

Flora & Fauna Guarantee Action Statement

#62

This Action Statement was first published in 1995 and remains current. This version has been prepared for web publication. It retains the original text of the action statement, although contact information, the distribution map and the illustration may have been updated.

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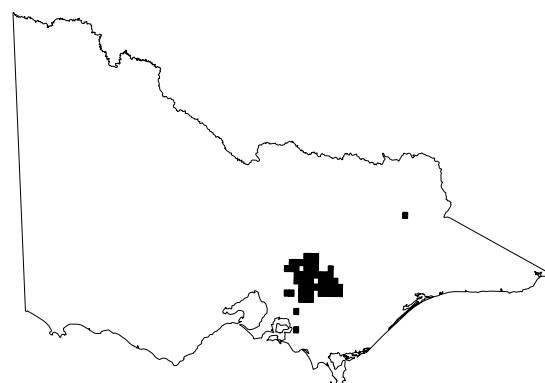
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Leadbeater's Possum *Gymnobelideus leadbeateri*



Leadbeater's Possum (*Gymnobelideus leadbeateri*)
(Illustration by Robert Inghen)



Distribution in Victoria (DSE 2002)

Description and Distribution

Leadbeater's Possum (*Gymnobelideus leadbeateri*) is a small omnivorous arboreal marsupial with a head and body length between 150 and 170 mm and a tail length between 145 and 180 mm. The animal weighs between 100 and 135 g in the spring and 110 and 166 g in the autumn. It is grey to greyish-brown above and paler below with a prominent dark mid-dorsal stripe. Leadbeater's Possum is distinguishable from the related Sugar Glider (*Petaurus breviceps*) by the absence of a gliding membrane and a club-shaped tail, broader near the tip than at the base (Smith 1980). Until 1961 Leadbeater's Possum was known from only five specimens which had been collected prior to 1910 (four from the Bass River region in south-western Gippsland and a fifth specimen from Mt Wills, approximately 250 km north-east of the Bass River locality (Brazenor 1932)). Naturalists conducted a number of searches in these localities (Brazenor 1931, 1946; Fleay 1933, 1947) but were unsuccessful,

and in 1960 Leadbeater's Possum was listed as 'probably extinct' by the International Union for the Conservation of Nature (Calaby 1960). However, one year later the possum was rediscovered at Tommy's Bend, near Marysville in the Central Highlands of Victoria (Wilkinson 1961).

This discovery, the first for this region, resulted in many exploratory surveys in montane ash forests and there was a sudden and increasing number of sightings within the Central Highlands. Today, in some select localities of this region, Leadbeater's Possum is the most commonly observed arboreal marsupial (Seebeck et al. 1983; Smith et al. 1985).

Records since the species' rediscovery indicate that Leadbeater's Possum is mainly confined to montane ash forests, dominated by *Eucalyptus regnans*, *E. delegatensis* or *E. nitens*, in the Central Highlands of Victoria. It appears that the possum is not uniformly distributed throughout this area, but occurs in patches of suitable habitat influenced by past wildfires and selective timber

harvesting operations. Of considerable interest are a number of recent records within snow gum *E. pauciflora* woodland at Lake Mountain in the Victorian Alps (Jelinek et al. 1995). Other records exist in the forests of eastern Victoria, but all are unconfirmed except for a small resident colony in a lowland *E. camphora* and *E. ovata* dominated swamp forest at Cockatoo Creek, in Yellingbo State Nature Reserve (Smales 1994).

Habitat

The most important components of Leadbeater's Possum habitat are nest-tree abundance, vegetation structure and food availability. Large old hollow trees (either dead or alive) for nesting and shelter are essential for the survival of Leadbeater's Possum. Maximum population densities occur in regrowth forests (15-50 years) with more than six potential nest-trees per 3 ha and a biomass of *Acacia* spp. between 20-50% of stand basal area (Smith and Lindenmayer 1992). The term 'potential nest-tree' refers to existing hollow-bearing trees that have the potential to be utilised by the species. Leadbeater's Possum prefer short, fat trees with numerous holes and a large quantity of dense surrounding vegetation (Lindenmayer et al., 1991).

Conservation Status

Current Status

CNR (in press)	Endangered
ANZECC (1991)	Endangered
IUCN (1994)	Endangered
SAC (1991)	Threatened

Leadbeater's Possum has been listed as a threatened taxon on Schedule 2 of the Flora and Fauna Guarantee Act 1988.

Reasons for Conservation Status

Leadbeater's Possum is the only member of the genus *Gymnobelideus* and wild populations are confined to Victoria. This means that the survival of the species in the wild is totally dependent on conservation measures undertaken in Victoria.

Leadbeater's Possum now appears to be mainly confined to the montane ash forests of the Central Highlands of Victoria, although early records come from a much larger area. The known range of the species expanded rapidly following rediscovery in 1961, and this trend, although slower in recent times, has continued probably due to increasing search efforts and improved detection methods. It has been predicted that the availability of nest trees will decline (Lindenmayer et al. 1990), precipitating a massive decline of Leadbeater's Possum over the next 30 years followed by a population 'bottleneck' lasting until 2075. This bottleneck means that for a period of 50 years, from 2020 to 2075, there will be the minimum habitat suitable for Leadbeater's Possum, so threats to population viability will increase. Smith et al. (1985), and Smith and Lindenmayer (1988) pointed out that existing nest-trees in 1939 regrowth forests or recently logged regrowth forests are being reduced by logging or natural decay more rapidly than replacement hollows are developing. Thus, the suitability of

regrowth forest for Leadbeater's Possum is declining and it is in these regrowth forests where the highest densities of Leadbeater's Possum may now occur.

In its final recommendation the SAC (1991) determined that the Leadbeater's Possum is:

- significantly prone to future threats which are likely to result in extinction, and
- very rare in terms of abundance and or distribution.

Major Conservation Objectives

- To guarantee that Leadbeater's Possum can survive, flourish and retain their potential for evolutionary development in the wild. In quantitative terms this may be described as to ensure the survival of Leadbeater's Possum by managing its forest habitat towards a target of no more than a 1% probability of extinction over 250 years throughout the forest within its current range.
- To identify and take measures to protect all areas of optimum and potentially optimum habitat (as defined in this Action Statement) throughout the known range of the species.
- To apply strategies that address the development of habitat for the future by achieving a long-term balance between the rate of loss of habitat and the rate of formation of habitat.
- To develop modified and alternative silvicultural systems that result in the continuing presence of habitat and still allow for the extraction and production of wood products on an economic basis.
- To undertake research on the biology and ecology of the species with particular emphasis on the risk of wildfire to reduce strategic populations and the dispersal and recolonisation capacities of the species.
- To maintain a stable captive-breeding population of the species for community education and research purposes.

Management Issues

The Timber Industry Strategy (Victorian Government 1986) sets directions for the timber industry by outlining a balance between timber production and environmental protection. Broad guidelines and principles to achieve this balance have been developed in the Code of Forest Practices for Timber Production (CFL 1989). A requirement of this "Code" is the production of Forest Management Plans (FMPs) which include detailed prescriptions for the conservation of native forest fauna. In State forest, FMPs are the primary vehicles for the implementation of Flora and Fauna Guarantee Action Statements.

Land use within the known distribution of Leadbeater's Possum includes forest where timber harvesting is permitted (State forest, 69%) and where it is prohibited (parks and reserves, 31%) (LCC 1994); A further 27% of State forest is excluded from timber harvesting by prescription. When the relevant FMPs have been completed less than 50% of the area within the habitat range of Leadbeater's Possum will be available for timber production. The majority of the reserved forest is contained within the recently legislated Yarra Ranges

National Park, which is strategically placed at the core of the species' distribution. The Park encloses three large water catchments, comprising the most extensive areas of old-growth and mixed-aged ash forest in this region and represents a critical medium and long-term resource of hollow-bearing trees. Management of parks and reserves for Leadbeater's Possum, will be relatively simple, considering the overriding need for habitat protection, rather than manipulation.

In parks and reserves, Leadbeater's Possum habitat is not subjected to change by deliberate management. However, in State forest where timber harvesting is permitted, the current system of harvesting and regenerating ash forests is clearfelling. In areas harvested, this involves the removal of all merchantable trees at one felling, followed by seedbed preparation by either burning or mechanical disturbance, and artificial sowing or planting. Large dead and live old trees are left standing on the coupe unless they present an unacceptable safety hazard or are chosen for seed collection. Clearfelling effectively meets key silvicultural requirements and, from an operational viewpoint, the method is comparatively simple, safe and easily supervised. However, for the conservation of hollow-dependent forest fauna, including Leadbeater's Possum, the current practice has two major problems. Firstly, retained trees within the coupe are subject to a high intensity regeneration fire and then to varying degrees of exposure, so managers cannot guarantee that these trees will remain standing through the following rotation. Secondly, the current system is planned to operate on a nominal 80-year rotation, which leaves no allowance for any trees on logging coupes to grow to ecological maturity and thus develop hollows for future use.

The major challenge for the long-term conservation of the species is the protection and continuing development of old trees with suitable hollows for nesting and shelter, in conjunction with suitable habitat for foraging. Recent conservation strategies have concentrated on the permanent and temporary reservation of forest to provide for both the protection and the development of Leadbeater's Possum habitat. The main issue surrounding the application of this strategy has been the determination of the most appropriate scale and spatial arrangement of reserved areas. The option of modifying or adopting alternative silvicultural systems to develop habitat for the future and to enhance the effectiveness of reserve systems has been addressed and shows promise. Smith et al. (1985) have suggested that, within the spectrum of habitat changes, Leadbeater's Possum can benefit from integrated conservation and development.

Ecological Issues Specific to the Taxon

A Population Viability Analysis (PVA) has shown that, for a 100-year projection, simulated populations of 200 animals or more remained demographically stable and experienced a decline of less than 10% in predicted genetic variability (Lindenmayer et al. 1993). With a mean density of one animal per 3 ha of old growth forest (Lindenmayer 1989) populations of Leadbeater's Possum could survive in areas

of mature forest as small as 600 ha, such as those currently in the Yarra Ranges National Park. However, this approach by itself does not meet the Victorian Government's commitment to conserve Leadbeater's Possum throughout their range.

A more recent and detailed PVA undertaken by Lindenmayer and Possingham (1994), which was commissioned by CNR as part of developing strategies for the conservation of the species, simulated the dynamics of metapopulations of Leadbeater's Possum in three forest blocks where timber harvesting is permitted and one closed water catchment. This study combined extensive information on the life history attributes of Leadbeater's Possum, the habitat requirements of the species, the spatial distribution of suitable habitat patches, changes in the temporal suitability of forest habitats, and data on the frequency and impact of disturbances such as logging operations and wildfire.

Spatial data on the distribution of different types of habitat patches were derived from detailed forest inventory information that has been captured in the database of a Geographic Information System being developed by CNR. The analysis predicted the likelihood of Leadbeater's Possum becoming extinct within the next 150 years in two of the three forest blocks studied due to the limited areas of existing older-growth montane ash forest. A higher probability of persistence was predicted in the other forest block and the water catchment which were characterised by larger patches of old-growth forest. On the basis of this work, the authors strongly recommended that a key forest wildlife management objective must be to grow areas of existing regrowth forest through to ecological maturity or old-growth status (i.e. 250 years). Wildfires were predicted to have a major negative effect on the persistence of populations of Leadbeater's Possum, particularly in areas supporting limited or single areas of old-growth forest. It is important to note that wildfire has been instrumental in the habitat development process, but the scale and intensity of wildfires since European settlement, most notably the 1939 wildfires, has resulted in approximately 82% of ash type forests in the Central Highlands being regrowth with few live hollow-bearing trees. Consequently, these regrowth forests require >150 years of growth before fire can effectively create the necessary floristics and structural diversity critical for Leadbeater's Possum habitat.

The major threats to the long-term survival of Leadbeater's Possum are the progression of current favourable habitat to a structurally less-suitable successional stage and the reduction in the number of available nest-trees (Smith et al. 1985). Currently, 50% of nesting hollows are provided by very old trees killed by wildfire in 1939 and earlier (Smith and Lindenmayer 1988). Lindenmayer (1990) found that 18% of 302 measured living and dead hollow-bearing trees had collapsed through natural decay between 1983 and 1988. These figures translate to a loss of 3.6% per annum for that period. Smith et al. (1985) concluded that, unless then current (1985) management prescriptions in the Central Highlands were altered, Leadbeater's Possum would be eliminated from logged areas. The nominal rotation length of 80 years does not allow trees to grow large enough on harvested areas for hollow formation to begin, let alone develop sufficiently for Leadbeater's Possum to use. Smith and Lindenmayer (1988)

have described in detail the form of trees selected as nest sites, and their data emphasise the old age of trees selected. It thus appears, that, to properly cater for Leadbeater's Possum, rotation times should be well in excess of 200 years. However, by that age trees would have senesced and be well beyond optimum harvest age, and the forest structure may not be suitable for Leadbeater's Possum feeding and movement requirements. Therefore, strategies are needed to maintain an adequate number and even distribution of nest-trees in selected areas of regrowth forest and to allow for a proportion of regrowth, either as individual trees or complete stands of forest, to grow through to ecological maturity (>250 years).

Under current forest management practices such strategies would necessarily be confined solely to a strategy of long-term reservation. However, a major program commenced under the Timber Industry Strategy continues 'to evaluate the effectiveness of alternative and potentially more environmentally sensitive silvicultural systems, such as the even-aged shelterwood and uneven-aged group selection systems where clearfelling is now used'. Experimental and operational trials of retained overwood systems have shown particular promise from both environmental and economic perspectives and are approaching the stage where their adoption as a viable alternative to clearfelling systems is a reality. Such a system will be instrumental in providing long-term optimal habitat for Leadbeater's Possum.

Fire is an integral component of montane ash forest ecosystems and has an important influence on the occurrence, extent and viability of habitat for Leadbeater's Possum. This influence can be both positive and negative, and varies greatly depending on the extent, frequency and intensity of fire. Frequent, low-intensity fire (e.g. every 50 years) will have a positive effect by encouraging floristic and structural diversity necessary for foraging habitat and by not killing existing and potential hollow-bearing trees. While very intense fire will also create suitable foraging habitat, it will kill all or most trees and thus reduce the time during which hollows will be available for the species. Despite careful planning and modern technology, wildfire remains highly probable, yet unpredictable in its effects, so conservation strategies require options with regard to both space and time to attempt to counter widespread deleterious effects of fire and to take advantage of the positive effects.

Both fire and timber harvesting operations, or the absence of them, may result in the loss or development of habitat for Leadbeater's Possum. The varying nature of such disturbances (e.g. fire intensity and different silvicultural systems) and the time between them will, through the process of forest succession, determine when and for how long habitat will occur in an area of forest. Consequently, management for the conservation of the species, which must include the provision of adequate habitat through time, needs to incorporate different strategies, applied individually or in combination, for different timeframes into the future.

A common practice undertaken in Victorian forests following wildfire is salvage logging. In the past little recognition has been given to the value of burnt stems and fire-damaged trees in the forest ecosystem, despite their known importance to a wide variety of hollow-dependent fauna, including Leadbeater's Possum. Extensive salvage logging was undertaken in the montane ash forests of the Central Highlands following the 1939 bushfires and this is suspected to have exacerbated the current extensive areas of regrowth forest where there are few hollow-bearing trees.

Wider Conservation Issues

There is little Leadbeater's Possum habitat in private ownership. Nevertheless, advice and assistance to private landholders about the most appropriate way to manage their land for the conservation of Leadbeater's Possum is necessary. CNR's Land for Wildlife scheme allows for private land to be registered for wildlife conservation, and there are other options such as cooperative management agreements and covenants. Captive colonies of Leadbeater's Possum are held at a number of Australian zoos and at several overseas Zoos - London, Poland, Metro (Toronto) and Brookfield (Chicago). The Association of Zoo Directors of Australia and New Zealand (now the Australasian Species Management Program) prepared a Species Management Plan for the captive population (see Macfarlane and Seebeck 1991). The genetic and demographic management of the captive population has been reviewed (Myroniuk and Seebeck 1992) and the need to manage the captive population via a world metapopulation was identified.

However, it is assumed that field management will sustain the species without the need to re-introduce captive-bred stock. Successful management for the long-term conservation of Leadbeater's Possum offers clear benefits to a wide range of other hollow-dependent fauna inhabiting the montane ash forests of Victoria. This group of animals has been identified as those most at threat as a result of past and some present management activities.

Social and Economic Issues

The philosophical, cultural, biological and aesthetic values of Leadbeater's Possum and other forest wildlife are intrinsic and cannot be directly translated in monetary terms, although estimates can be derived indirectly. However, monetary values can be directly calculated for the timber resource that is within the known range of the possum. The LCC estimated in 1994 that the mean standing royalty value of ash eucalypt timber is \$10,465 per ha. The gross value of the timber increases to \$29,210/ha after transport to the mill and \$236,000/ha when it has been processed (LCC 1994). A 1987 estimate put the gross value of the finished product at point of consumption at about \$500,000 per ha (Squire et al. 1987). Less easily calculated are values to the community of water supply, soil conservation and tourism.

There will be negative social impacts only if conservation of Leadbeater's Possum leads (in either short or long-term) to reduction or cessation of timber harvesting in some areas. Many local communities are essentially dependent on the timber industry. A consultant's study commissioned by the

LCC estimated that the entire Central Highlands timber resource sustains about 1840 jobs directly and 2390 indirectly. Social factors include the basic issues of employment and the attendant relationships within regional communities - housing, services, business interests. Other social constraints may include retraining and perhaps relocation of some people if there are any impacts. The complexities of Leadbeater's Possum management suggests that the assessment of the economic and social impacts of actions will be dynamic and adaptive, and that those impacts will be subject to review. The analysis of the impacts will need further investigation. An appropriate methodology has been prepared by Reid Sturgess (1995).

Management Action

Previous Management Action

Following the rediscovery of the species in 1961, management actions to conserve it were restricted to general wildlife prescriptions.

In 1987 specific management for the conservation of Leadbeater's Possum began. This management followed the Interim Guidelines and Field Management Prescriptions for the Conservation of Leadbeater's Possum in Timber Production Ash Forests (CFL 1987).

In February 1991 the Draft Management Strategies for the Conservation of Leadbeater's Possum, *Gymnobelideus leadbeateri*, in Victoria (Macfarlane and Seebeck 1991) was endorsed by the Director-General of the then Department of Conservation and Environment and officially released by the Minister for public comment. At that time it was determined that implementation of the Draft Strategies should begin immediately, although it was recognised that changes to these strategies would be necessary on receipt of public comment, new information on the biology and ecology of the species and experience gained on the logistics and practicalities of implementation.

In March 1991, Guideline W:18-Gu 03 - Management Strategies for Leadbeater's Possum was approved by the Director General. Effective immediately, this Guideline summarises the Draft Strategies but is applicable only to timber production forests.

Since March 1991 all management actions outlined in the Draft Strategies and Guideline have been progressively implemented. These include the establishment of a zoning system with specific prescriptions designed to protect and develop habitat for the species. Such prescriptions address assessment procedures, logging coupe size and shape, buffer establishment and the protection of all hollow-bearing trees regardless of zoning classification. The last prescription means that all montane ash trees older than 120 years are protected within the known distribution of Leadbeater's Possum. Management actions have also excluded from the following harvesting: special habitats (incl. Zone 1 classified forest), steep and rocky forest, unmerchantable forest, streamside reserves, and wildlife corridors. All known colonies are protected and other management activities such as reforestation and roading

activities are addressed. Further research on the species has been undertaken as recommended, and assessment of current and future habitat using various techniques has been completed in more than 70% of the species' known distribution. A change to the definition of optimum and potentially optimum habitat incorporating an Acacia (wattle) component was adopted in 1992.

Intended Management Action

Management for the conservation of Leadbeater's Possum will continue to be based on a combination of habitat protection and habitat development. The key strategies involved in this approach are: the establishment of a reserve system, both permanent and temporary; detailed prescriptions for areas where other management actions are planned (especially in designated timber production areas); the adoption of alternative silvicultural systems; and continued research and monitoring activities. This approach requires a variety of management actions which may be undertaken in combination, or singularly, and will necessarily vary from area to area within the known distribution of the species. Such variation will depend on the natural and management history of areas as well as determined land use, future commitments and associated planning. Management actions will also need to be planned for specific timeframes.

The adoption of management actions contained in this document and their subsequent implementation recognises that they are dynamic and subject to continuing review. New information on the biology, ecology and distribution of the species, combined with knowledge about the practicalities and logistics of application, will drive and direct an adaptive approach to the species' management.

Planning and Management Units

- In the Central Highlands, 25 Leadbeater's Possum Management Units (LMU) will be delineated, based on the extent and spatial distribution of ash-type forest. Each LMU will generally contain between 6000 and 10,000 ha of ash-type forest and will be composed of one or more adjacent forest management blocks, containing contiguous patches of ash forest. Planning for intended management actions will consider the conservation status and intended actions in adjacent LMUs. The target for the conservation of Leadbeater's Possum will be to maintain viable populations of the species in all LMUs.

Habitat Resource Assessment

- In order to effectively implement the key conservation strategies outlined in this document, CNR will continue resource assessment surveys to determine the extent and distribution of current optimum and potentially optimum Leadbeater's Possum habitat.

Management Zoning

- The current zoning system operating in State forest will be revised to reflect the relative long-term stability of some good habitat with living old trees (Zone 1A) and the expected impermanence of other good habitat where most existing hollow-bearing trees are dead and likely to

collapse in the near future (Zone 1B). A further zone, Zone 2, will consist of remaining forest, where the prescriptions described under Logging Coupe Planning and Harvesting will be applied to protect existing habitat components for their on-site value and to enhance the value of adjacent habitat.

The objectives, definitions and management of the zoning system will be as follows:

Zone 1A - Leadbeater's Possum (and other wildlife) conservation as the major priority.

- mature ash forest (>120 years old) and mixed aged ash forest where the oldest age class is mature (>120 years old).
- regrowth ash forests with at least 12 live hollow-bearing trees per 3 ha.
- the minimum area for assessment and establishment of Zone 1A type forest shall be 3 hectares.

Zone 1B - Leadbeater's Possum conservation and timber production as joint priorities.

- regrowth ash forest with > 12 live or dead hollow-bearing trees per 3 ha combined with a basal area >5m² of *Acacia dealbata*, *A. obliquinervia* or *A. frigescens*.
- the minimum area for assessment and establishment of Zone 1B type forest shall be 10 hectares

Zone 2 - Timber production as the major priority, but including the conservation of existing components of habitat.

- regrowth ash forest of varying ages.
- areas with features of Zones 1A, but <3 ha in size and 1B, but <10 ha in size.

If Zone 1 areas become unsuitable or offer little potential as habitat for Leadbeater's Possum through successional or other change, (which is likely for Zone 1B during the next 50 years), they will become available for timber harvesting. Conversely, areas that develop the essential components for Zone 1 classification through time, or circumstance will attain Zone 1 status. Zone 1A forest should not be included in sustained sawlog and pulpwood yield calculations whilst Zone 1B will be included. The role of Zone 1B, including the minimum area of assessment, will be reviewed following completed habitat resource assessment, reserve establishment and subsequent population viability analysis (PVA), to determine its effectiveness in contributing to the major conservation objectives.

Logging Coupe Planning and Harvesting

Assessment

Assessment of proposed logging coupes to validate zoning classification will continue to be undertaken using resource information held on GIS and elsewhere in CNR, aerial photographs, helicopter reconnaissance and ground inspection.

Buffer Strips

Consideration should be given to retaining buffer strips of unlogged forest to avoid creating large areas of

continuously logged forest (e.g. >40 ha coupe conglomerates). These would be most applicable where streamside or other reserves do not form coupe boundaries. These buffer strips should be allowed to grow to ecological maturity (at least 250 years old) and thereby provide hollow trees for Leadbeater's Possum and other hollow-dependent wildlife. The width of buffers should ensure that the health of trees within them is maintained, and allow for continual replacement of hollow trees in the future. The desired width will vary with aspect, position on slope and ridge, and climatic factors.

Protection of Hollow Trees

Protective measures to aid the continuing survival of nest-trees on logging coupes should be used, including the use of fire retardants and the provision of fire breaks around such trees. Special attention should be given to the protection of currently living nest-trees, regardless of zoning classification. Even if these trees die after subsequent fire or exposure they will still provide potential nesting sites for Leadbeater's Possum during the following rotation. Hollow-bearing trees should not be felled for seed collection.

Salvage Logging

In areas burnt in fires, special plans for salvage logging, required under the Code of Forest Practices for Timber Production (CFL 1989), should consider both the number and spatial distribution of hollow-bearing trees and zoned accordingly. Zone 1A forest must not be salvage logged. Prescriptions developed for normal logging operations should be adhered to in all areas where salvage logging is undertaken.

Adoption of Alternative Silviculture Systems

CNR will continue to undertake operational trials of retained overwood silvicultural systems with a view to their adoption as an alternative to the current system of clearfelling in selected areas of ash forest within the Central Highlands. Such areas will be selected considering existing and potential habitat within each Leadbeater's Possum Management Unit (LMU).

Establishment of Reserves

- In addition to the application of specific prescriptions according to zoning classifications in State forest, CNR will establish a reserve system based on the extent and spatial distribution of Zone 1 classified forest, combined with strategic areas of regrowth forest (Zone 2). This permanent reserve system will:
 - be excluded from timber harvesting operations
 - consist of patches (>50 ha) of ash-type eucalypt forest
 - be linked by wildlife corridors, streamside reserves, buffer strips and areas of State forest not suitable or available for timber harvesting, and
 - include a network of patches to minimise the risk of individual patches being made unsuitable for Leadbeater's Possum by events such as wildfire.The number of patches or total reserved area per LMU will vary depending on the extent and spatial distribution of potential and existing habitat, both within and adjacent to each LMU
- When the extent and spatial distribution of Zone 1A and Zone 1B habitat is known for all LMUs in each Forest Management Area, an appropriate target will be

determined for the short-term and long-term protection of habitat in the respective Forest Management Areas.

- Forest in the reserve system will be allowed to grow to maturity to provide recruitment of habitat considering the expected losses in Zone 1A (gradual) and Zone 1B (rapid in the next 50 years), and hence to establish a continuing supply of habitat at appropriate levels and distribution to enable Leadbeater's Possum to thrive throughout its range in State forest. The reserve system will also encompass existing parks, closed water catchments and other legislated reserves where timber harvesting is not permitted.

Assessment of the Effectiveness of Reserve Systems and Alternative Silvicultural Systems

The reserve system will be assessed using suitable habitat and PVA modelling to ensure that the major conservation objectives are achieved. This will provide a holistic view of the conservation status of Leadbeater's Possum following implementation of this Action Statement.

Research

CNR will continue research to assist and improve management for the long-term conservation of Leadbeater's Possum. Those high priority projects necessary for the effective application of proposed and ongoing conservation strategies include:

- determining the dispersal and recolonisation capacities of Leadbeater's Possum, and
- improving the precision of modelling fire in the ash forests of the Central Highlands, particularly as it relates to the risks of reducing populations of Leadbeater's Possum.

Captive Management Planning

CNR will continue to support the Management Plan for the Captive Population of Leadbeater's Possum administered by the ASMP. There is now sufficient experience with captive management to ensure that Leadbeater's Possum can be effectively and efficiently bred in captivity to provide animals for re-introduction to the wild. However, the management of this species assumes that field management will sustain the species without the need for re-introducing captive-bred stock.

Social and Economic Planning

An assessment of the socio-economic impacts arising from the Leadbeater's Possum Action Statement will be conducted by CNR's Flora and Fauna Branch, in conjunction with the Forests Service, using an agreed socio-economic methodology.

Community Education

CNR's Flora and Fauna Branch will provide information for a community education campaign on the management of Leadbeater's Possum, in accordance with the strategies adopted in the Branch's Community Education Strategy.

Monitoring, Review and Recommendation of Further Management Actions

The Leadbeater's Possum Management Team (LMT) will:

- Continue to recommend priorities for research and monitoring projects and ensure that intended management actions and associated prescriptions

are applied in a consistent manner in each of the three CNR Areas where Leadbeater's Possum occurs.

- Monitor the establishment and effectiveness of intended management actions outlined in this Action Statement.
- Review and recommend alterations and additions to this Action Statement and associated management plans in the light of new information.
- Provide an annual written report to the Leadbeater's Possum Steering Committee, which will include an evaluation of the achievement towards the Major Conservation Objectives of this Action Statement.
- The membership of the LMT will be revised to include representation from the Commonwealth Government, academia and the community, as well as staff from the relevant CNR Areas.

Other Desirable Management Actions

- Investigate the status and determine the necessary management objectives for the recently-discovered population of Leadbeater's Possum in the Yellingbo State Nature Reserve and snow gum forests at Lake Mountain and Mt Baw Baw.
- Examine the possibility of manipulating forest to promote important habitat resources, including the provision of artificial nest sites.
- Further investigate the distribution and density of Leadbeater's Possum in Victoria.
- Determine the effects of road construction and upgrading operations on Leadbeater's Possum and develop prescriptions for planning and operational procedures that take into account the conservation of the species.
- Investigate the effects of fire on both the reduction and development of suitable habitat for the species.

Legislative Powers Operating

Species Protection

Wildlife Act 1975 - regulates the taking and possession of wildlife. Leadbeater's Possum is proclaimed as endangered wildlife under S41 of the Act.

Land Conservation Act 1970 - results in recommendations to Government on the use and reservation of Crown Land;

Flora and Fauna Guarantee Act 1988 - establishes a legal and administrative structure to enable and promote the conservation of Victoria's native flora and fauna and to provide a choice of procedures which can be used for the conservation, management or control of flora and fauna and the management of potentially threatening processes.

Forests Act 1958 - provides for the management and protection of all State forest.

National Parks Act 1975 - provides for protection and management of certain areas of land as National Parks.

Zoological Parks and Gardens Act 1967 - provides for the maintenance and display of captive specimens.

Licence/Permit Conditions

No permit will be granted unless a proposal conforms with the broad conservation and research strategy proposed in this action statement and the CNR Management Plan for the Conservation of Leadbeater's Possum in Victoria.

Consultation and Community Participation

In the preparation of this Action Statement, consultation has included industry, public interest groups, land managers and international and local wildlife experts. Comments on the draft management strategies (Macfarlane and Seebeck 1991) from a wide range of groups and individuals have also been considered.

CNR will undertake consultation with other Government authorities (Commonwealth, State and local), academic agencies, industry and conservation organisations. CNR will also encourage the establishment of a Friends of Leadbeater's Possum group. Strategies for the conservation of the species will be distributed to the public for comment.

Implementation, Evaluation and Review

This Action Statement will be implemented by planning and operational staff from the relevant Areas of the Department of Conservation and Natural Resources. Whilst the Intended Management Actions will provide the necessary directions and options for the conservation of Leadbeater's Possum, the management of the forest estate will be determined by relevant area management plans which take into account economic, social and other environmental considerations. Intended actions in this Statement should be incorporated in forest management plans, forest coupe plans, park and reserve management plans, plans for the management of closed water catchments and captive management plans.

Contacts

Management

CNR Flora and Fauna Branch
CNR North East, Port Phillip and Gippsland Areas
CNR Forest Service

Biology

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Further information

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

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: <http://www.dse.vic.gov.au>

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