Vertebrate Fauna Assessment of Tower Hill/Pwakkenbak Reserve 15162

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Contents

Tables

Figures

Appendices

1.0 Introduction

Great Southern Centre for Outdoor Recreation Excellence (GSCORE), on behalf of the Shire of Plantagenet, commissioned a vertebrate fauna assessment of the Tower Hill/Pwakkenbak Reserve 15162 in March 2020, prior to future development of recreational trails. The aim of the survey was two-fold:

1. Carry out a desktop search to highlight any potential threatened or priority fauna that may occur on the reserve, and

2. Carry out a field assessment searching for suitable habitat and evidence to determine the presence of threatened or priority fauna at the reserve.

Reserve 15162 is Crown land covering approximately 58ha, its highest elevation is 403m. The land is managed by the Shire of Plantagenet under a management (vesting) order for the purpose of Parklands.

2.0 Methods

2.1 Desktop search

A desktop search was performed using a 5km radius from -34.6559^{o} S, 117.6463^{o}E on the Atlas of Living Australia (ALA) platform cited below.

Atlas of Living Australia occurrence download at https://biocache.ala.org.au/occurrences/search?q=%3A*&fq=geospatial_kosher%3Atrue&lat=-34.6559&lon=117.6463&radius=5.0 accessed on Wed Mar 04 17:18:42 AEDT 2020.*

This search included records from the following sources:

Australian National Wildlife Collection
Australian Museum
BirdLife Australia, Birdata
Climate Watch
eBird Australia
FrogID
Historical Bird Atlas
iNaturalist Australia
South Australian Museum
Western Australian Museum

An additional search was conducted of the NatureMap website (Department of Biodiversity, Conservation and Attractions) using the same coordinates as above.

https://naturemap.dbca.wa.gov.au/

2.2 Field assessment

The field assessment was planned by examining satellite imagery of vegetation patterns to ensure that all potentially different threatened and priority fauna habitats were covered. The field assessment was conducted on Monday March 16. A map showing the areas traversed using GPS tracking of the area is given in Figure 4. The sections not walked were easily assessed for suitable habitat from vantage points around the reserve.

During walking traverses habitat assessments were carried out and the following were noted and GPS coordinates were taken:

- Scats, tracks, diggings and other signs of quenda, black-gloved wallaby, south-western brush-tailed phascogale and western ringtail possum.

- Feeding signs and potential nesting hollows for all species of black cockatoo.

3.0 Results

3.1 Desktop search

The search of ALA records resulted in a total of 2 or 3 threatened bird species; forest red-tailed black cockatoo (*Calyptorhynchus banksia naso*) and unidentified white-tailed black cockatoo that could have been either Carnaby's (*Calyptorhynchus latirostris*) and/or Baudin's (*Calyptorhynchus baudinii*) cockatoo. These species are difficult to tell apart in the field and are often recorded as just white-tailed black cockatoo. The locations of these species were between 3-4 km to the north of the reserve, some in the town of Mount Barker and some in a remnant to the west of the town (see Table 1). The author heard a Baudin's cockatoo in the town of Mt Barker on the day of the survey.

Species	Date	Number of birds	Vegetation
Forest Red-tailed Black Cockatoo	2010	1	Jarrah Forest
Forest Red-tailed Black Cockatoo	2018	2	Jarrah Forest
Forest Red-tailed Black Cockatoo	2019	1	Jarrah Forest
White-tailed Black Cockatoo (species unknown)	2018	4	Jarrah Forest

Table 1: Records of cockatoos within 5km of the reserve from ALA

The NatureMap search resulted in records for malleefowl (*Leipoa ocellata*), forest red-tailed black cockatoo, Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*Calyptorhynchus baudinii*) and quenda (*Isoodon fusciventer*). Locational data was not available for these species.

In addition the author added black-gloved wallaby (*Notamacropus irma*), south-western brush-tailed phascogale, wambenger (*Phascogale tapoatafa*), and western ringtail possum, ngwayir (*Pseudocheris occidentalis*) to the list of possible threatened and priority species for the reserve based on the likelihood of suitable habitat using satellite imagery.

These species did not appear on the database searches but these data are not complete and should not be used as the definitive source of information. There are many areas, including Tower Hill, where exhaustive surveys have not been carried out for fauna and therefore there are gaps in the records.

3.2 Field assessment

Examination of satellite imagery and the field assessment identified three broad fauna habitats.

1. Jarrah/marri forest
2. Mallee/Eucalypt woodland
3. Granite outcrops

The field assessment was severely hampered by the fact that the majority of the reserve had been burnt within 6-7 months prior to the survey (Alex Tucker *pers. com*). The fire was hot and as well as scorching the ground and understorey the fire burnt into the tree canopy. Many of the trees were showing post fire epicormic growth. There was a small area on the eastern boundary of the reserve that wasn't burnt and the search for chewed marri and jarrah nuts was concentrated in this area.

3.2.1 Birds

Cockatoos

Searching for feeding signs of forest red-tailed black cockatoo, Carnaby's and Baudin's cockatoo was difficult as most of the fallen marri (*Corymbia callophylla*) and jarrah (*Eucalyptus marginata*) nuts had been fire damaged. Only a few marri nuts showing the characteristic signs of forest red-tailed black cockatoo feeding were found on the eastern boundary to the east of the access track (see Figure 4). This area had not been burnt. The large marri were assessed for the likelihood of white-tailed cockatoo nesting hollows but most trees did not have hollows large enough for these birds. A few potentially suitable marri hollows were identified and are shown on Figure 2. No jarrah trees large enough for cockatoo hollows were seen. It is unlikely that the forest red-tailed cockatoo nests on the reserve as they favour high hollows in marri that are over 200 years old.

A few banksia and hakea species were seen and these may also provide food for Carnaby's and Baudin's cockatoos but no feeding signs were found.

Based on the records in close proximity and the presence of suitable habitat, the reserve is likely to provide feeding and roosting sites for all the cockatoo species, particularly the jarrah/marri forest. It is unlikely to provide breeding hollows as the tree hollows are few and may not be suitable.

Figure 1: Marri nuts, on the eastern unburnt boundary of the reserve, chewed by forest red-tailed black cockatoo (the base of the nut is chewed)

Malleefowl

No suitable malleefowl habitat was encountered on the reserve, jarrah/marri forest and granite areas are not known malleefowl habitat. The mallee/eucalypt areas were also unsuitable as they were too small and steep to support malleefowl. The record from NatureMap would have been from a site with suitable habitat.

3.2.2. Mammals

Although only one mammal species, quenda, was uncovered in the database searches, using aerial photographs of the vegetation prior to the recent fire and species distributional information, the author identified several possible additional mammals. These were black-gloved wallaby (*Notamacropus irma*), south-western brush-tailed phascogale (*Phascogale tapoatafa*), and western ringtail possum (*Pseudocheris occidentalis*).

The habitat assessment confirmed the potential presence of habitat for all four species, although no signs were found owing to the burnt vegetation.

Scat searches for black-gloved wallaby were unproductive, although there were ubiquitous and numerous scats of western grey kangaroo (*Macropus fuliginosus*).

The most likely habitat for quenda occurred in the small drainage line in the south-east corner of the reserve. However, this patch is relatively small and may take several years of recovery to provide enough cover for quenda.

There are several marri and jarrah trees with hollows that may be suitable for south-western brush-tailed phascogale. These hollows coincide with the cockatoo habitat shown in Figure 4.

Habitat for the western ringtail possum, prior to the fire, would also have coincided with the cockatoo habitat shown in Figure 4.

Owing to the severity of the recent fire it is unlikely that any of the four species are present in the reserve now, however, when the vegetation has recovered it is possible that they may recolonise from surrounding areas of bushland. The reserve is linked to patches of remnant vegetation on the south east corner and on the north eastern boundary. The vegetation would need to be unburnt for at least 4 years to allow for monitoring of these species.

4.0 Recommendations

In conclusion there is one confirmed bird, two potential bird and four potential mammal species that are threatened or are priority fauna that use or may potentially use Reserve 15162, once it has regenerated post-fire, they are summarised in Table 2.

It is recommended that 4-5 years post fire the reserve is surveyed again for the above listed species. Targeted searches for signs and spotlighting and use of remote cameras are recommended to ascertain their presence.

Owing to the severity and area covered by the fire (a hot fire over most of the reserve) this survey should also include an assessment of the regeneration of native flora with the view to supplementary planting of either trees or understorey if necessary. If this is found to be necessary then species used by the threatened species listed in this report should be planted.

In the meantime any planned work in the reserve i.e. development of recreational trails, should avoid removing any of the large trees (unless for public safety reasons) including those that are burnt. Burnt larger trees often contain hollows and fire can enhance these hollows by making them more accessible for hollow dependent species (see Figure 2).

Figure 2: Tree hollows in the reserve

Table 2: Summary of threatened and priority fauna present or potentially present in the reserve

Species	Status*	Habitat	Presence	Threats
Forest red-tailed black cockatoo	VU	Eucalypt forests. Feeds on marri and jarrah in south-west forests and Blackbutt (*Eucalyptus patens*), Albany Blackbutt (*E. staeri*), Sheoak (*Allocasuarina fraseriana*), Snottygobble (*Persoonia longifolia*).	Confirmed – chewed marri nuts	Destruction of forests, fires in spring breeding season, feral European honey bees (which take over nesting hollows), expansion of Australian shelduck and Australian wood duck which take over nesting hollows, also vehicle strikes.
Carnaby's cockatoo	EN	Woodlands and scrubs of semiarid interior of Western Australia, in non-breeding season wandering in flocks to coastal areas, especially pine plantations and banksia woodlands. Food includes the flowers, nectar and seeds of Banksia, Dryandra, Hakea, Eucalyptus, Corymbia, Grevillea, also seeds of Pinus, fruiting nut trees especially almonds and macadamias, the flesh and juice of apples and persimmons and insect larvae.	Unconfirmed, records within 5km	Clearing of forest, fires, climate change, vehicle strikes, feral European honey bees (which take over nesting hollows) and in the past large numbers shot by orchardists.
Baudin's cockatoo	EN	Mainly feeds on the seeds and flowers of marri in the forested regions of the south-west, the seeds of the Proteaceous *Banksia grandis*, *B. littoralis*, *B. ilicifolia*, *Hakea undulata*, *H. prostrata*, *H. trifurcata*, and *Dryandra* spp., as well as *Erodium botrys*, jarrah and insect larvae. Also feeds on apple and pear seeds in orchards. Strips bark from dead trees in search of beetle larvae. Forages at all levels from canopy to ground.	Unconfirmed, records within 5km	Direct causes of population decline include land clearing and fragmentation of habitat, the loss of hollow-bearing trees and impact of climate change and of hollow competitors including galah, corellas and feral European honey bee, also fires and vehicle strikes.
Black-gloved wallaby	P4	The western brush wallaby's optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest.	Unconfirmed, habitat suitable	A dramatic increase in the number of foxes in the early 1970s in south-western Australia appears to have led to a decline in the numbers of western brush wallaby. It is thought that juveniles not long out of the pouch may fall prey to this predator. The western brush wallaby is now uncommon throughout its range but its numbers increase in response to fox baiting.

South-western brush-tailed phascogale	CD	This subspecies has been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. Records are less common from wetter forests.	Unconfirmed, habitat suitable	Habitat clearing and fragmentation, and habitat alteration by logging and mining. The greatest threat appears to be the reduced availability of trees with hollows, and predation by cats. Predation by foxes is also a threat. Residual habitat is often fragmented, thereby isolating populations and impeding genetic exchange.
Western ringtail possum	CR	Plant communities critical to the species include long unburnt mature remnants of peppermint (*Agonis flexuosa*) woodlands with high canopy continuity and high foliage nutrients (high in nitrogen and low toxin levels); jarrah (*Eucalyptus marginata*)/marri (*Corymbia calophylla*) forests and woodlands with limited anthropogenic disturbance (unlogged or lightly logged, and a low intensity and low frequency fire history), that are intensively fox-baited and have low indices of fragmentation; coastal heath, jarrah/marri woodland and forest, peppermint woodlands, myrtaceous heaths and shrublands. Any habitat where western ringtail possums occur naturally are considered critical and worthy of protection.	Unconfirmed, habitat suitable	The threatening processes operating on the western ringtail possum are complex, interactive and are often population-specific. The main threatening processes addressed in the recovery plan are: • Habitat loss and fragmentation • Predation • Climate change • Timber harvesting • Fire • Competition for tree hollows • Habitat tree decline • Un-regulated relocation of orphaned, injured and rehabilitated western ringtail possums • Disease • Gaps in knowledge.
Quenda	P4	Scrubby, often swampy, vegetation with dense cover up to 1 m high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting jarrah and wandoo forests are usually associated with watercourses. Quenda will thrive in more open habitat subject to introduced predator control.	Unconfirmed, records within 5km	Major threats to the Quenda include fragmentation and loss of habitat, fire in fragmented habitat, predation by foxes (particularly in more open habitat), predation of young by cats and predation around residential areas by dogs.

*See Appendix 1 for Status information.

5.0 Bibliography

Department Environment and Conservation (2008). Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan. Department Environment and Conservation Locked Bag 104, Bentley Delivery Centre, WA 6983.

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http://museum.wa.gov.au/explore/online-exhibitions/cockatoo-care/carnabys-cockatoo

http://museum.wa.gov.au/explore/online-exhibitions/cockatoo-care/baudins-cockatoo

https://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/quenda_2012.pdf

https://library.dbca.wa.gov.au/static/FullTextFiles/071549.pdf

https://library.dbca.wa.gov.au/static/FullTextFiles/071535.pdf

Figure 3: Eastern boundary of the reserve showing the unburnt (left) and burnt jarrah/marri forest (right)

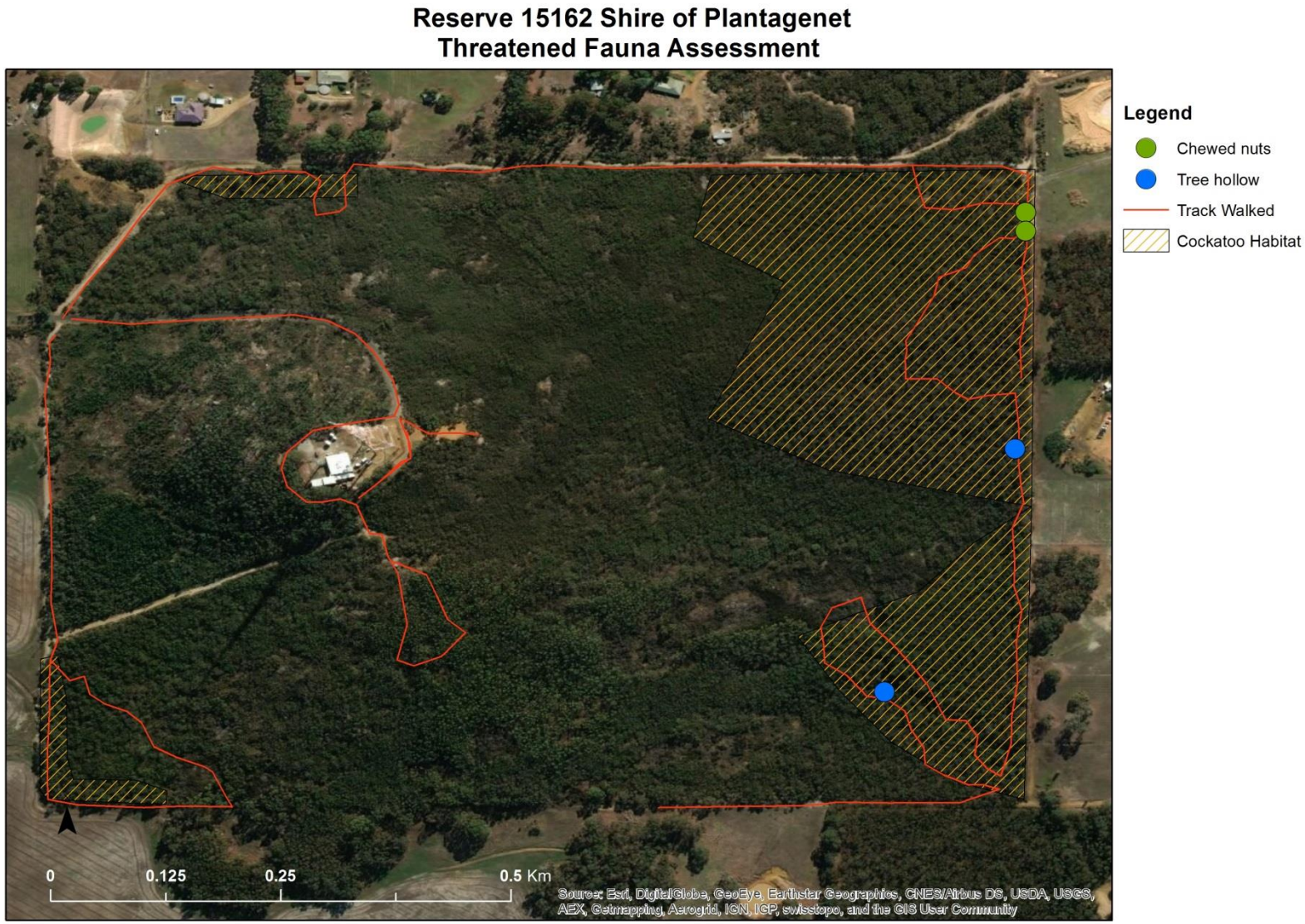

Figure 4: Map of Reserve 15162 showing tracks walked, cockatoo habitat and cockatoo sites

Appendix 1: Categories of threatened fauna species

Threatened, Extinct and Specially Protected fauna or flora1 are species2 which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the Biodiversity Conservation Act 2016.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T	**Threatened species**
	Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act). **Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.
	CR Critically endangered species
	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.

EN Endangered species

Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”.
Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.

Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.

VU Vulnerable species

Threatened species considered to be “facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines”.
Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.

Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.

Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

P	**Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.