



Conservation Advice for *Petrogale persephone* (Proserpine Rock-wallaby)

In effect under the *Environment Protection and Biodiversity Conservation Act 1999* from 29 September 2021.

This document provides a foundation for conservation action and further planning.



Photograph of *Petrogale persephone* (Proserpine Rock-wallaby) © Copyright, Barry Nolan

Conservation status

Petrogale persephone (Proserpine Rock-wallaby) is listed in the Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) effective from 16 June 2000. The species is eligible for listing as prior to the EPBC Act, it was listed as Endangered under the *Endangered Species Protection Act 1992* (Cwlth).

The main factors that make the species eligible for listing in the Endangered category include a restricted distribution, fragmented habitat and continuing decline in extent and/or quality of habitat and the number of mature individuals (Burnett and Winter 2019; Woinarski 2014).

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

Species information

Taxonomy

Conventionally accepted as *Petrogale persephone* Maynes, 1982.

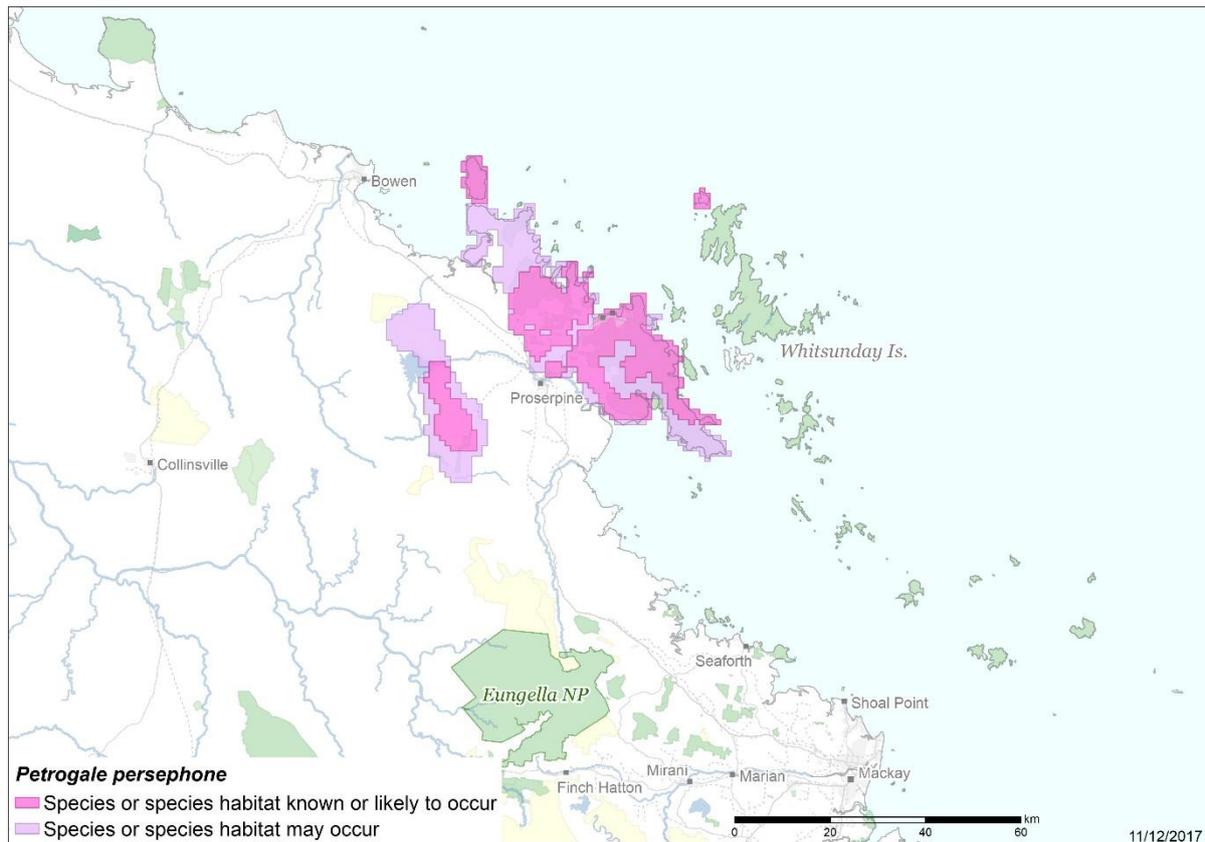
Description

The Proserpine Rock-wallaby is a medium-sized marsupial with a head and body length of 500–640 mm, tail length of 580–734 mm for males (slightly smaller for females), and an adult weight of 4.3–10.2 kg for males and 3.5–8 kg for females (EHP 2018, Nolan 2007 cited in DERM 2010). It has dark grey body fur with a light mauve tinge. The backs of the ears are dark brown to black, the head has a cream stripe running along the upper lip and face to the level of the ear, while the chest and belly are a light grey to dirty cream colour. The tail is long and mostly black in colour with the base a rich rufous brown and a lighter upper surface of the tail. Like all rock-wallabies, the toe nails on the hind feet are reduced to short stout hooks and the soles of the hind feet have thick fleshy pads, which aid grip when moving over rocks (EHP 2018; DERM 2010).

Distribution

The Proserpine Rock-wallaby occurs in Queensland is known from 24 subpopulations across Clarke Range, Conway Range and Dryander, and on two islands; Gloucester island where it occurs naturally and Hayman island where it has been introduced. Its distribution covers three National Parks being Conway National Park, Dryander National Park and Gloucester Island National Park. The population size of the Proserpine Rock-wallaby is small, but there are no reliable estimates, nor reliable estimates of the size of most subpopulations (Woinarski et al. 2014).

Map 1 Modelled distribution of Proserpine Rock-wallaby



Source: Species distribution data [Species of National Environmental Significance](#) database, base map Geoscience Australia

Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the specific habitat type or geographic feature that represents to recent observed locations of the species (known to occur) or preferred habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Cultural and community significance

The cultural significance of the Proserpine Rock-wallaby is currently unknown however the locality in which the species occurs has a long history of Indigenous occupation. The Ngaro and Gia people are the Traditional Owners of the land on which the species occurs.

Relevant biology and ecology

The Proserpine Rock-wallaby occupies a variety of densely-vegetated and/or rocky habitats across its range including rocky outcrops, boulder piles, gorges, cliff lines and rocky slopes that create crevices, tunnels and overhangs (Woinarski et al. 2014; Winkel 1997b all cited in DAWE 2020). Large rocky features are used as refuge sites for protection from predators and the combination of high temperatures and humidity during summer (DERM 2010).

On the mainland, the species inhabits boulder outcrops in pockets of semi-deciduous, semi-evergreen or complex microphyll or notophyll vine forest. These habitats are dry rainforest

characterised by some deciduous canopy and emergent trees, large woody vines and often with thorny shrubs in the understorey. This habitat generally occurs on foothills near open woodland (Harden et al. 2006; McDonald 1995; Nolan 1997; Delaney 1993 all cited in DAWE 2020). The species occasionally occurs on the outer margins of rainforest and moves into adjacent grassy woodlands or residential gardens to feed (Woinarski et al. 2014). On Gloucester Island, the species prefers littoral (beachside) habitat where it utilises dry vine scrub covered rocky outcrops and rock piles, usually associated with beach scrub (DAWE 2020), and it also occupies rocky *Acacia* woodland at higher elevations (Eldridge 2012a cited in Woinarski et al. 2014). On Hayman Island, the species utilises boulder piles covered with vine thicket in low dry rainforest or vine forest (Harden et al. 2006; Schaper & Nolan 2000 all cited in DAWE 2020).

The Proserpine Rock-wallaby feeds mainly on dropped leaves (approximately 60 percent of their diet), supplemented by grasses, vines, ferns, and fungus (Winkel 1997 cited in DERM 2010). In dry periods, foraging occurs in adjacent grassy areas, with riparian vegetation and beach scrub providing critical foraging resources during drought (DERM 2010). Home ranges are approximately 20 to 30 hectares and are larger for males than females (DERM 2010a; Eldridge 2012a all cited in Woinarski et al. 2014).

The Proserpine Rock-wallaby is crepuscular (active during twilight), relying on rock piles to provide shelter during the day (Holloway 2001 cited in DAWE 2020; DES 2021). At elevations above 140 m they are occasionally active during the day and will bask in cooler weather (Tipping et al. 2004 cited in DAWE 2020).

Breeding occurs throughout the year. Females mate soon after giving birth (within hours), and development of young is such that the next young is born the day after the previous one leaves the pouch permanently (at around 209 days old). In captivity, young are weaned at about 122 days after permanently leaving the pouch (DAWE 2020). In the wild, their lifespan is 7-10 years (Woinarski et al. 2014).

Habitat critical to the survival

Due to the species eligibility for listing (restricted distribution, fragmented habitat and continuing decline in extent and/or quality of habitat and the number of mature individuals), all habitat is considered critical to the survival of the species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Important populations

In this section, the word population is used to refer to subpopulation, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation.

There is sufficient evidence through the species eligibility for listing, to declare all populations/the national population as important populations of this species under particular pressure of survival and which therefore require protection to support the recovery of the species.

Threats

The Proserpine Rock-wallaby is facing several severe and/ or increasing threats including habitat loss, impacts from invasive species, mortality from vehicle collisions and bushfire (Table

1). In addition, anthropogenic climate change is also a likely long-term threat as habitat availability and distribution change in response to changes in climate (Clancy & Close 1997 cited in DAWE 2020) including drought and extreme weather events. The crossover of boundaries of various species of *Petrogale* in Queensland may be influenced by climate (Sharman et al. 1990 cited in DERM 2010). This combined with the relationship between *Petrogale inornata* (Unadorned Rock-wallaby), which adjoins the Proserpine Rock-wallaby on at the northern and southern ends of the Proserpine Range, on the north-western side of Mt Dryander, and directly south on Gloucester Island may have an effect on the survival of the Proserpine Rock-wallaby. The Unadorned Rock-wallaby is more of a habitat generalist and therefore has the potential to displace populations of Proserpine Rock-wallaby. Further, there is also potential for the two species to interbreed, producing infertile off-spring (Close & Bell 1997 cited in DERM 2010). This is a particular threat for small colonies that are disjunct or isolated from larger populations. Diminished breeding pools within small colonies will also place further pressure on the genetically depauperate species in the long term through inbreeding (Eldridge 2008 cited in DERM 2010; DERM 2010).

Table 1 Threats impacting Proserpine Rock-wallaby

Threat	Status and severity ^a	Evidence
Habitat loss and fragmentation		
Agricultural and residential development	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: major • Trend: static • Extent: across the entire range 	Habitat loss associated with agriculture (particularly sugar cane) and residential and tourism development is recognised as a historic and ongoing threat for many colonies. As well as the loss of habitat, developments have also resulted in habitat fragmentation and isolation of several colonies through disturbance to habitat connectivity and physical barriers to dispersal.
Bushfire		
Increased severity and frequency of bushfire	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: major • Trend: increasing • Extent: across the entire range 	Although the Proserpine Rock-wallaby inhabits rainforest, bushfires have the potential to burn habitat during drought and particularly the drier island locations. Due to the limited distribution of the species, fire events could destroy entire subpopulations (Close 2001; Schaper & Nolan 2000; Winkel 1997b all cited in DAWE 2020). Climate change projections show that southern Australia is likely to experience harsher fire weather (CSIRO 2015), and in 2019-20, following years of drought (DPI 2020), catastrophic bushfire conditions resulted in extensive bushfires across eastern Australia. This is considered to be an increasing threat to the Proserpine Rock-wallaby.
Climate change		
Increased intensity of the strongest tropical cyclones	<ul style="list-style-type: none"> • Timing: current • Confidence: inferred • Consequence: moderate • Trend: increasing • Extent: across the entire range 	While more research is required to better quantify projections of the effect of climate change on tropical cycles, the current understanding is that intensity of the strongest tropical cyclones is likely to increase, but many climate models project a substantial decrease in tropical cyclone numbers in this region, which may lead to an overall decrease in the total

Threat	Status and severity ^a	Evidence
		<p>number of intense tropical cyclones (Walsh et al. 2012).</p> <p>Cyclone Debbie devastated north Queensland in March 2017 with wind gusts exceeding 260 km/h (Climate Council 2017). This severe cyclone impacted habitat for the Proserpine Rock-wallaby and initial monitoring identified that two previous colony sites no longer have wallabies present following the impacts of this cyclone (DES 2021). Damage from the cyclone included structural changes to ground vegetation including large amounts of fallen trees, branches, etc., opening the closed canopy for extended periods which led to direct heating of the rock piles the wallabies use for shelter, as well as other impacts caused by habitat damage including opportunities for increased predation (DES 2021).</p>
<p>Increased temperature and change to precipitation patterns</p>	<ul style="list-style-type: none"> • Timing: current • Confidence: inferred • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p>Climate change projections show that Australia's climate will get hotter and drier, with time in drought predicted to increase over southern Australia (CSIRO 2015). Such changes in climate are likely to cause forest decline, with drought stress leading to plant mortality (Choat et al. 2012).</p> <p>Given the species extremely specific habitat requirements, including reliance on refuges and riparian vegetation/beach scrub during drought (DERM 2010), and its limited distribution, climate change is likely to be a significant threat to the species (Clancy & Close 1997 cited in DAWE 2020). Impacts are likely to be changes to and loss of habitat and food resources, and extreme weather events such as increasing occurrence and severity of drought (WWF Australia 2008; Pearson 2013).</p>
<p>Invasive species</p>		
<p>Predation by both domestic and wild Dogs (<i>Canis familiaris dingo</i>), domestic and feral Cats (<i>Felis catus</i>), and European Red Fox (<i>Vulpes vulpes</i>)</p>	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p>Growth in residential development has led to an increase in domestic Dogs and Cats occurring within and adjacent to habitat areas. This has led to an increase in the number of fatal Dog attacks on rock-wallabies (DERM 2010). Wild Dogs crossbreeding with Dingoes are also present in habitat areas and have been responsible for Proserpine Rock-wallaby mortalities (DERM 2010). Predation by Cats (primarily feral Cats) on joeys is also considered to be a threat (DERM 2010). European Red Fox (<i>Vulpes vulpes</i>) occurs in some habitat areas and would also prey upon the species.</p>
<p>Introduced toxic plants</p>	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p>The propagation of introduced toxic plants poses a serious threat to Proserpine Rock-wallabies that graze in household gardens, especially during the drier months (DERM 2010). Invasion of these palatable, but potentially lethally toxic species into rainforest habitat is also of concern. Potentially lethal plants include Pink Periwinkle (<i>Catharanthus roseus</i>), Mother of Millions (<i>Kal Kalanchue spp.</i>), Oleander (<i>Nerium oleander</i>), Yellow Oleander (<i>Thevetia peruviana</i>), Rhoeo (<i>Rhoeo discolor</i>),</p>

Threat	Status and severity ^a	Evidence
		Brazilian Nightshade (<i>Solanum seaforthianum</i>), Fruit Salad Plant (<i>Monstera deliciosa</i>), Elephant Ear (<i>Colocasia antiquorum</i>), Dumb Cane (<i>Dieffenbachia maculata</i>), Yellow Allamanda (<i>Allamanda cathartica</i>), Angel's Trumpet (<i>Datura metel</i>), Poinsettia (<i>Euphorbia pulcherrima</i>), Pepper Tree (<i>Schinus terebinthifolius</i>), Coral Bush (<i>Jatropha podagrica</i>), Arum Lily (<i>Zantedeschia aethiopica</i>), and Castor Oil Plant (<i>Ricinus communis</i>) (Queensland EPA 2006a cited in DAWE 2020). Pink Periwinkle (<i>Catharanthus roseus</i>) has invaded habitat on Gloucester Island which may pose a threat (DERM 2010).
Disease carried by Cats and Dogs	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: minor • Trend: unknown • Extent: across the entire range 	<p>Domestic and Feral Cats spread <i>Toxoplasma gondii</i> which is known to cause blindness and death in Rock-wallabies (Begg et al 1995; Owen 2005 all cited in DERM 2010).</p> <p>Hydatid disease (cause by <i>Echinococcus granulosus</i>), a cyst formed by tapeworm larvae, is known to be fatal in Proserpine Rock-wallabies and may be contracted from Dogs (DERM 2010).</p>
Roads and traffic		
Vehicle impact	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: minor • Trend: increasing • Extent: across the entire range 	<p>Urban development is leading to the construction of more roads through habitat for the species. Mortality from vehicle impact is usually higher during the dry season from September to November, when animals move to roadside verges in search of food (DERM 2010).</p> <p>Death by vehicle strike has been recorded, including 14 deaths during 1992 -1993 (Johnson et. al. 2003) and in 2004, four deaths in nine days occurred at one location (DERM 2010).</p> <p>Previously turf was planted on the colony side of Proserpine Dam in an attempt to encourage wallabies to feed at this site instead of crossing the road to feed on the irrigated grass around recreational picnic areas. Early monitoring results were positive (DERM 2010).</p>

Timing—identify the temporal nature of the threat;

Confidence—identify the extent to which we have confidence about the impact of the threat on the species;

Consequence—identify the severity of the threat;

Trend—identify the extent to which it will continue to operate on the species;

Extent—identify its spatial content in terms of the range of the species.

Each threat has been described in Table 1 in terms of the extent that it is operating on the species. The risk matrix (Table 2) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts and using available literature.

Table 2 Proserpine Rock-wallaby risk matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain	Low risk	Moderate risk Disease carried by Cats and Dogs Vehicle impact	Very high risk Predation by both domestic and wild Dogs (<i>Canis lupis familiaris</i>), domestic and Feral Cats (<i>Felis catus</i>), and European Red Fox (<i>Vulpes vulpes</i>) Increased temperate and changes to precipitation patterns Increased intensity of the strongest tropical cyclones	Very high risk Agricultural and residential development Increased severity and frequency of bushfire	Very high risk
Likely	Low risk	Moderate risk	High risk Introduced toxic plants	Very high risk	Very high risk
Possible	Low risk	Moderate risk	High risk	Very high risk	Very high risk
Unlikely	Low risk	Low risk	Moderate risk	High risk	Very high risk
Unknown	Low risk	Low risk	Moderate risk	High risk	Very high risk

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be ‘very high’ or ‘high’. For those threats with an unknown or low risk outcome it may be more appropriate to identify further research or maintain a watching brief.

Conservation and recovery actions

Primary conservation objective

By 2030, the population of Proserpine Rock-wallaby will have increased in abundance and viable subpopulations are sustained in habitats which are managed for ongoing threats.

Conservation and management priorities

Habitat loss and fragmentation

- Update and refine habitat maps to with consideration to Queensland’s regional ecosystem classification. Integrate this mapping into land use planning processes and development approval processes.
- Avoid further loss and fragmentation of habitat: avoid loss of vegetation connecting areas of habitat for the Proserpine Rock-wallaby; avoid creating or enhancing barriers to movement between colonies.

- Promote the restoration and enhancement of habitat between colonies to allow safe movement of animals.
- Promote the conservation and management of Proserpine Rock-wallaby habitat outside of National Parks through voluntary conservation agreements, council open space habitat areas and management of covenant areas.

Invasive species (including threats from disease carried by Dogs and Cats)

- Promote and implement a regional feral and stray Cat management plan to reduce the number of Cats around rock-wallaby colonies
- Promote the responsible management of domestic Dogs.
- Develop and implement long-term strategies to control numbers of wild Dogs and European Red Foxes in habitat areas.
- In areas where there are a large number of domestic and wild Dogs, implement a program to treat both Dogs and Proserpine Rock-wallabies for tapeworm, if this parasite is causing high mortality in the Rock-wallabies.
- Control weed infestations, particularly toxic plants, in and adjacent to habitat. Pink Periwinkle (*Catharanthus roseus*) and Rubber Vine (*Cryptostegia grandiflora*) have become established on Gloucester Island and are toxic when eaten (Batianoff & Dilleward 1994 cited in DERM 2010). Chemical control or physical removal for both weed species is required.
- Stipulate requirements for avoiding the use of toxic garden plants when approving development.

Vehicles

- Install road signage where wallabies cross roads to reduce traffic speed and alert drivers.
- Plant trees to shade out palatable grasses on road verges on Shute Harbour Road and Staniland Drive.
- Spray guinea grass along road verges on Shute Harbour Road, Mandalay Road, and Staniland Drive.
- Install culverts of at least 1500 mm diameter on new or upgraded road within or near colonies. Similar culverts have been demonstrated to allow safe passage to and from habitat areas (DERM 2010).

Climate change and fire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the Proserpine Rock-wallaby, that they support rather than degrade the habitat necessary to the species, that they do not promote invasion of exotic species, and that they do not increase impacts of predation.
- Physical damage to the habitat and individuals of the threatened species must be avoided during and after fire operations.
- Fire management authorities and land management agencies should use suitable maps and install field markers to avoid damage to habitat for the Proserpine Rock-wallaby
- Consider undertaking weed control after fire management, including along urban roadsides

- Consider the need for immediate and ongoing post-fire predator control in areas surrounding Rock-wallaby colonies after high severity fire.
- Understand of the effects of climate change on the subspecies, and whether any effects can be ameliorated.

Stakeholder engagement/community engagement

- Undertake public education campaigns to:
 - increase public awareness of the status and threats to the Proserpine Rock-wallaby populations.
 - alert the public to where Proserpine Rock-wallabies regularly cross roads and encourage them to reduce speeds in these areas
 - inform the public of the impacts of roaming Cats and Dogs and encourage responsible Cat and Dog management
 - Increase awareness of the deadly effects of hydatids on Proserpine Rock-wallabies and encourage keeping domestic Dogs away from habitat areas and regular worming of domestic Dogs.
- Continue the distribution of brochures discouraging the use of toxic introduced plant species in local gardens and encouraging the use of native species.
- Promote and facilitate community involvement (local communities and Traditional Owners) in the recovery of the Proserpine Rock-wallaby . Population monitoring, habitat management, education and other programs should where possible, involve landholders, schools and community conservation and other action groups.

Survey and monitoring priorities

- Establish or enhance an integrated, standardised monitoring program of known Proserpine Rock-wallaby populations to track occurrence, population size of colonies, condition of individuals in the colonies, habitat condition, and the status of threats, to inform ongoing management. This is particularly important for disjunct sites which will not be naturally recolonised if existing colonies are lost.
- Conduct targeted surveys throughout the range of the Proserpine Rock-wallaby to better define its distribution and abundance. Accurately identify potentially suitable habitat and undertake survey work to locate and map any additional populations.
- Identify, map and monitor colony refuge sites which are critical habitat components to identify threats and to inform management actions.
- Monitor the introduced Hayman Island colony to determine the population size and age structure and monitor the populations genetic diversity over time to help manage the population and determine if it is a suitable source for reintroduction or augmentation. Monitor vegetation every three years to track and compare changes in vegetation since the introduction of the species and the removal of goats from the island.

Information and research priorities

- Develop a plan to document management of the Hayman Island population.

- Monitor roadkill numbers across the species range and particularly the effectiveness of decoy foraging areas (turf areas) established to reduce the number of Proserpine Rock-wallabies crossing roads.
- Determine the home ranges for colonies, and particularly for those in close proximity to expanding residential areas.
- Undertake connectivity analysis to prioritise important areas for connectivity conservation between disconnected population across a heterogeneous landscape.
- Study behavioural interactions with *Petrogale inornata* (Unadorned Rock-wallaby) where populations are adjacent.
- Map the prevalence of *Toxoplasmosis gondii* and *Echinococcus granulosus* in Proserpine Rock-wallaby colonies (from blood samples taken during trap and release surveys), and establish the incidence of disease and the disease outcomes. For example, conduct post mortems on dead wallabies to check if death can be attributed to either pathogen.
- Initiate research to determine what impact fragmentation has had on individual areas containing Proserpine Rock-wallabies and what impact any additional fragmentation is likely to have, as it is not known whether fragmented areas can support viable populations indefinitely (DERM 2010).

Links to relevant implementation documents

[National recovery plan for the Proserpine rock-wallaby *Petrogale Persephone* \(2010\)](#)

[Survey guidelines for Australia's threatened mammals. EPBC Act survey guidelines 6.5 \(2011\)](#)

[The action plan for threatened Australian macropods 2011-2021 \(Roache 2011\)](#)

[Threat abatement plan for predation by feral cats \(2015\)](#)

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