Brush-tailed mulgara

*Dasycercus blythi*

Vulnerable (*Nature Conservation Act 1992*) | Ecological Sciences, Queensland Herbarium

**Identification**

A stocky, rat-sized carnivorous marsupial with a broad head, pointed muzzle and rounded ears. The fur is light sandy-brown above and greyish-white on the belly. The thick, tapered tail is approximately 60% of the head-body length, with reddish hair at the base and black hair on the final two-thirds (Woolley 2005; Masters 2012). It is distinguished from the closely related crest-tailed mulgara *D. cristicauda* by its generally smaller size and its smooth tail, and lacking the fin-like crest of black hairs on the tail’s dorsal surface of *D. cristicauda* (Woolley 2005). Female *D. blythi* have six nipples, versus eight for *D. cristicauda* (Woolley 2005). Males are bigger than females (Masters et al. 2003). Also similar to the kowari *Dasyuroides byrnei*, which has a narrow rather than thick tail-base and four toes on hindfoot versus five in the mulgara (Menkorst and Knight 2011).

**Distribution**

*Dasycercus blythi* is found from the Simpson Desert in far south-western Queensland across the arid interior through the Tanami and Great Sandy Deserts of southern and central Northern Territory and central Western Australia (Woolley 2008). There is some uncertainty over its historical distribution, with taxonomy and nomenclature only finally resolved in 2005 (Woolley 2005), but it has certainly declined from its southern extent (Masters 2008). Despite substantial surveys, there have been no records of the species in South Australia since 1966 (Masters 2012).

**Habitat**

Favoured habitat of *D. blythi* includes spinifex *Triodia* spp. grasslands on sand plains and the swales between low dunes. The species is generally considered to be associated with spinifex on flat to gently sloping topographic positions, with or without an open mulga *Acacia aneura* woodland overstorey (Woolley 2008; Masters 2012; Pavey et al. 2011). Also recently recorded from gibber plains, although burrows were restricted to sandy patches or mounds (Pavey et al. 2011).

The species has been recorded in the absence of spinifex cover; in burnt or regenerating landscapes (Masters et al. 2003; Letnic and Dickman 2005; Körtner et al. 2007), but possibly only as short-term residents (P.
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Masters pers. comm. 2012). Mature spinifex hummocks appear to be a particularly important resource in protecting mulgaras from introduced predators (e.g. Gibson and Cole 1992; Körtner et al. 2007).

More rarely, it has been found in habitats dominated by tussock grasses and forbs (sand plain and gibber sites) (Pavey et al. 2011). The species was formerly found in chenopod shrublands, but are not currently known from this habitat (Masters 2012).

### Seasonal and timing considerations

In general, searches for signs and other inferential evidence, as well as hair trapping can be undertaken at any time of the year. Tracks are best surveyed in the early morning when shadows are long.

To maximise detection success, trapping surveys should be undertaken during fine weather conditions, and avoid the hotter months and inclement weather (i.e. rainfall periods). Populations do appear to decline seasonally in winter and increase in spring after an influx of young animals (Pavey et al. 2011; Masters and Dickman 2012). A second peak seasonal activity occurs in autumn when the young have matured and the males are looking for mates, so surveys are best planned for these October to November and March to April periods (Atlas of Living Australia 2013; P. Masters pers. comm. 2012). Opinions vary as to whether the species undergoes climate-driven population increases (“boom” and “bust”) with several studies indicating responses in the year following above-average rainfall (Gibson and Cole 1992; Dickman et al. 2001) whilst others, including the longest study, have found no population increases after ‘good’ seasons (Masters 2012; Greenville et al. 2012).

### Recommended survey approach

The following survey techniques should be prioritised in order as per the headings below:

**Box or Elliott trapping**

Type ‘A’ Elliott trapping surveys are the most commonly employed technique for detecting *D. blythi* (e.g. Masters et al. 2003, Körtner et al. 2007; Pavey et al. 2011). However, despite using a combination of both Ellotts and pits in the Simpson Desert, Dickman and colleagues (2001) found pitfall traps to be far more successful in catching dasyurids including *D. blythi*. Home ranges are large (25.5 ha for males and 10.8 ha for females, Körtner et al. 2007) so trap spacing should be wider than is typically recommended. Bait traps using universal bait (peanut butter and rolled oats).

**Pitfall trapping**

Mulgara require deeper and narrower pits to stop the animals from escaping, so we recommend using 600 mm deep, 160 mm diameter PVC pipes with flywire caps rather than buckets. Pitfall arrays should target suitable habitat (sandplains and swales), but can extend into more marginal habitat (sandridges, gibber plains, shrublands).

**Searching for signs (scats, tracks, burrows)**

Daytime searches should target signs including burrows and pop-holes, particularly those with freshly excavated earth. Burrow systems can have multiple entrances and tend to be within 2.5 m of the raised sandy base of spinifex hummocks (Woolley 1990). Burrow entrances are 4-5 cm wide with a rounded base and can be hidden under dense spinifex, amongst roots of shrubs such as *Grevillea* or *Eremophila* spp., or be in the open (Körtner et al. 2007; Dickman et al. 2011; Masters 2012; Moseby i. 2012). Mulgara scats (20-30 mm long, 4-6 mm wide) are twisted, strong-smelling and are often deposited near burrows as territorial markers (Triggs 2004; Pavey et al. 2009; Moseby et al. 2012). Mulgara tracks are best identified from their size (foot
size > 30 mm) and gait (hind feet placed together in front of front feet when moving) (see Moseby et al. 2012). Signs of *D. blythi* cannot be separated from those of *D. cristicauda*, but can be used to target further Elliott, pitfall or camera trapping efforts.

### Hair and camera trapping

Hair sampling may be an option as both species of mulgara are apparently distinguishable from hair samples (DSEWPaC 2011). While there is no information on efficacy of hair tubes in general (or different types of hair tubes) for this species, hair funnels (Faunatech Pty Ltd) appear to be more successful than other designs for some species of dasyurid (Mills et al. 2002; Nelson 2006).

Camera trapping may be a good alternative to live trapping as pictures showing the tail morphology can differentiate between both mulgara species and the similarly-sized kowari (DSEWPaC 2011). Cameras can be deployed for much longer periods, have fewer ethical issues than live trapping and can be very effective at detecting animals at low densities (Vine et al. 2009). White-flash camera traps set for a minimum of 14 days, with no time delay and an infinite number of photos per event, will be most likely to capture enough detail for a positive identification (see Meek et al. 2012).

Cameras can be deployed on transects with bait attractants (e.g. in a metal cage wired to a star picket 2-3 m away from the camera). Another good option is to place unbaited camera traps around burrow systems with active burrows.

### Survey effort guide

Detection rates for *D. blythi* have varied with different studies. For example, 8.9 captures per 100 Elliott-trap nights at Uluru and the Tanami Desert (Masters and Dickman 2012), and 0.91 captures per 100 pit-trap nights in the eastern Simpson Desert (Letnic and Dickman 2005), 0.27 captures per 100 trap nights (Elliotts and pits) in the western Simpson Desert (Pavey et al. 2011). In Queensland, pitfall trapping at 12 sites at Ethabuka Station in the Simpson Desert over a period of 22 years has yielded 438 captures of *D. blythi* from nearly 400,000 trap nights (0.11 captures per 100 pit-trap nights) (Greenville et al. 2012). The recommended level of effort below may provide a reasonable opportunity to detect *D. blythi* if present in suitable habitat in the project area.

<table>
<thead>
<tr>
<th>Survey technique</th>
<th>Minimum Effort</th>
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<tbody>
<tr>
<td>Elliott trapping</td>
<td>3 trapping grids for 4 nights, each in 2 different survey periods (= 1200 trap nights). Each grid: 2 rows of 25 Type ‘A’ Elliott’s each spaced at 25 m, rows spaced 50 m apart.</td>
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<tr>
<td>Pitfall trapping</td>
<td>2 arrays of 10 pits with 100 m drift fence for 4 nights, each in 2 different survey periods (= 160 trap nights).</td>
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<tr>
<td>Searching for signs</td>
<td>4 hours per survey day. Search 2 m either side of 100 m transects.</td>
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<tr>
<td>Camera trapping</td>
<td>3 trapping grids for 14 nights, each in 2 different survey periods (= 1008 camera trap nights). Each grid: 2 rows of 6 baited cameras each spaced 100 m apart, rows 50 m apart.</td>
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<tr>
<td>e.g. 150 Elliott traps and 20 pitfall traps for 4 nights, 36 camera traps for 14 nights, plus 4 hours per day of searching for signs; with all survey effort repeated in a 2nd survey.</td>
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</table>
Ethical and handling considerations

- Check traps early in the morning before temperatures become too hot.
- Close or move traps with lots of ants.
- Trapped animals should be protected from temperature extremes and exposure (heat, cold, dehydration). Provide shelter in the bottom of pitfalls e.g. some leaf litter or a 35 mm piece of PVC pipe (this also reduces predation for captured animals). Position Elliott traps under cover (e.g. under spinifex hummock) where possible or provide shelter (e.g. leaf litter or even a shovel-load of sand on top of the Elliott trap).
- Ensure that individual mulgara are not trapped for four nights consecutively; fur-clip captures and close traps after three nights if recaptures occur.
- Consider weed and pathogen spread when using equipment in multiple locations as these can be transported via dirty equipment.
- Gloves should be worn when handling scats to reduce exposure to zoonotic diseases.

Acknowledgements

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Citation


Key references


Targeted species survey guidelines: Dasycercus blythi


