist pers. comm.). At Chiltern, Brush-tailed Phascogales are better able to reproduce successfully in areas of least-disturbed habitat (Traill pers. comm.).

The Brush-tailed Phascogale is the largest dasyurid that exhibits obligate male die-off at the end of the first breeding season (aged 11–12 months). Females generally die after weaning their young and few survive to breed in a second season. This breeding strategy guarantees the loss of any isolated population that fails to breed in just one year. Thus, the species is prone to local and possibly regional extinctions.

Wider Conservation Issues

The Brush-tailed Phascogale is one of many dry forest and woodland species of fauna threatened with extinction in south-eastern Australia, including the Squirrel Glider (*Petaurus norfolcensis*), Regent Honeyeater (*Xanthomyza phrygia*), Bush Stone-curlew (*Burhinus grallarius*) and Grey-crowned Babbler (*Pomatostomus temporalis*), primarily due to loss of habitat and predation from introduced species. Management actions detailed in this action statement will assist with the conservation of these other species.

The box-ironbark forest type widely utilised by the Brush-tailed Phascogale in south-eastern Australia has suffered a severe reduction in range, and in habitat quality where it remains. Sixty-six percent of the community has been cleared in Victoria, and of that which remains, only 20% is in conservation reserves. Sixty-six percent of Victoria's remaining box-ironbark forests are managed as multi-purpose State Forest for activities including: timber production; flora and fauna conservation; honey production; mining; recreation and water production. The Victorian National Parks Association hosted a conference on the conservation of these forests in 1992 and concluded that urgent action was required to ensure the long-term survival of the community (Robinson 1993). As a result of the recommendations of the conference, NRE is developing a Conservation Program for box-ironbark forests (Traill 1993).

The paucity of hollow-bearing trees is of particular concern for the conservation of the Brush-tailed Phascogale. The loss of hollow-bearing trees from Victorian native forests has been listed as a potentially threatening process on Schedule 3 of the Flora and Fauna Guarantee Act 1988, largely because of the dependence of many vertebrates (including a number of rare species) on this habitat for shelter and nesting. An action statement which outlines the actions necessary to ameliorate the effects of this process is being prepared (NRE in

prep.). Actions to protect Brush-tailed Phascogale habitat will thus have much in common with those aimed at protecting the habitat of many other species. Forest Management Area (FMA) plans and prescriptions that are prepared or are in preparation incorporate strategies designed to retain and ensure the future supply of hollow-bearing trees. The most relevant of these plans and prescriptions are those for the Bendigo, Midlands and Central Highlands FMAs. Box-ironbark forests in the Bendigo FMA support the core populations of Brush-tailed Phascogale in Victoria, and their protection and enhancement is essential to the species' conservation. Fragmentation, isolation and degradation of the remnants are likely to be limiting factors for the fauna.

The species also occurs in grassy woodlands and foothill mixed-species open forests. Little of these forest types remain undisturbed.

Social and Economic Issues

Key social issues that need to be addressed on private land include management of habitat remnants, particularly in relation to firewood collection, grazing by domestic stock, subdivision and revegetation. The removal of 'dead and down' timber for firewood can decrease the value of otherwise suitable habitat for the Brush-tailed Phascogale and other hollow-dependant species, through loss of hollows and reduction in habitat for their invertebrate prey. Continuous grazing of habitat remnants on private land also has the potential to simplify the community structure and reduce the habitat suitability for food items because of reduced regeneration. Extensive consultation with landholders in significant habitat areas on private land will need to be undertaken, perhaps as a group Land for Wildlife project in conjunction with Landcare groups. A similar approach has had some success for the Regent Honeyeater (Willett 1993) and Superb Parrot (Davidson 1993) in northern Victoria. The Brush-tailed Phascogale has a strong public appeal, and such a project is likely to capture the interest of landholders, who would volunteer labour and material. Additional support is available, from sources such as NRE's Land Protection Incentive Scheme. The costs and benefits of fencing remnants and excluding stock need to be properly assessed.

The practice of bulldozing land as a preliminary to metal detecting (for gold) in the box-ironbark forests of central Victoria has the potential to conflict with habitat protection measures. Although the size of the area of the mining operations may be relatively small, there is often overlap with the best remaining habitat, and there may be severe local impact on biodiversity. Land managers must consider all mining proposals on a

landscape, spatial and temporal basis when determining the impact on local Brush-tailed Phascogale populations and consider possible conditions on mining proposals in order to minimise the potential impact. In such situations there may be social and economic consequences to the mine operators although, based on the current scale of mining operations in the area, this is likely to affect only a small number. Other sectors of the local community may 'vigorously oppose the mining proposal'.

It is possible that objections to mining may not be necessary in the future as adjacent areas of habitat mature or are restored. The community benefits of mining could be deferred rather than missed altogether.

Cats and Red Foxes are a threat to Brush-tailed Phascogales. Red Foxes are a concern to landholders, who are generally aware of the benefits of control efforts for livestock as well as for wildlife protection. The community is becoming increasingly aware of the problem created for wildlife by Cats, both unowned and owned but inappropriately managed. The Domestic (Feral and Nuisance) Animals Act 1994 provides the legislative framework for management of Cats.

The Brush-tailed Phascogale gained an early reputation as a 'determined slayer of chickens, and one which killed not merely to appease its appetite' (Jones 1923). This reputation continues today and aviculturists have reported losses of caged birds (Ahern pers. comm.; Humphries unpubl. data). There may be concerns raised if populations of Brush-tailed Phascogales rise in local areas so as to become a problem for poultry farmers and bird fanciers. However, it is unlikely that this situation will occur, given the ecological characteristics of the species, i.e. low population densities. The problem is manageable by taking appropriate precautions in areas where Brush-tailed Phascogales occur, e.g. protective fencing. Extension and liaison with poultry farmers will need to occur.

Previous Management Action

Biology and Research

Prior to the studies of Cuttle (1978, 1982a,b), only natural history notes had been reported on the Brush-tailed Phascogale. Jones (1923) gave a comprehensive description and some anecdotes of its carnivorous habits; Fleay (1929, 1934) provided observations on behaviour in the wild and in captivity, and bred animals in captivity; field observations of activity at a feeding station were published by Harrison (1961); and Wakefield (1961) briefly reviewed what was known about the species

in Victoria. Lunt (1988) described foraging behaviour.

Healesville Sanctuary (Zoological Board of Victoria) commenced a captive breeding program in 1976 with founder stock from Gosford (NSW). The stock in that colony was subsequently replaced with Victorian wild-caught stock from Christmas Hills, Bendigo and Chiltern (M. Halley, Healesville Sanctuary, pers. comm.). Halley (1992) has detailed captive breeding and husbandry techniques.

Studies of Brush-tailed Phascogale ecology in northern and central Victoria from 1986 to 1989 yielded information on capture methods, nest-site use, foraging behaviour, diet, home range and dispersal (Traill and Coates 1993).

Soderquist (1993a,b; 1995a) investigated foraging and reproductive strategies of the Brush-tailed Phascogale. Part of this study included a trial reintroduction program in central Gippsland using animals from the Healesville Sanctuary captive breeding program. The results of this trial revealed factors important to the survival chances of re-introduced captive-bred animals (Soderquist 1994).

Current research in Western Australia (Rhind 1996a) is investigating the impact of timber harvesting on spatial organisation, reproduction, and foraging behaviour.

Monitoring

A group of residents in the Christmas Hills/Bend of Islands area north of Melbourne, has monitored local Brush-tailed Phascogale populations since the mid-1970s.

Survey

Distribution records have been maintained by the Flora and Fauna Branch (NRE) and its predecessors. The records represent an accumulation of museum, Departmental and literature records, rather than being the result of systematic surveys.

Threat Abatement and Habitat Protection

Nest boxes have been erected at many locations throughout Victoria where Brush-tailed Phascogales occur and natural hollows are limited. Boxes have been occupied by Brush-tailed Phascogales at many of these locations. This action is of limited value as a provider of shelter on a large scale; its principal use is as a survey technique.

Liaison and Community Extension

The plight of the Brush-tailed Phascogale has featured in many articles in the press and electronic media (e.g. The Age 15 June 1978; 1 April 1992; Ballarat Courier 20 August 1988, 3 March 1990 and 28 January 1995; Channel 10 children's program Totally Wild, April 1994).

The Land for Wildlife Newsletter, circulated widely in rural areas, carried articles about the Brush-tailed Phascogale in February 1992 and May 1993 (Soderquist 1992, 1993c; Platt 1993a,b). Healesville Sanctuary Tracks, a periodical produced by Healesville Sanctuary, featured articles on the Brush-tailed Phascogale (Anon. 1991, 1993).

In May 1992 the State Government launched a campaign to raise community awareness of the problems caused by Cats to native wildlife. The campaign promotes responsible pet ownership to 'Protect your cat, protect your wildlife' (DCE 1992). The Cat Kit: a Resource for Communities (CNR 1994) provides information about improving Cat management, to be used in conjunction with state legislative requirements under the Domestic (Feral and Nuisance) Animal Act 1994.

A brochure describing the biology and conservation status of the Brush-tailed Phascogale has been produced by Healesville Sanctuary in its 'Cadbury Furry Friends' series. The Brush-tailed Phascogale has also featured in popular magazines such as Wildlife Australia (Sharpe 1992), Australian Natural History (Sharpe 1993) and Australian Geographic (Rhind 1996b).

Community Participation

In 1991 the 'Friends of the Tuan' was formed by the National Threatened Species Network, hosted by the Victorian National Parks Association. This group coordinates and gives assistance to groups interested in the conservation of the Brush-tailed Phascogale. Activities to date include liaison and assistance with postgraduate research work, facilitation of a nest-box monitoring project at Rushworth with the Australian Trust for Conservation Volunteers, provision of information for extension displays including at Bendigo Special School and distribution of monitoring sheets.

Land for Wildlife participants and local naturalists' groups are involved in the erection of nest-boxes.

Legislation

In June 1991, Amendment S16 to the State Section of all planning schemes in Victoria placed planning controls on the removal, destruction and lopping and disturbance of native vegetation. This amendment has increased public awareness of the value of remnant native vegetation and have resulted in reduced levels of native vegetation clearing across Victoria.

Predation of native wildlife by the introduced Red Fox has been listed as a potentially threatening process in Schedule 3 of the Flora and Fauna Guarantee Act 1988. An Action Statement has been published (CNR 1993), and increased controls are being implemented progressively.

Predation of native wildlife by domestic and feral Cats has received the SAC's preliminary recommendation as a threatening process under the Flora and Fauna Guarantee Act 1988 and an Action Statement has been published.

Intended Management Action

The following management actions will be carried out by the Flora and Fauna Program (FF), Regions (REG), universities or other research institutions (UN), Parks Victoria (PV), the Zoological Parks and Gardens Board (ZPG), the Forests Service (FS), Friends of the Tuan (FOT), field naturalists clubs (FN), the Victorian Roadsides Conservation Committee (VRC), the Bureau of Animal Welfare (BAW) and Landcare groups (LC).

Management

1. Nominate the Brush-tailed Phascogale for listing as a threatened species pursuant to the provisions of the Commonwealth Endangered Species Protection Act 1992. (FF)
2. Prepare a Recovery Plan for the Brush-tailed Phascogale in south-eastern Australia (if accepted for listing) in conjunction with representatives from New South Wales and Queensland, as a matter of urgency. This plan will be prepared in accordance with the Environment Australia (EA) Endangered Species Unit Recovery Plan guidelines. Funding for the preparation and subsequent implementation of the Recovery Plan will be sought from EA and State bodies. (FF, REG)
3. Form a Recovery Team to oversee and coordinate the implementation of the Recovery Plan and Action Statement. Members will include biologists, wildlife, park and forest managers, a social biologist and representatives from community groups and captive breeding organisations. The Recovery Team will disseminate information to managers and interest groups. (REG, FF)
4. Determine, designate and ensure appropriate management of the Critical Habitat of Brush-tailed Phascogales in Victoria by 2000. (FF, REG)

Research

Priorities for research will be to refine knowledge about abundance and distribution, identify key habitat features and threats, identify key populations to meet the major conservation objective of maintaining at least 1000 breeding

females in viable populations in Victoria, and develop recommendations for ameliorative actions at selected sites.

5. Encourage research into:
 - the contribution of linear reserves to Brush-tailed Phascogale populations
 - the effects of different silvicultural practices on survival;
 - effects of different fire regimes;
 - the dynamics of nesting and shelter hollows;
 - the effects of habitat isolation and simplification; and
 - the causes of mortality. (FF, REG, UN, FS, PV)
6. Conduct population viability analyses using reproductive and ecological data derived from research projects to determine short to long-term viability of isolated populations and the critical biological parameters affecting their survival.(FF, REG, UN) 7.
7. Establish trials to determine the impact of 1080 predator poisoning campaigns on the Brush-tailed Phascogale using the captive colony at Healesville Sanctuary. The captive colony will be used to determine if Brush-tailed Phascogales take unpoisoned baits deployed by standard procedures. If Brush-tailed Phascogales are found to take these baits in pens, further field trials will be implemented and if necessary, poison bait deployment methods reviewed. (REG)
8. Inform NRE zoologists, forest and wildlife managers of research findings from Victoria and interstate. (FF)

Survey and Monitoring

9. Encourage NRE staff and the public, in conjunction with the Friends of the Tuan, to record all sightings of the Brush-tailed Phascogale on the Atlas of Victorian Wildlife. (PV, FS, REG, FOT)
10. Encourage interest groups and NRE to survey areas of potential Brush-tailed Phascogale habitat by using nest-boxes and other appropriate methods. (PV, FS, REG, FOT)
11. Record sites important for scientific research (critical populations, areas of high density) on relevant databases and maps. (REG, FF)
12. Establish long-term (10+ years) monitoring at important sites aimed at determining changes

in distribution and density. This monitoring will provide correlative information on habitat change and population vulnerability. Short-term surveys are of little value as local Brush-tailed Phascogale populations may fluctuate between years (Soderquist pers. comm.). (REG, FF, UN, FS, PV)

Community Participation and Involvement

13. Promote awareness of the species in its current range (in conjunction with the Friends of the Tuan) by news articles and displays. (FF, FOT, REG)
14. Encourage Land for Wildlife group projects aimed at protecting, managing and restoring Brush-tailed Phascogale habitat on private land which is critical to populations identified to meet the major conservation objective. (FF, REG)
15. Encourage naturalist groups to adopt local Brush-tailed Phascogale populations. (FN, FOT)
16. Approach local government for assistance through rate relief or incentives for actions involving revegetation or protection of Brush-tailed Phascogale habitat in key areas on private land. (REG)

Actions 13-16 may serve to engender community ownership of the recovery program.

Habitat Protection and Restoration

17. Identify (by the end of 1998) 40 areas across the geographic range; each area is to provide suitable habitat for a minimum 25 female Brush-tailed Phascogales. Each site is to be a minimum of 1000 ha, preferably already managed sympathetically for Brush-tailed Phascogale. Review and change sites only if new sites are of a higher quality or are better able to be protected*. (REG, FS, PV)

*Priority for inclusion as follows: confirmed 'hot spot', known presence of animals, reintroduction site, suitable habitat.

18. Prepare prescriptions to protect and maintain Brush-tailed Phascogale populations and their habitat in State Forests as part of public land planning processes. Actions may include a review of fuel-reduction burning practices in sensitive areas, retention of large trees, prohibition of the removal of naturally fallen timber, removal of grazing in specified areas, development of prescriptions for Brush-tailed Phascogale habitat restoration after mining. (REG, FS, PV)

19. Provide training for public land managers in areas where Brush-tailed Phascogale occurs, to enable them to identify suitable habitat trees for retention during activities such as timber harvesting or infrastructure development. (REG, FS, PV)
20. In local conservation planning, link fragmented habitat patches by protecting and enhancing existing habitat corridors and establishing others. Manage habitat appropriately. (REG, FS, PV)
21. Monitor roadside management activities in key habitat areas and liaise with management authorities if necessary with a view to improving management of roadside remnants. This will be achieved through consultation and liaison with the Victorian Roadside Conservation Advisory Committee, local municipalities and State management authorities. (REG, VRC)

Threat Abatement

22. Publicise, with emphasis in areas that support Brush-tailed Phascogales, the requirements for responsible Cat management under the Domestic (Feral and Nuisance) Animals Act 1994. Recommendations regarding control of unowned Cats and impacts on native wildlife will be widely publicised as outlined in the Cat Kit (CNR 1994). Covenants restricting the keeping of Cats may be applied to housing or hobby-farming subdivisions in key areas. (FF, BAW, REG)
23. Control Red Foxes on both private and public land, especially in key areas. This will be carried out in conjunction with local Landcare groups where applicable. (REG, LC)

Captive Breeding

24. Modify the captive colony at Healesville Sanctuary so that only Victorian animals of known provenance are maintained. Animals from NSW and Qld will not be used for breeding and will be maintained only for display purposes until natural death. The captive colony at Healesville Sanctuary will be used for studies of the species' biology and for display and education purposes. (ZPG)

Other Desirable Management Action

25. Undertake reintroductions only as part of investigations into the effects of potentially threatening processes, or as part of a species rehabilitation program prescribed in the

recovery plan. The captive colony may be used to supply animals for reintroduction programs.

26. Encourage the covenanting or acquisition of suitable habitat in key areas.
27. Liaise with Catchment Management Authorities on appropriate land management for the species.

Legislative Powers Operating

Legislation

Conservation, Forests and Lands Act 1987 — provides for the management of public land under the Act, the co-ordination of legislation administered by NRE and for the preparation of Codes of Practice.

Crown Land (Reserves) Act 1978 — provides for reserving areas as public land and for making a specific reservation status for existing public land.

Country Fire Authority Act 1958 — provides for fire protection and suppression in country areas and requires that authorities take practical steps for the prevention of fires.

Domestic (Feral and Nuisance) Animals Act 1994 — provides for the management of domestic and feral cats and dogs to be in accord with responsible pet ownership.

Endangered Species Protection Act 1992 — provides for the protection and conservation of threatened species of plants and animals throughout Australia.

Flora and Fauna Guarantee Act 1988 — provides for the protection of flora and fauna in Victoria through a range of mechanisms including the determination of critical habitat.

Forests Act 1978 — provides for the management of forests, including fire management and controls over the taking of forest produce.

Local Government Act 1958 — provides for local municipal by-laws and conservation regulations (e.g. permit requirement for land clearing).

Mineral Resources Development Act 1990 — provides for the facilitation of mineral development and management of mineral resources and includes controls over exploration and mining activities to minimise impacts on the environment.

National Parks Act 1975 — provides for the preservation, protection and management of specified natural areas and includes controls over taking native flora and fauna from parks.

Planning and Environment Act 1987 — provides for the protection of native vegetation through the

State section, and for regional planning controls in all planning schemes.

Victorian Conservation Trust Act 1972 — provides for the establishment of conservation covenants on land titles.

Wildlife Act 1975 — provides for the management of wildlife and includes controls over the handling of protected wildlife. The status of the Brush-tailed Phascogale as protected wildlife makes the taking of it an offence under the Act unless an appropriate permit has been obtained.

Licence/Permit Conditions

No permits to take, relocate, reintroduce or study Brush-tailed Phascogales will be given except in conformity to the broad conservation and research strategy proposed in this Action Statement.

Consultation and Community Participation

Wildlife, Forest, National Park, Crown Land Managers and biologists with experience and knowledge of the Brush-tailed Phascogale have been consulted widely in the preparation of this Action Statement. The Friends of the Tuan has also provided valuable information and management advice.

NRE will encourage community support and participation in the implementation of all aspects of this Action Statement.

Implementation, Evaluation and Review

The Director, NRE Flora and Fauna Program, and the NRE Regional Managers in areas where Brush-tailed Phascogales occur will be responsible for coordinating the implementation of this Action Statement.

A review of research and management implications will be undertaken by the Wildlife Section and provided to Regional personnel annually.

Contacts

Management

Flora and Fauna Program staff in relevant NRE Regions
Threatened Species Unit, Flora and Fauna Program, NRE

Biology

Todd Soderquist, Bendigo
Barry Trill, Environment Victoria
Merril Halley, Healesville Sanctuary

Other

Todd Soderquist, 'Friends of the Tuan'

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Personal Communications

Soderquist, T.R., formerly Department of Zoology and Evolutionary Ecology, Monash University

Dempster, J.K., formerly Research Manager, Fisheries and Wildlife Division

Halley, M., Head Mammal Keeper, Healesville Sanctuary.

Compiled by Robert Humphries and John Seebeck, Department of Natural Resources and Environment.

Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

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