

# Action Statement

Flora and Fauna Guarantee Act 1988

No. 58 (revised in 2009)

## Long-footed Potoroo *Potorous longipes*

### Description

The Long-footed Potoroo (*Potorous longipes* Seebeck & Johnston 1980) is a medium-sized terrestrial rat-kangaroo of the marsupial family Potoroidae. It has a head and body length of about 400 mm, a tail about 320 mm long and weighs up to 2.2 kg with an average weight of 1.7 kg (females) to 2.1 kg (males) (Saxon *et al.* 1994). It is grey-brown above, grey below and is morphologically similar to the Long-nosed Potoroo (*P. tridactylus*), but is larger, has a longer, thicker tail and proportionally longer hind feet.

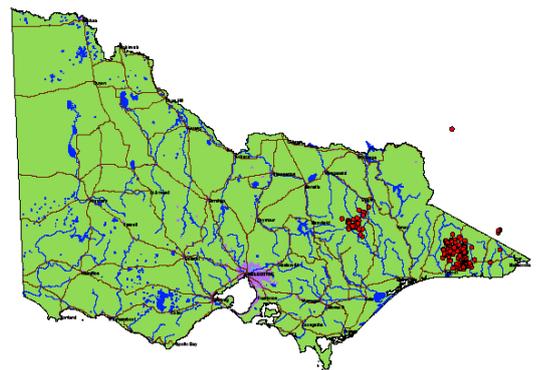
The existence of the Long-footed Potoroo as a distinct taxon was suspected from the late 1960s, when two dead individuals, both from near Orbost in East Gippsland, were sent to the Museum of Victoria (John Seebeck pers. comm.). One of these had been caught in a dog trap and the other killed by a car. However, the separate identity of the species was not clarified until 1978, when live specimens were captured and the species was only formally described in 1980 (Seebeck & Johnston 1980). In 1986, the Long-footed Potoroo was discovered in south-eastern New South Wales (Dovey 1987) and in 1995 another sub-population was located in north-eastern Victoria (Jones & Johnson 1997).

### Distribution

In Victoria, two sub-populations have been recorded: one in East Gippsland and the other straddling the Great Dividing Range in the upper Ovens, Buckland, Buffalo and Wonnangatta catchments. In East Gippsland, the Long-footed Potoroo is known from more than 60 separate sites (sites include clusters of records) within an area of approximately 160,000 ha, approximately bounded by the Bemm River, Princes Highway, Yalmy Road and Gap Road. A recent (2009) record from Cape Conran has further extended this range. The Great Divide sub-population is known from more than 60 sites across more than 300,000 ha,



Long-footed Potoroo (Photo: L. Lumsden)  
(female with pouch young)



Distribution in Victoria  
Source: Victorian Fauna Display 2009)

from around Grant, north-west of Dargo, in the south to Mount Buffalo and Harrietville in the north.

Within these broad areas of distribution, potoroos are likely to occur in only a relatively small proportion of the area. Occupancy modelling of the Great Divide sub-population is currently quantifying and mapping in detail the areas with the highest probability of occurrence (Lumsden *et al.* in prep). In New South Wales, evidence of the species based on hair samples from predator scats and hair tubes has been found at six sites over about 20,000 ha in the South-East Forests National Park (Broome *et al.* 1996). Another sub-population, known only from a skull fragment in a predator scat, may exist around Mount Drummer, east of Cann River (Gillespie *et al.* 1993), but several surveys have so far failed to confirm the species in this area. Fossil remains have been reported from Yarrangobilly in New South Wales (Seebeck 1992a), and a specimen dated 1900 in the Museum of Victoria is labelled as coming from 'Rosedale' (Norris *et al.* 1983) although it is not known if this is a reference to the town of Rosedale in Gippsland.

The majority (60 percent) of confirmed sites in Victoria occur within State forest, with the balance in national parks (Snowy River, Errinundra, Mount Buffalo and Alpine), flora and fauna reserves (Martins Creek and Goolengook) and the Grant Historic Area.

### Habitat

The Long-footed Potoroo has been found in a wide range of forested Ecological Vegetation Classes (EVCs) from altitudes of 150 m to 1370 m. The EVCs from which most records come (referred to hereafter as primary habitat) are Wet Forest, Damp Forest and Riparian Forest on the Great Dividing Range and in East Gippsland, as well as Lowland Forest, Cool and Warm Temperate Rainforest and Montane and Tableland Damp Forest in East Gippsland. Secondary habitat EVCs (with a smaller number of records and often close to the margins with primary habitat) are Montane Damp Forest, Herb-rich Foothill Forest and Shrubby Dry Forest on the Great Dividing Range, and Shrubby Dry Forest, Valley Grassy Forest and two riparian shrub EVCs in East Gippsland (Scotts & Seebeck 1989, Saxon & Noble 1993, Jones & Johnson 1997, Jones 1999, Atlas of Victorian Wildlife database). There is about 112,000 ha of primary habitat and 29,000 ha of secondary habitat within the distribution of the Long-footed Potoroo in East Gippsland, and about 7,000 ha and 53,000 ha of primary and secondary habitat respectively within the Great Dividing Range distribution. Preferred sites appear to be characterised by sheltered aspects with moist soils, supporting a mixed-species overstorey and a dense understorey. Animals shelter in dense vegetation

during the day, and forage in adjacent areas at night (Scotts & Seebeck 1989). Long-footed Potoroos have been detected in a range of forest age classes from eight-year regrowth post-timber harvesting to old growth forests (Chick *et al.* 2006).

One of the objectives of a current study (Lumsden *et al.* 2007, in prep.) is to test the understanding of preferred habitat within the Great Divide distribution by estimating occupancy rates for each of three habitat categories (based on EVCs) i.e. primary, secondary (as mentioned above) and 'other' habitat (all other EVCs). From this analysis it will also be possible to quantify and map in detail where potoroos are most likely to occur.

### Life history and ecology

The Long-footed Potoroo is primarily a fungivore, feeding on the sporocarps (fruiting bodies) of hypogeous (underground fruiting) and sub-hypogeous fungi throughout the year. Invertebrates and plant material comprise less than ten percent of the diet (Scotts & Seebeck 1989, Green *et al.* 1999). Hypogeous fungi form ectomycorrhizae (symbiotic attachments to the roots) with forest trees and shrubs (Claridge *et al.* 1993). While some hypogeous fungi such as *Mesophellia* spp. are resistant to desiccation because they form hard-cased sporocarps, the majority are soft and unlikely to persist in dry soils (Claridge *et al.* 2000). The apparent preference of Long-footed Potoroos for habitats with moist soil throughout the year is probably associated with the ecology of these food items.

Long-footed Potoroos give birth to a single young which remains in the pouch for about 145 days. Births occur throughout the year with a peak in late winter and early spring. The young remain at heel until they are about 20 weeks old, then remain in their mother's territory for at least another 12 months. Some young then disperse whilst others remain in the natal range (Green & Mitchell 1997). The dispersal behaviour of the Long-footed Potoroo is very poorly understood; only one dispersal event, involving a movement of about 3 km to a new home range, has been documented (Green & Mitchell 1997). No animals were recorded to have moved between the Watchmaker Creek and Bellbird Creek study areas in East Gippsland during five years of simultaneous monitoring, despite these areas being less than 2 km apart (Chick *et al.* 2006, Tony Mitchell pers. comm.). Females become sexually mature at about two years of age (Seebeck 1992b, Green & Mitchell 1997). Life expectancy in the wild is not known but some individuals reach at least eight years and captive animals have lived beyond 14 years. Long-footed Potoroos have home ranges from about 14 ha to more than 100 ha (Chick *et al.* 2006, Green *et al.* 1998), although this upper limit is based on observations of a single animal. Male home ranges

are generally larger than those of females. Adults are territorial and appear to be monogamous, with adult pairs often foraging together at night (Arthur Rylah Institute unpub. data).

### Conservation status

The Long-footed Potoroo (*Potorous longipes*) is listed as 'endangered' in Australia under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Long-footed Potoroo (*Potorous longipes*) is listed as 'threatened' in Victoria under the *Flora and Fauna Guarantee Act 1988* (FFG Act).

The Long-footed Potoroo (*Potorous longipes*) is considered 'endangered' in Victoria according to the Department of Sustainability and Environment's (DSE) *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007*.

### Threats

The Long-footed Potoroo may appear to present something of a conservation paradox in the sense that, unlike most threatened species, which have shown conspicuous historic decline in distribution or abundance, the known distribution and population size of the Long-footed Potoroo has gradually increased since its discovery. Although this increase can be attributed to greater, and more targeted, survey effort, the species is nevertheless rare; it has been encountered at only about 120 sites despite intensive survey effort over 20 years, its known distribution is only of the order of 500,000 ha spread over three sub-populations, and there are historical indications that it was once more widespread. The known sub-populations appear to be disjunct, and this increases the vulnerability of the species to several threatening processes, principally predation by introduced foxes but including habitat disturbance as a result of timber harvesting and fire.

The survey programs in recent years have resulted in the gradual expansion of the Long-footed Potoroo's known distribution, however it remains difficult to determine the species' abundance and population dynamics. Long-footed Potoroos occur at low densities and are usually trap-shy (Tony Mitchell pers. comm.) Only three sites, Bellbird Creek and Watchmaker Creek in East Gippsland and Riley Creek in the north-east, have been intensively monitored for two years or more and this has required a large trapping effort for relatively low return. The unsuccessful resurvey of some sites where the species has previously been detected (Lumsden *et al.* 2007a, DSE Orbost unpub. data) suggests that they may have disappeared from these sites, but this could also reflect the unreliable nature of survey techniques. The recent advent of a new survey technique using remote cameras has improved the probability of detection

and the efficiency of survey (Lumsden *et al.* 2007b, Lumsden *et al.* in prep.).

The primary habitat requirements of Long-footed Potoroos appear to be a diverse and abundant supply of hypogeous fungal sporocarps throughout the year and dense cover in a forested environment to provide shelter and protection from predators. It is currently unknown how climate change may affect these habitat requirements.

The major threats probably or potentially operating on the Long-footed Potoroo are predation (especially by introduced species) and habitat destruction or degradation from timber harvesting and fire.

### Predation

Predation, particularly by canids and possibly feral Cats (*Felis catus*), is suspected to be an important factor limiting the distribution and abundance of the Long-footed Potoroo (Scotts & Seebeck 1989). Introduced terrestrial predators have had a severe impact on Australian wildlife, particularly small to medium-size terrestrial mammals, such as potoroos (Kinnear *et al.* 2002, Murray *et al.* 2006). The Red Fox (*Vulpes vulpes*), the Dingo (*Canis lupus dingo*) and feral Dog (*Canis familiaris*) are recognised predators of the Long-footed Potoroo (Scotts & Seebeck 1989, Brown & Triggs 1990, Broome 1996, Jones & Johnson 1997). Approximately 26 percent of the 300 records of the Long-footed Potoroo are from remains in canid scats (Atlas of Victorian Wildlife) and it is assumed that most of these are the result of predation rather than scavenging.

Foxes and Dogs may prefer to move along roads and walking tracks, especially in dense forest (Newsome *et al.* 1983, Claridge 1998) and may hunt most efficiently in adjacent areas; thus increased pressure from predators is possible in disturbed habitats (Andren & Anglestam 1988, Saxon *et al.* 1992). Occupancy modelling of the Great Divide sub-population indicates a negative impact of foxes on Long-footed Potoroos, with potoroos more likely to occupy sites with low probabilities of occupancy by foxes (Lumsden *et al.* in prep.). The threat posed by feral Cats is unclear as their diets are more difficult to study, but potoroo hair has been detected in the gut of a cat destroyed at Bellbird (Tony Mitchell pers. comm.) and their impact has probably been underestimated.

### Habitat disturbance

Timber harvesting in State forest (and the Grant Historic Area) within the Long-footed Potoroo's distribution occurs in a mosaic across the landscape; areas of harvestable forest are interspersed with unavailable areas such as stream buffers and Special Protection Zones (SPZs), as well

as by unmerchantable forest and parks and reserves. However, the localised habitat disturbance that accompanies intensive timber harvesting has the potential to harm resident animals at least until dense cover is re-established. Timber harvesting and roading increase access for predators such as foxes. Work by Chick *et al.* (2006) has sought to clarify the impact of timber harvesting (see below).

The entire distribution of the Long-footed Potoroo is in forest vulnerable to periodic wildfires. The 2003 Alpine fire burnt 47 percent of the estimated Long-footed Potoroo distribution along the Great Dividing Range. The 2006-07 Great Divide fire burnt all of the Great Dividing Range distribution not burnt in 2003, and 32 percent of the estimated Great Divide distribution was burnt for the second time in four years. Fires of such magnitude and intensity clearly have the potential to cause local extinctions in sub-populations (see below for survey results subsequent to the fires). The majority of sites where the species has been recorded in surveys since these fires were either unburnt or suffered only low intensity burning (Lumsden *et al.* in prep.), suggesting that unburnt patches are probably important for the species persistence in an area. The 2007 Boulder Creek fire in East Gippsland is also thought to have negatively affected part of the East Gippsland population (Tony Mitchell pers. comm.). Fuel reduction burning also occurs within the Long-footed Potoroo's distribution. Like wildfire, fuel reduction burning reduces cover, increases risk of exposure to predators, may cause direct mortality and probably disrupts food availability and social structure. However fuel reduction burning may reduce the risk of extensive high intensity wildfire impacting on large areas of Long-footed Potoroo habitat. The impacts of fire on the species and the optimum fire mosaic in potoroo habitat remain unclear.

The impacts of habitat disturbance on hypogeous fungi also remain unclear. Hypogeous fungi are ectomycorrhizal on the roots of forest trees and shrubs, and disturbance that affects the biomass of host plants could be expected to compromise sporocarp production, at least in the short term. Overseas research suggests that fire and timber harvesting may reduce hypogeous fungi production (Meyer *et al.* 2005). In Australia, the impact of timber harvesting is the subject of current research (Andrew Claridge pers. comm.), but results are not yet available. The effects of fire on the abundance and distribution of hypogeous fungi eaten by Long-footed Potoroo are also unclear (Claridge & Trappe 2004). However, it is generally thought that high intensity fires reduce ectomycorrhizal fungi but low intensity fires have a lesser impact (Dahlberg 2002). The effects may vary for different fungal taxa (Vernes *et al.* 2004) or with time after fire (Trappe *et al.* 2006).

### Climate change

The almost complete dependence of the Long-footed Potoroo on hypogeous fungi (Scotts & Seebeck 1989, Green *et al.* 1999) clearly ties the species to habitat where there is reliable supply throughout the year and across the variation generated by climate and other natural processes. Hypogeous fungi are virtually ubiquitous in the forests of south-eastern Australia but their patterns of abundance across vegetation types as a year-round food source vary between taxa and may be dependent on many factors (Claridge *et al.* 2000).

Climatic factors such as rainfall and temperature have been shown to influence the abundance and diversity of hypogeous fungi and may affect the production of fruiting bodies (Claridge *et al.* 2000, Bougher & Lebel 2001). As such, changes to environmental factors due to climate change may impact on food availability for the Long-footed Potoroo.

Reduced precipitation due to climate change and resultant drought may also impact on the available habitat for Long-footed Potoroo, through desiccation of the damp gullies, dense understorey and rainforests which are preferred by the species. Drought conditions exacerbated by climate change may also result in an increased frequency and severity of wildfire events which will directly impact on the habitat and food resources of the Long-footed Potoroo.

### Small populations

The size of the Long-footed Potoroo population is difficult to estimate with any accuracy. Long-footed Potoroo are not evenly distributed across preferred habitat, with surveys failing to find them at many sites in apparently suitable habitat within their distribution. The modelling currently being undertaken based on three years of camera surveys in the Great Divide area will give much greater precision in the area likely to be occupied by potoroos (Lumsden *et al.* in prep.). There are reasonable density estimates (based on trap grid monitoring for two years or more) from only three sites: Bellbird Creek, Watchmaker Creek (both in East Gippsland) and Riley Creek (in the north-east). These range from about 0.05-0.5 individuals per ha (based on Chick *et al.* 2006, Tony Mitchell pers. comm., DSE unpublished data). A population estimate, based on the lowest of these densities and using only primary and secondary habitat, suggests the total population could be no more than about 10,000, distributed across three disjunct geographic areas (two in Victoria and one in New South Wales), with the largest of the sub-populations in East Gippsland comprising perhaps two thirds of the total.

Population modelling on Long-footed Potoroos has not been undertaken, but analysis of minimum viable population estimates for a suite of mammals (Reed *et al.* 2003) suggests that conservation programs should generally aim to conserve habitat capable of supporting about 7000 adults. Furthermore, Reed *et al.* (2003) suggest that where the habitat is pristine, sufficient habitat for 2000 individuals should give a high probability of long-term persistence.

Small populations with a restricted distribution are vulnerable to major stochastic events such as wildfire, disease and processes such as climate change. The large extent of the 2003 and 2007 wildfires (described above) illustrates the potential for a fire to imperil an entire sub-population. Diseases and parasites likely to affect survival have not been studied, but one individual at Bellbird died from the Bairnsdale Ulcer, caused by a mycobacterium *Mycobacterium ulcerans* (Dr John Hayman pers. comm.). The small captive population from Healesville Sanctuary was diagnosed with avian tuberculosis, but this has not been detected in the wild. The risks posed by these events and processes can be minimised by maintaining habitat continuity and protection of substantial areas of primary habitat across the breadth of the distribution.

The net consequence of the small population, restricted distribution, limited ecological information and the range of threatening processes in operation is that a conservative approach to species management is strongly justified.

## **Past Management Actions**

### **Survey**

Since the Long-footed Potoroo was described in 1980, there has been an extended and intensive survey effort to determine the distribution of the species. It has been recorded at approximately 128 sites in south-eastern Australia, the vast majority of these in Victoria. This survey program has gradually expanded the known range, the most significant extension being the discovery of the Great Divide sub-population in 1995.

Resurvey of historic sites (where the species had not been recorded for five or more years) has yielded mixed results. In 2000, 15 historic sites in East Gippsland were resurveyed, with potoroos detected at 12 (Tony Mitchell pers. comm.). Two to three years after the 2003 Alpine Fires, the species was relocated at eight (six burnt, two unburnt) of the 25 historic sites surveyed in the Great Dividing Range area as well as at five (three burnt, two unburnt) of 25 new sites surveyed (Lumsden *et al.* 2007a). In NSW, there were no positive records of potoroos between 1993 and 2006, when a footprint at Sheepstation Creek was attributed to the Long-footed Potoroo.

The modelling currently being undertaken based on three years of camera surveys in the Great Divide area will give much greater precision in the area likely to be occupied by potoroos (Lumsden *et al.* in prep.). Detection of scats and direct sightings of individuals by experienced researchers yield occasional records whilst diggings are useful indicators of possible presence, but require confirmation through other methods. Examination of predator scats for potoroo hair is also useful but gives only a general locality as the predator can travel several kilometres between eating and defaecating. Trapping can be effective but is very time consuming, labour intensive and limited to areas with good access. Hair-tubing became the most widely employed method, but is far from definitive and repeat samplings were often required to confirm the presence of the species at a locality (e.g. Robley *et al.* 2005, Lumsden *et al.* 2007a).

Intensive repeated hair tube sampling in the Great Dividing Range area in 2004/05 and 2005/06 (Robley *et al.* 2005, Lumsden *et al.* 2007a) resulted in highly variable probabilities of detecting Long-footed Potoroos (48 percent chance of detection where potoroos were present in 2004/05 and a 88 percent chance in 2005/06). Given these variable levels of uncertainty, a new survey technique was introduced: automated digital cameras triggered by a heat and movement sensor. This technique has been used extensively from 2006-09 in surveys of the Great Divide population with 338 sites sampled (Lumsden *et al.* 2007b, in prep.). Using the new technique in the 2006/07 sampling period (limited due to the 2006/07 Great Divide fires), the probability of detecting potoroos at sites where they occurred is very high (close to 100 percent). Occupancy modelling is currently being completed, combining all three years of data. This analysis will explore the extent to which the three habitat categories are used, and more accurately delineate the distribution of the species in the area. It will also investigate the influence of other habitat and management variables on the probability of occupancy, including predator baiting, elevation, slope, aspect, and distance from road/track. A map will then be produced showing in detail the likelihood of occurrence of Long-footed Potoroos across the whole study area. This information will provide a greater understanding of the status of the population, its distribution, habitat utilisation, post-fire recovery and response to predator control measures and will assist in identifying key areas for the conservation of this species in this area (Lumsden *et al.* in prep.).

### **Habitat protection**

Scotts and Seebeck (1989) recommended a Potoroo Management Zone over most of the range of the species within East Gippsland and 2.5 km radius

Special Management Areas (SMAs) around each confirmed location of the species. In 1994, Saxon *et al.* (1994) developed an Interim Management Strategy for the species in Victoria, with habitat protection to be based on 400–500 ha SMAs around each confirmed location, up to a maximum of 17,500 ha. The original Action Statement (Thomas *et al.* 1994) adopted these arrangements, which were also included in the East Gippsland Forest Management Plan (CNR 1995).

In 1995, the discovery of the Great Dividing Range sub-population generated a deferred timber harvesting zone encompassing the known sites as a conservation response. In 2001, the guidelines which apply to the East Gippsland sub-population were applied to the Great Divide sub-population through the North East Forest Management Plan (NRE 2001).

In 2009, an area of 17,500 ha lies within SMAs in East Gippsland and an area of 29,693 ha lies within SMAs in the north-east (includes 23,798 ha for the Hummfray Riley consolidated area, 147 ha for SMA 14 and several thousand hectares which are neither primary nor secondary habitat).

These measures to protect the Long-footed Potoroo in State forest were reviewed in 2008. The new measures are set out in the intended management actions below.

#### **Ecological research**

Several research projects on the ecology of the Long-footed Potoroo have been undertaken. Initial studies by Drinnan and Hill (1984) and Hill and Triggs (1985) examined habitat requirements and diet respectively. In 1986–87, Scotts and Seebeck (1989) undertook the first major intensive study of the species, using the Bellbird Creek site, 35 km east of Orbost. This has proven to be the most accessible colony of Long-footed Potoroos and the principal site for subsequent research and monitoring, which has now been underway for 20 years.

Scotts and Seebeck (1989) examined diet, habitat selection and population ecology at the Bellbird site. Several years of intermittent research at that site gathered further data on population dynamics (Saxon *et al.*, 1994, CNR unpublished data). In 1994, a second major research project commenced at Bellbird. This examined home range and social organisation, reproduction and population ecology, and diet (Green & Mitchell 1997, Green *et al.* 1998, Green *et al.* 1999). A second colony at Riley Creek on the Great Dividing Range was studied simultaneously as part of comparative studies (Green *et al.* 1988; DSE unpublished data). Similar information was also gathered over a six-year period from Watchmaker Creek in East Gippsland (Chick *et al.* 2006). Intensive ecological studies of the Long-footed Potoroo elsewhere have been

constrained by lack of accessible colonies. However, several years of trapping data and scat material from the Bellbird and Watchmaker sites are available for further study into diet and population dynamics.

#### **Effects of habitat disturbance**

In 1998, research on the impacts of habitat disturbance by timber harvesting commenced in East Gippsland (Chick *et al.* 2006). Part of the project examined the immediate effects of timber harvesting by monitoring the resident animals before, during and after the harvesting of a single 28 ha coupe. Consistent with previous studies (Scotts and Seebeck 1989, Jones and Johnson 1997, Green *et al.* 1998), this project found that Long-footed Potoroos showed a preference for lower slopes and gullies before harvesting. The main gullies and some lower slopes remained unharvested and the species persisted in these areas; generally avoiding the harvested areas until regeneration was established. The study area population remained similar throughout the project (at three or four resident animals), except for an unexplained temporary spike to 12 individuals detected two years after harvest. The project also surveyed 63 sites across a range of forest age-classes from eight years after harvest to old forest. Long-footed Potoroos were detected at 19 of these sites. There was no correlation between forest age and Long-footed Potoroo presence.

The five year study in the Great Divide area is currently investigating, the retrospective effects of the 2003 Alpine and the 2007 Great Divide wildfires (Gillespie & Alexander 2004, Robley *et al.* 2005, Lumsden *et al.* 2007a, b, in prep.), and factors influencing the distribution of the species..

Research on the distribution and abundance of hypogeous fungi in a range of forest age-classes is underway in the south-east of New South Wales. Results of this work are not yet available (Andrew Claridge, pers. comm.).

#### **Predator control**

Since 1990, a control program for Red Foxes and wild Dogs has been undertaken at Bellbird, using buried baits poisoned with 1080 (Tony Mitchell pers. comm.). The baiting program initially focused on the Bellbird Track study grid, but was expanded in 1995 to encompass about 2000 ha. Buried bait stations were established along vehicular tracks through the area at 200-m intervals. Baiting occurred monthly or bi-monthly. In 1997, the protected area was expanded again to encompass about 8000 ha. The predator control program initially coincided with an approximate tripling of the potoroo population on the Bellbird study grid (from about five to 14), but the population has subsequently settled at about eight to ten individuals. A second predator control network

was established around the top of Sardine Creek in East Gippsland in 1997 to encompass other records of the species and bimonthly baiting occurred in this area. These baited areas have now been absorbed into the Southern Ark project (DSE 2003, DSE 2007) which baits foxes continuously and intensively across 860,000 ha of Victoria east of the Snowy River, thus covering the entire distribution of the Long-footed Potoroo in East Gippsland.

Since January 2005, predator control has also occurred through parts of the Long-footed Potoroo's Great Dividing Range distribution during times of the year when tracks are accessible. Commercial fox baits have been deployed in approximately 130 bait stations at about 1 km intervals along roads and tracks, covering about 48,000 ha of national park and State forest (Charlie Pascoe pers. comm.). As foxes are readily detected using the remote cameras set for Long-footed Potoroos it has been possible to investigate the probability of occurrence of foxes throughout the study area. Preliminary analysis indicates that this predator baiting is successfully suppressing fox occupancy (Lumsden *et al.* in prep.). Current analysis will clarify this further and investigate the relationship between occupancy and distance from bait line to determine the area over which baiting is effective.

#### **Captive breeding**

A captive population of Long-footed Potoroos was established at Healesville Sanctuary in Victoria in 1980 to provide security against the possible extinction of the wild population, to provide

accessible animals for research, and for educational and display purposes. Wild animals were taken from the Bellbird study site and the colony initially bred successfully, but after 1992 no young were successfully raised. By 2002 there was only one adult male and one adult female left in the colony (NSW NPWS 2002) and these were joined by a wild caught young male from the Watchmaker study site early that same year (R. Chick pers. comm.). The last of the Long-footed Potoroos at Healesville died in 2004. There are no current plans to attempt to create an actively breeding colony based on additional wild-caught animals.

#### **Program co-ordination**

A Long-footed Potoroo Management Advisory Committee was established by the then Department of Conservation, Forests and Lands in 1988 to advise on species management and to review management guidelines in the light of new research. Since 1993, the functions of this committee have been absorbed by the Long-footed Potoroo Recovery Team, currently convened by the DSE and including representatives from Victoria and New South Wales wildlife, park and forestry authorities and Zoos Victoria.

The Recovery Team guided the production of a national Recovery Plan for the species in 2000 (NRE 2000) and a revised version which is in preparation. The Recovery Plan sets out general conservation goals as well as priorities for research, as required by the Commonwealth EPBC Act. This Action Statement is consistent with the Recovery Plan.

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## **Conservation Objective**

### **Long term objective**

To ensure that the Long-footed Potoroo can survive, flourish and retain its potential for evolutionary development in the wild.

### **Intended Management Actions**

*The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities. It is intended that the targets specified below be met within the five year timeframe of this Action Statement.*

#### **Objective I To protect populations or habitat from potentially incompatible use**

##### *Targets:*

*Sufficient habitat identified and protected in both East Gippsland and the Great Dividing Range to provide for a substantial and viable population of Long-footed Potoroos.*

*Timber harvesting and other activities managed to protect potoroo habitat at Long-footed Potoroo detection sites outside Core Protected Areas.*

In the following Actions, a Special Protection Zone (SPZ) is an area of State forest managed primarily for conservation purposes. Special Management Zones (SMZs) are areas of State forest jointly managed for conservation and timber production, and General Management Zones (GMZs) are primarily utilised for timber production.

In both of East Gippsland and the Great Dividing Range, the areas in which the Long-footed Potoroo is known to occur have been delineated by a 'distributional polygon' (one for each population) within which the measures outlined below apply. The distributional polygons will

change with new information about Long-footed Potoroo distribution. The measures described below will apply within the distributional polygon. .

'Core Protected Areas' are defined as areas of Long-footed Potoroo habitat protected in State forest SPZs and in conservation reserves such as national parks and other statutory reserves. Core Protected Areas will replace the previous 'Special Management Areas' (SMAs). 'Additional Protected Areas' are defined as areas of State forest and other public land tenures where Long-footed Potoroos have been recorded outside of the Core Protected Area, which are then protected in SMZs or equivalent categories in other tenures. 'Sites' are specific places where Long-footed Potoroos have been detected.

- Action 1      Implement Long-footed Potoroo Core Protected Area for East Gippsland**
- A network of protected areas of primary habitat in East Gippsland has been identified, comprising in excess of 40,000 ha of conservation reserves and State forest SPZs. This Core Protected Area will replace the current SMA-based approach and will consist of existing conservation reserves, existing and proposed SPZs and proposed new and expanded conservation reserves. This area is considered sufficient to support more than 2000 individuals, based on a conservative estimate of Long-footed Potoroo density (0.05 animals per ha).
- Responsibility:    DSE*
- Action 2      Implement Long-footed Potoroo Core Protected Area for the Great Dividing Range area**
- A network of protected areas of primary and secondary habitat in the Great Dividing Range area has been identified, comprising in excess of 40,000 ha of conservation reserves and State forest SPZs. This Core Protected Area will replace the previous SMA-based approach. All primary habitat within the Long-footed Potoroo distribution will be included in the Core Protected Area. Primary habitat currently within SMZ or GMZ will be included in SPZ. Secondary habitat within existing reserves or SPZ will make up the remainder of the Core Protected Area. This area is considered sufficient to support 2000 individuals, based on a conservative estimate of Long-footed Potoroo density (0.05 animals per ha). Changes to State forest zoning will be implemented. If significant, new information regarding the habitat requirements or preferences of the Long-footed Potoroo arises during the life of this Action Statement, a formal review will be initiated.
- Responsibility:    DSE*
- Action 3      Protect populations and their habitat in parks or reserves**
- Ensure that park and reserve management plans recognise and protect areas of habitat identified in Actions 1 and 2. New roads and facilities should not be constructed close to Long-footed Potoroo detection sites.
- Responsibility:    Parks Victoria*
- Action 4      Protect Long-footed Potoroo habitat at detection sites on public land outside the Core Protected Area**
- Establish additional protected areas where Long-footed Potoroos have been detected in State forest or other public land outside the Core Protected Area. In State forest, apply the protection measures specified in Appendix I. The protection measures will be formally reviewed in 2014.
- Responsibility:    DSE, VicForests*
- Action 5      Protect Long-footed Potoroo habitat at detection sites on private land**
- Where Long-footed Potoroos are detected on private land, encourage landholders to protect the area (and especially primary habitat) and to undertake active management such as predator control. Incentives to assist landholders should be made available wherever possible. If extension efforts do not achieve a satisfactory result, use provisions under local government planning schemes to place conditions on any proposed clearing of native vegetation so as to achieve a result equivalent to the Special Management Zones described in Action 4. Recognise Long-footed Potoroo sites on private land in local government planning overlays, such as the Environmental Significance Overlay. Delineate these areas by applying the same principles used to define Special Management Zones as in Action 4.
- Responsibility:    DSE, Local Government*
- Objective II    To protect populations from potentially threatening processes**
- Targets:*      *The risk of extensive wildfire within the distribution of the Long-footed Potoroo is reduced by strategic fuel reduction and aggressive first attack on unplanned fires.*
- The abundance of exotic predators is reduced to a level that allows an increase in the Long-footed Potoroo population and is maintained at that level.*

- Action 6 Manage fire regimes**
- Management of fire within the Long-footed Potoroo distribution will be considered as part of regional ecologically-based fire management planning processes. Fuel reduction burning in Core Protected Areas and SMZs for Long-footed Potoroos will be low intensity and will be concentrated in less-preferred Long-footed Potoroo habitat through use of fuel moisture differentials to avoid burning primary habitat such as gullies and damp forest. Strategic fuel breaks will not be built through Core Protected Areas and SMZs for Long-footed Potoroos unless based on existing roads and there are no practical alternatives. Wildfire control in or near Long-footed Potoroo sites will be undertaken using the most environmentally sensitive technique appropriate for the circumstances and the risk posed by the fire.
- Responsibility: DSE, Parks Victoria*
- Action 7 Control predators**
- Red Foxes will be controlled across as large a part of the Long-footed Potoroo distribution as possible. In East Gippsland the entire distribution is included within the Southern Ark fox control project area. Long-footed Potoroo population monitoring will continue in selected areas with predator control, especially Bellbird Track. In the Great Dividing Range area, DSE and Parks Victoria will continue to implement strategic fox control programs to protect the main concentration of known Long-footed Potoroo sites and primary habitat. Wild dogs will be controlled where they are demonstrated to be posing a threat to Long-footed Potoroos. Feral cats will be controlled at Long-footed Potoroo sites on an *ad hoc* basis by trapping and humane disposal until a viable cost effective broad scale control technique is available. This technique should then be applied to as many sites as possible. A protocol specifying trigger points to initiate dog or cat control measures and the appropriate design of control programs will be developed.
- Responsibility: DSE, Parks Victoria*
- Action 8 Undertake threat monitoring**
- Monitor introduced predator densities at key Long-footed Potoroo sites in East Gippsland and the Great Dividing Range area to determine whether trigger points for control have been reached and whether control programs are effective.
- Responsibility: DSE, Parks Victoria*
- Objective III To improve knowledge of biology, ecology and management requirements**
- Targets: Monitoring protocol has been reviewed and updated.*
- New protocol has been fully implemented.*
- Reliable information has been obtained on population trends.*
- Substantial improvement has occurred in our understanding of biology, habitat requirements and response to disturbance.*
- Action 9 Monitor populations**
- In light of the effectiveness of remote cameras in detecting Long-footed Potoroos, review the current protocols for surveying and monitoring, and implement revised protocols. Maintain long-term monitoring activities, such as those at Bellbird Creek in East Gippsland, as far as possible.
- Responsibility: DSE*
- Action 10 Undertake research**
- Undertake further research on the effects of habitat disturbance (especially by fire) on the Long-footed Potoroo and its food sources. Encourage other ecological research on the Long-footed Potoroo consistent with priorities identified in the National Recovery Plan, including interrelationships between Red Foxes, Wild Dogs, feral Cats and Long-footed Potoroos.
- Responsibility: DSE, Parks Victoria*
- Action 11 Undertake population modelling**
- When sufficient information on Long-footed Potoroo population biology is known, undertake population modelling to refine our understanding of the probability of the species thriving under various scenarios. The results of the modelling should be used to revise habitat protection arrangements if necessary.
- Responsibility: DSE*
- Action 12 Captive management**
- The captive Long-footed Potoroos at Healesville will be re-established for display and educational purposes if the opportunity arises to deposit orphaned, sick or injured animals that cannot be rehabilitated to the wild. If established, these animals will be available for ecological research. No new healthy wild-sourced Long-footed Potoroos will be taken into

captivity at Healesville Sanctuary due to the risk of the animals acquiring avian tuberculosis. Other options for captive management will only be considered for approval following rigorous assessment of conservation and animal welfare risks and benefits.

*Responsibility: DSE, Zoos Victoria*

**Objective IV To increase community awareness and support**

*Target: Opportunities for involvement have been identified, promoted and supported.*

**Action 13 Develop and distribute community awareness material**

Information on the need for special management of the Long-footed Potoroo and on the species' ecology will continue to be distributed to the community, especially in East Gippsland (including the Dargo area) and north-east Victoria. The unique occurrence of the Long-footed Potoroo in these areas should be included as part of the promotion of ecotourism, forest management and the wildlife of the regions. Liaison with deer hunting associations (and especially hunters who use hounds) will be increased to improve their understanding of the importance of the baiting program for the great Dividing Range population and to try to develop mechanisms to minimise the risks of baiting to hunters' dogs. Fact sheets should be added to the DSE website to increase the accessibility of information.

*Responsibility: DSE, Parks Victoria*

**Action 14 Involve the community in recovery activities**

Involve the community in the management of the Long-footed Potoroo by providing opportunities for volunteers to assist with field work if appropriate.

*Responsibility: DSE*

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## **Appendix I: Prescriptions to be applied in State forest:**

1. Each Long-footed Potoroo (LFP) detection site outside the Core Protected Area will generate a Special Management Zone (SMZ) of approximately 150 ha.
2. As far as possible, SMZ boundaries will follow recognisable landscape features such as ridges, spurs and watercourses.
3. Within each SMZ, at least one third (~50 ha) will be protected from timber harvesting and new roading.
4. This will be known as Long-footed Potoroo Retained Habitat.
5. The LFP Retained Habitat will include the best LFP habitat in the SMZ, which will generally be in gullies and on lower, sheltered slopes.
6. The LFP Retained Habitat may include areas otherwise unavailable for timber harvesting due to restrictions under the Code of Practice for Timber Harvesting.
7. The SMZ will also have a general restriction of one third of the total area that can be harvested in any three year period. If more than one coupe is to be harvested in an SMZ in the same year, the coupes must be separated by at least the equivalent of another coupe width.
8. The SMZ, with the LFP Retained Habitat clearly delineated, will be shown as part of the Forest Management Area zoning scheme.
9. The SMZ will be designed by DSE, in consultation with VicForests, and approved by DSE.
10. If the ~150 ha area includes any part of an existing conservation reserve or Special Protection Zone (SPZ), these areas will retain their existing reservation or zoning status but will be considered for inclusion as part of the area of retained habitat. In such cases, the final area designated as SMZ may be correspondingly smaller.