DRAFT SPECIES CONSERVATION MANAGEMENT PLAN

RED-TAILED PHASCOGALE

(Phascogale calura)

CONSERVATION PLAN FOR THE

WHEATBELT POPULATIONS

2009-2014

Red-tailed Phascogale (Photo: Babs & Bert Wells / DEC)

Australian Government

Department of Environment and Conservation

Our environment, our future

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SECTION 1. BACKGROUND

1.1. HISTORICAL INFORMATION / DISTRIBUTION AND RANGE

The red-tailed phascogale (*Phascogale calura*) was first described in 1844 by John Gould. It had a wide but patchy distribution across Australia prior to settlement and specimens have been collected from locations such as Canning Stock Route, Western Australia; 16 km from Darling Junction in Victoria; Alice Springs and Barrow Creek, Northern Territory and Adelaide, South Australia (Kitchener, 1981). Recent fossil records and records of distribution at settlement suggest that the species occurred widely through arid and semi-arid Australia and that the contraction of its range was concurrent with the introduction of exotic predatory species, such as the feral cat and red fox (Finlayson 1961). Currently *P. calura* is found at a limited number of locations in the southern Wheatbelt in Western Australia (Kitchener, 1981; Friend and Friend 1992).

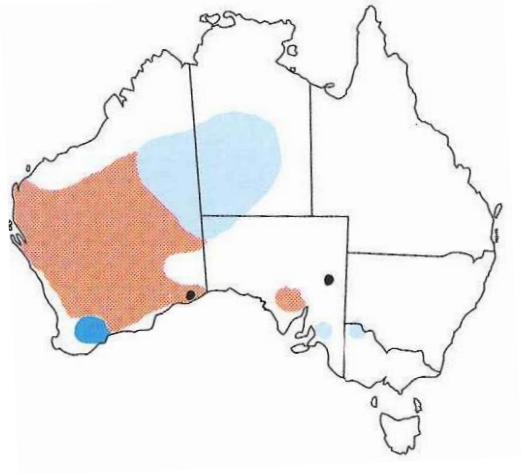

Figure 1: Past and present distribution of *Phascogale calura*. Red hatching and black dots indicate recent fossil records, light blue indicates distribution at the time of European settlement and dark blue indicates current distribution (Bradley *et al.* 2008).

1.2. SPECIES DESCRIPTION

The red-tailed phascogale is a small arboreal dasyurid, with dusty red fur on the upper proximal half of the tail with a tuft of brushy black hairs on the distal half of the tail. It is characterised by ash grey fur on the dorsal surface and cream to white below. The males are, on average, slightly larger than the females with the average head and body length being 113mm and 101mm, tail length averaging 141mm and 132mm and average weight of 60g and 43g respectively.

P. calura can be distinguished from *Phascogale tapoatafa* using head and body length and weight of adult animals, the lack of the dusty red colouring on the upper proximal surface of the tail and the more prominent brush on the end of the tail of *P. tapoatafa*.

1.3. HABITAT AND DISTRIBUTION

At settlement the red-tailed phascogale was known to have a wide but patchy distribution throughout the arid and semi-arid areas of Western Australia, South Australia, north-western Victoria and the Northern Territory (Kitchener 1981). The species is now confined to remnant patches of vegetation containing suitable habitat in the central and southern Wheatbelt, where vegetation is long unburnt or burning is infrequent (Kitchener 1981; Friend and Friend 1992). The known distribution of the red-tailed phascogale within the Avon Catchment is limited. Current records of the *P. calura* are restricted to the southern half of the catchment area and records indicated in red have been collected and validated in the past five years, with many of the remaining records between 15 to 30 years old.

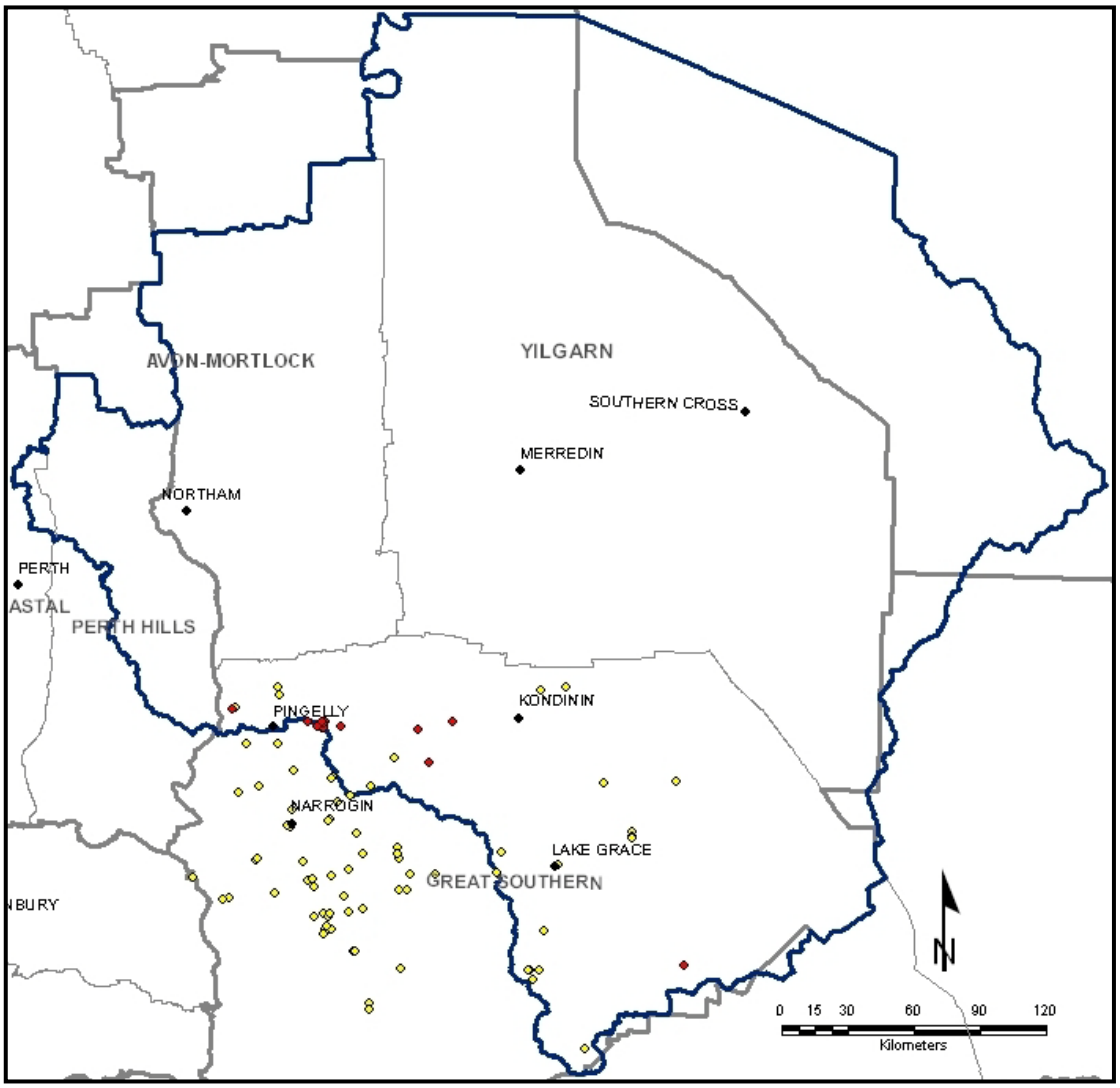

Figure 2: Location of the known captures and reports of Red-tailed Phascogales, through Avon funded surveys and data collection (red dots) within the Avon NRM Region (blue line) and Department of Environment and Conservation records (yellow dots). The grey lines denote DEC District and Regional boundaries.

The red-tailed phascogale is known to prefer habitat consisting of dense, taller climax vegetation communities of wandoo (*Eucalyptus wandoo*) and rock oak (*Allocasuarina huegeliana*) including *Gastrolobium spp.* and reach their highest density where dense *A. huegeliana* is interspersed with senescent *E. wandoo* to provide nesting sites (Kitchener 1981; Bradley *et al.* 2008; Friend and Friend 1992). Recent captures indicate that the species can also be found through Mallee and heath in the south eastern Wheatbelt. The species can also be found inhabiting letter boxes, ceiling cavities and other opportunistic refuges. This suggests that although their habitat preference is clear, they will use other vegetation types and artificial refuges, in lower densities, as nesting sites where preferred habitat is not available.

1.4. BIOLOGY AND ECOLOGY

The red-tailed phascogale is an arboreal marsupial that also feeds extensively on the ground (Bradley *et al.* 2008). It is an opportunistic feeder, taking a wide range of insects, spiders and small birds and mammals, particularly the house mouse. A mainly nocturnal animal, it has also been known to investigate potential food sources during the day. Home ranges vary from

1.5 to 8 hectares depending on breeding season and other environmental conditions (Friend and Friend 1992), with animals being able to leap up to two metres across the canopy enabling them to move rapidly when searching for prey.

Mating occurs within a three week period in July. During the lead up to and throughout this period, males home ranges expand and they become highly mobile. The death of all males in the population occurs shortly after the mating period in July (Friend and Friend 1992) as a result of increased stress and hormone levels (Bradley 2003). Gestation is usually 28-30 days in length, with litter size reaching up to thirteen. However, no more than eight young can be accommodated and the average litter size is 7.5. Weaning occurs in late spring with young becoming independent and developing home ranges by the end of summer. In the wild, females can survive to breed a second or third time, with males only living 11.5 months (Bradley *et al.* 2008).

1.5. CONSERVATION STATUS

The conservation status of the *Phascogale calura* is listed under the following legislation:

Schedule 1 Fauna under the *Wildlife Conservation Act 1950* (WA). (Schedule 1 is defined as fauna that is rare or likely to become extinct and are declared to be fauna that is in need of special protection).

Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) and the World Conservation Union (IUCN Red List) (on the basis of criteria B1 + 2b, d) (IUCN, 2008; Maxwell *et al.* 1996).

1.6. THREATENING PROCESSES

There are a number of threats that impact on the red-tailed phascogale, these include but are not limited to; habitat loss and fragmentation, introduced predators and fire.

1.6.1. *HABITAT LOSS AND FRAGMENTATION*

Habitat loss as a result of clearing is a significant conservation issue in the Wheatbelt of Western Australia. The isolation of populations and the resulting impediments to genetic exchange are of concern when managing populations of threatened species, such as *P. calura*. The potential for threatened species in a fragmented landscape to become extinct in localised areas as a result of declining resource condition, lack of refuge and increased pressure from competition and predation is high. The ability of a particular species to withstand the increased stress associated with these impacts depends on the size of patches, their degree of isolation, the disturbance regime, dispersal ability and the demographic potential of the species (Morton 1990).

Phascogale calura is restricted to remnant vegetation throughout the central and southern areas of the Wheatbelt. The rate of localised extinction of this species is unquantified and similarly rates of recolonisation are unknown. Local extinctions or declines of *P. calura* could be attributed to climatic variations and prolonged periods of drought throughout the landscape. The persistence of *P. calura* within small patches of vegetation in Wheatbelt reserves again increases this species' vulnerability to outside pressures on population stability.

1.6.2. *INTRODUCED PREDATORS*

Cats impact on native animals up to 2000 grams but the impact falls most heavily on smaller species weighing less than 220 grams and vulnerability is enhanced by behavioural traits such as salutatory locomotion (leaping) (Dickman 1996). This would suggest that while foxes have a significant impact on the critical weight range fauna (0.035 – 5.5 kg) (Morton 1990; Burbidge and McKenzie 1989) cats impact heavily on species at the lower end of that spectrum and that the behavioural features of the red-tailed phascogale would cause it to be more attractive as prey to a cat.

Cursorial predators such as the feral cat *Felis catus* and the red fox *Vulpes vulpes* are widespread in Australia. The impact of these predators, particularly foxes, on native fauna within the critical weight range has been demonstrated through programs such as Western Shield where baiting to control foxes has been applied and monitored for over 12 years. However, development of methods such as baiting to control the feral cat are less advanced and information about the impact of fox numbers on feral cat populations is currently being researched.

1.6.3. *FIRE*

The habitat and refuge requirements and life history characteristics of *Phascogale calura* make it vulnerable to fire, particularly in spring. The life strategy of *P. calura* and other species, including many *Antechinus spp.* and *Dasyurus hallucatus*, includes the post-mating mortality of males in the population (Bradley 2003; Friend and Friend 1992; Bradley 1987; Lee *et al.* 1982). Fire, particularly in spring post-mating, could lead to increased stress and mortality of females and their dependant young or a pre-breeding mortality and/or a failure to breed created by the reduction in resources, particularly food and refuges (Friend and Friend 1992).

1.6.4. *MANAGEMENT OF THREATENING PROCESSES*

No species specific conservation measures are undertaken at this time by the Department of Environment and Conservation (DEC) for the *P. calura*. However, conservation actions undertaken by DEC throughout the Wheatbelt that impact positively on phascogale conservation include:

Fox baiting under the Western Shield Program, this includes reserves containing populations of *P. calura*

Research into the Meso-predator phenomenon (the effect of fox baiting of feral cat populations)

Monitoring of populations on Wheatbelt reserves annually to determine population trends and health

Reserve management

Covenants

Land for Wildlife Program

Revegetation in targeted landscapes

Fencing of remnant vegetation on private property in target landscapes

SECTION 2. ON GROUND ACTIONS UNDERTAKEN AS PART OF BACK FROM THE EDGE

2.1. NEST BOX BUILDING WORKSHOPS

Reduced hollow availability could be a limiting factor in the red-tailed phascogales ability to successfully recolonise an area that has once under gone a disturbance event, such as clearing and land development, fire and incursion of introduced predators, or a combination of these factors. Providing suitable hollows, in the form of nest boxes, provides phascogales an opportunity to find refuge in areas that may otherwise be suitable habitat. This activity also provides an excellent opportunity to engage local community groups and landholders that border nature reserves in the conservation of threatened species.

Two nest box building workshops have been conducted within the Avon Catchment as of February 2009, with more planned throughout the year. These workshops have highlighted the conservation issues facing species, such as the red-tailed phascogale, within the Wheatbelt and the importance of involving local community groups, landowners and other interested parties in developing effective on-ground management actions for threatened species.

Factors that have contributed to the success of these workshops include:

advertising;

using pre-developed links with community groups such as the 1st Pingelly Scouts and the Toodyay Naturalists Club;

talking to local land owners when out on reserves;

partial construction of the nest boxes prior to the workshops to reduce time and effort of participants on the day;

providing background information on the day to support the use of nest boxes; and

an informal setting where participants are comfortable in asking questions.

Factors that impede the number of workshops able to be offered include:

availability of labour to partially construct nest boxes prior to workshops;

lack of interest from land holders; and

time of staff and land holders.

2.2. SURVEYS INVOLVING COMMUNITY GROUPS

Surveys, reported sightings and other community information has been verified and then utilised to determine a brief distribution of the red-tailed phascogale within the Avon Catchment. Community groups such as 1st Pingelly Scouts and Northam Bush Ranger Cadets in conjunction with other local volunteers and interested land owners have participated in the surveys and contributed to raising the profile of the species in the local community.

These events have provided participants:

opportunities to view threatened species;

opportunities to observe the habitat in a close to original condition;

observations of species behaviour; and

a greater understanding of the general habitat and broad environmental requirements the species needs to survive.

Feedback has indicated that participants involved in field surveys have enjoyed the experience and in many instances have been exposed to new information regarding conservation of threatened species for the first time.

Factors that have contributed to the success and enjoyment of participants include:

participation in an authentic survey activity;

development of skills used in practical management of a threatened species; and

spending time outdoors in the natural environment with a purpose.

Factors that impede the level of participation and frequency of survey events:

species biology and seasonal requirements;

cost of survey;

number of people that can be effectively included by the staff member per morning;

time of day and location of survey events;

potential physical requirements of participants; and

time available to conduct surveys.

2.3. AGRICULTURAL FIELD DAYS

The Newdegate Agricultural Field Day and Wagin Woolorama have been attended annually to increase the audience of 'Back from the Edge' message with posters, stickers, magnets and brochures being displayed and available for members of the public to take. Conservation Officers and the Community Engagement Officer have been available on all occasions to answer any questions asked and develop contacts with local land owners where ever possible.

SECTION 3. COMMUNITY ENGAGEMENT – THE WAY FORWARD

3.1. NEST BOX BUILDING WORKSHOPS

To date nest box building workshops have been aimed at local interest groups that have previously involved in conservation activities or landholders that border nature reserves. The aim of moving forward with the nest box building program is to maintain and increase the network of landholders and community groups that place nest boxes on their property as part of a monitoring activity.

Actions to help achieve this aim may include:

following up with attendees of past workshops and monitoring progress by correspondence;

developing a survey program in areas where numerous records of *P. calura* are collected; and

developing a community based group or using a existing community group to take charge of the developed nest box monitoring program in an area.

Options for increasing interest for future nest box workshops include:

targeting local high schools in the Avon Catchment and developing the construction of a nest box as part of a Technology and Enterprise project;

broadening the scope of community involvement and targeting members of communities within towns known to have phascogales within the town boundaries; and

further targeted advertising in communities where established Landcare groups, Naturalist Clubs and other such organisations are known to exist.

This community engagement activity can be continued by the Avon Catchment Council (ACC) in the future with specialist input from the Department of Environment and Conservation (DEC) at presentations and for monitoring of nest boxes and population surveys when required.

3.2. SURVEYS INVOLVING LOCAL COMMUNITY GROUPS

Surveys have been used to determine presence/absence of *P. calura* in reserves of the Wheatbelt in conjunction with community groups where possible. This program has the capacity to be expanded to further survey many small reserves with patches of appropriate habitat. As mentioned in the above section, survey is a costly and time consuming activity and provides limited exposure to the community, however, when the community have the opportunity to be involved the response is always positive.

Future directions for the survey of red-tailed phascogale within the Avon Catchment should include:

targeted areas of previous distribution where habitat still exists;

monitoring of significant populations in areas that represent the periphery of the current distribution and stable populations within the centre of the current distribution as a comparison; and

continued opportunity for community members to participate in areas where survey occurs where appropriate.

Future surveys should aim to include the community, within reason, but not be solely based around community engagement. To further determine the patchiness within the distribution of *P. calura* a structure of two night surveys over a broader area may accomplish a more complete picture of the current range of the species.

Monitoring of known populations will be continued, where possible, by DEC in conjunction with other monitoring programs to determine persistence and health of populations.

3.3. REPORTING OF SIGHTINGS AND SPECIMENS

The reporting of sightings and specimens should be continually encouraged by both ACC and DEC to help form a broad basis for the development of survey programs and targeted management actions in the future. All reports should continue to end up with DEC in the appropriate threatened species database.

Options to continue and reinvigorate this program include:

placing the red-tailed phascogale profile from the 'Avon's Most Wanted' poster in local papers throughout the Wheatbelt; and

developing a competition for primary schools throughout the Wheatbelt to design an advert asking for sightings from their local communities.

3.4. COMMUNITY EDUCATION: FIELD DAYS, SCHOOL VISITS, LOCAL ENVIRONMENTAL GROUPS AND CLUBS

DEC will continue to provide information and advice where requested on threatened species in the Wheatbelt. Specific events in the future that ACC may consider targeting include: Newdegate Machinery Field Day, Wagin Woolorama and other local fairs or environmental days as they come up.

SECTION 4. FUTURE MANAGEMENT ACTIONS

Objectives		Actions
Identify and survey all suitable locations to determine the distribution of the red-tailed phascogale in the Avon River Basin.	Identify additional areas of suitable habitat using GIS vegetation mapping	Produce a map highlighting all potential habitat sites
	Assess areas identified to determine potential as red-tailed phascogale habitat	Produce a map showing all habitat areas in a ranking for suitability
		Create a timeline and program for surveying reserves with suitable habitat for the presence of red-tailed phascogale
	Survey within areas identified as suitable habitat to determine the presence/absence of the species	Create a database for all records of red-tailed phascogales caught in the Avon River Basin
Develop fire management documentation for managed reserves and parks in the Avon River Basin in relation to conservation of known populations of red-tailed phascogales	Construct fire management plans of *Allocasuarina huegeliana* / *Eucalyptus wandoo* woodlands where known populations exist.	Undertake active habitat management using fire where possible.
Monitor known populations of red-tailed phascogale within the Avon River Basin	Assess causal factors in recent declines or local extinctions in known locations.	Incorporate any recommendations into future conservation plans and management actions within the relevant reserves and provide the information to landholders so that they can also implement any management recommendations
	Develop and implement a monitoring plan for areas of known red-tailed phascogale populations	Maintain database with all capture records of red-tailed phascogale in the Avon River Basin
		Produce a current distribution map for the red-tailed phascogale within the Avon River Basin
	Monitor key areas of habitat and protect habitat from weeds, grazing, and the introduction of *Phytophthora cinnamomi*	Incorporate management of *Allocasuarina sp.* thickets into broader Regional and District Nature Conservation Strategic plans
Maintained or increased community awareness and	Increase in reported sightings	Raise awareness of the need to maintain a current database of sighting records

knowledge of and participation in conservation of the red-tailed phascogale		Produce and distribute an identification and fact sheet to assist in the reporting of sightings
	Increased participation in monitoring programs on private land and DEC run monitoring events	Conduct information seminars for local landholders and community groups on how to build, erect and monitor nest boxes in remnant vegetation
		Target schools, community groups and other interested parties to maintain or begin participating in DEC monitoring of on and off reserve red-tailed phascogale populations
Continue research into the ecology of the red-tailed phascogale to aid further conservation work	Continue research into habitat and resource requirements of the species. Including; diet, availability of resources, impact of fire.	Population Viability Analysis

4.1. PREDATOR CONTROL

4.1.1. *FOX CONTROL*

Under the Western Shield program a number of Wheatbelt reserves are baited using 1080 baits for the management of fox numbers and the recovery of threatened fauna. Where red-tailed phascogales occur within these reserves they will continue to benefit from these actions. However, there are still are large portion of reserves that do not fall under the Western Shield program and consequently do not under go active predator management.

There is still no conclusive evidence that suggests that *P. calura* is directly affected by fox predation (Friend and Friend 1992), however, there is some evidence to suggest that long term baiting allows phascogale populations to reach a functional equilibrium.

Funded community baiting programs could be initiated adjacent to remnant vegetation patches containing habitat suitable for P. calura. However, there is little point initiating a program such as this where long term commitment of funding is not available. Population studies have shown that there is varied effect of baiting on populations with no conclusive evidence of success in the short-term.

4.1.2. *FERAL CAT CONTROL*

Short term fox baiting is likely to release feral cat numbers, as described by the Meso-predator effect. This as described earlier is likely to have a significant negative impact on *P. calura* and may be the reason that other studies have not seen a significant population improvement after baiting has occurred.

4.2. MANAGEMENT OF PRIORITY REMNANT VEGETATION ON PRIVATE PROPERTY

Many conservation programs can benefit from the management of remnant vegetation on private property. The benefits of an action, such as fencing, include: the exclusion of introduced grazers such as sheep, exclusion of native species that can limit regeneration of native vegetation and increase ownership of land holders involved in the projects.

The provision of incentives for fencing and revegetation in priority areas provides the opportunity to limit degradation of natural bush and over time increase its value as habitat for fauna.

SECTION 5. REFERENCES

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