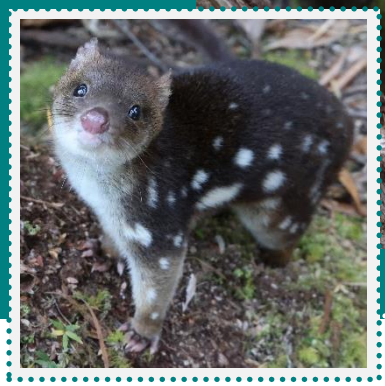
Dasyurus maculatus subsp. *maculatus*

spotted-tailed quoll

TASMANIAN THREATENED SPECIES LISTING STATEMENT



Dasyurus maculatus subsp. *maculatus*

Image © Akram Hameed

Scientific name: ***Dasyurus maculatus*** **subsp.** ***maculatus*** (Kerr, 1792)

Common name: spotted-tailed quoll

Other names: tiger quoll, tiger cat, spot-tailed quoll

Group: Vertebrate, Mammalia, Marsupialia, family **Dasyuridae**

Status: *Threatened Species Protection Act 1995*: **Rare**

Environment Protection and Biodiversity Conservation Act 1999: **Vulnerable**

IUCN Red List: **Near Threatened**

Distribution: Endemic status: **Not endemic to Tasmania**

Tasmanian NRM Region: **North, South, Cradle Coast**

Tasmanian IBRA region: **Central Highlands, Northern Midlands, Northern Slopes, South East, Southern Ranges, Ben Lomond, West**

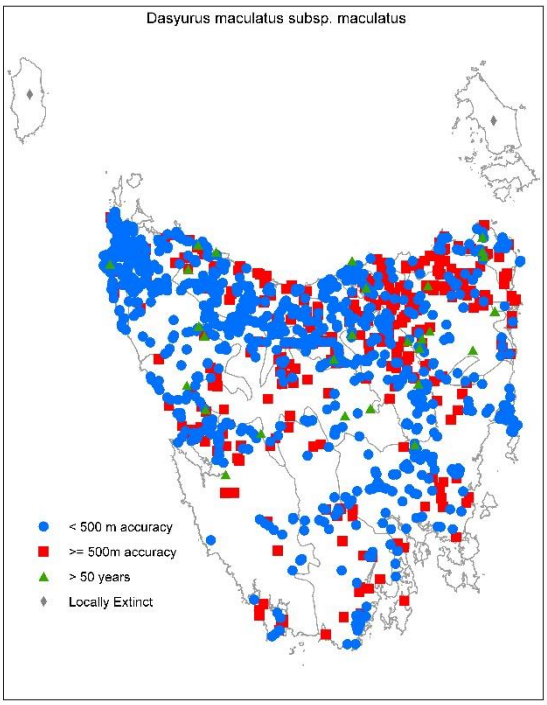


Figure 1. The distribution of *Dasyurus maculatus* subsp. *maculatus*, showing IBRA regions (from the Natural Values Atlas)

Plate 1. The spotted-tailed quoll

Image © Michael Driessen (NRE Tas)

SUMMARY: In Tasmania, the spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus)* is one of Australia's largest extant carnivorous marsupials. It hunts a wide variety of prey including mammals, birds, reptiles, and invertebrates and also scavenges opportunistically. It is sexually dimorphic, with males weighing up to 7 kg and females up to 4 kg (Jones et al. 2003). Pelt colour varies from pale brown to dark or reddish-brown with numerous bold white spots on the body, legs, and tail. The long spotted tail distinguishes it from the smaller eastern quoll (*Dasyurus viverrinus)* which also occurs in Tasmania. The spotted-tailed quoll is widely but sparsely distributed across mainland Tasmania, occurring in rainforest, wet and dry eucalypt forest, eucalypt woodland, coastal scrub and heath, non-eucalypt forest and woodland, highland treeless vegetation, and the fringes of pastoral areas. The species is under threat from a range of processes, primarily the loss and fragmentation of forest habitat (due to urban and agricultural clearing or conversion of native forest to plantation or pasture) and human induced mortality (from road collision, and deliberate persecution).

IDENTIFICATION AND ECOLOGY

The spotted-tailed quoll, *Dasyurus maculatus* subsp. *maculatus,* is the second largest remaining member of the carnivorous marsupial family Dasyuridae. Currently two subspecies of spotted-tailed quoll are recognised: *Dasyurus maculatus* subsp. *gracilis* occurring in north-eastern Queensland and *Dasyurus maculatus* subsp. *maculatus* occurring in south-eastern mainland Australia and Tasmania. Genetic analysis indicates that the Tasmanian and mainland *D. m. maculatus* are genetically distinct from each other, and that the Tasmanian population should be recognised and managed as a separate endemic subspecies (Firestone et al. 1999). This Listing Statement is for the Tasmanian population of the spotted-tailed quoll (*D. m. maculatus).*

The spotted-tailed quoll is the largest species of the genus *Dasyurus*. Males can weigh up to 7.2 kg (avg 2.6–4.6 kg) while females can weigh up to 4.0kg (average 1.5–2.2 kg) (Green & Scarborough 1990; Watt 1993; Jones 1997; Belcher 2003; Andrew 2005). The species has a long body (350–750 mm), long tail (350–550 mm) and short legs (Menkhorst & Knight 2004). Its pelage is brown and varies in colour from sandy brown to pale brown, to dark brown, to reddish-brown. The pelage is covered in numerous bold white spots on the body, legs, and tail. The ventral surface ranges in colour from creamy white to pale grey (Green & Scarborough 1990).

The spotted-tailed quoll is a primarily nocturnal opportunistic carnivorous hunter. It feeds upon a wide variety of terrestrial and arboreal prey and carrion, including mammals, birds, reptiles, and invertebrates. Medium-sized mammals usually comprise the majority of the diet, but the relative proportions of dietary components can vary with an individual's age, sex, location, and the availability of prey (Anderson et al. 2017b; Belcher 1994, 1995, 2000; Jones & Barmuta 1998; Burnett 2001; Andrew 2005; Glen & Dickman 2006b; Belcher et al. 2007; Dawson et al. 2007; Jarman et al. 2007). Carrion consumption increases in areas where the Tasmanian devil (*Sarcophilus harrisii*) has decreased in density due to Devil Facial Tumour Disease (DFTD) (Cunningham et al. 2018). Spotted-tailed quolls show a preference for foraging along linear landscape features such as forest edges that provide opportunities to ambush desirable prey who utilise these edges (Anderson et al. 2017a).

Adult spotted-tailed quolls are solitary and have large home ranges, resulting in naturally low population densities. Females are territorial while males will move in and between female territories (Anderson et al. 2020).

The spotted-tailed quoll has a synchronous breeding season typical of dasyurids which occurs from late May to early September.

Breeding peaks between June and July inclusive (Green & Scarborough 1990; Belcher 2003; Körtner et al. 2004). Gestation is approximately 21 days (Fleay 1948; Settle 1978; Andrew 2005).

Most young are born between the third week of June and the third week of August (Green & Scarborough 1990). Lactating females have been trapped between October and December, inclusive (Jones 1996), and the pouch has six teats. Most females produce one litter per year, with litter sizes ranging from one to six, with an average of five young (Settle 1978; Edgar & Belcher 1995; Burnett 2001; Andrew 2005). Sexual maturity is reached at 11 months of age (Burnett 2001; Andrew 2005), but some females do not produce a litter until their second year and not all females breed consecutively (Burnett 2001; Belcher 2003; Nelson 2007). Compared to other similar sized carnivorous mammals, the spotted-tailed quoll has a relatively short life span of 3 years in the wild, although captive spotted-tailed quolls can live up to 6 years of age (Burnett 2001; Jones et al. 2001).

Survey techniques

Desktop Assessment – Given their large home range size and the variety of habitats utilised, presence/occupancy within larger areas can be inferred from records of previous surveys on publicly available databases (Natural Values Atlas, Atlas of Living Australia).

Tracks and Scats – To the trained eye, spotted-tailed quoll scats and tracks are distinctive and a walked transect survey can provide rudimentary indices of abundance. Spotted-tailed quolls establish communal latrines within their home ranges, often on exposed rocks, large logs, or flat boulders, along creeks, or on exposed ground or rock (Triggs 1996). A latrine site is characterised by the presence of an accumulation of scats at varying stages of decay. Appearance of spotted-tailed quoll scats can vary with diet, but they are often dark in colour, twisted and cylindrical and showing evidence of a carnivorous diet with presence of animal hair, feathers, fur, bone fragments or invertebrate exoskeletons (Triggs 1996).

DNA testing can be used to confirm species of origin of scats. Scats usually have an unpleasant odour and bleach as they age.

All dasyurids have a similar foot structure but the spotted-tailed quoll is quite distinguishable from the Tasmanian devil's unique gait. The track patterns of both spotted-tail and eastern quolls are similar but spotted-tailed quoll prints will generally be larger, with the front footprint splayed more widely than the eastern quoll (Triggs 1996). Sand pads can be a useful means to detect presence.

Remote Cameras – Remote infrared cameras are highly effective at detecting spotted-tailed quoll presence when used in conjunction with scent lures such as fish oil and/or fresh meat; they can readily detect trap-shy individuals. The spotted-tailed quoll's distinctive and unique spot markings make it possible to confidently identify individuals to a relatively high degree and population density can be estimated using spatial-capture-recapture models (Henderson et al. 2022). The development of AI technology to automatically detect and classify different wildlife species is also advancing knowledge of distribution and habitat preference (UTas 2022).

Trapping – Originally designed for the Tasmanian devil, and best practice for humane quoll trapping are 250–315 mm diameter PVC "pipe" traps. These traps minimise injuries, exposure to extreme temperatures, and when disinfected, they reduce the risk of disease/pathogen transfer (Hawkins et al. 2006). Trapping should only be used where there is a clear benefit/requirement to assess population parameters (age, sex, fecundity, density), health status and/or for GPS/Radio tracking (e.g., to identify habitat use including den locations).

Please seek further advice from the Threatened Species Section if you wish to conduct surveys using baited remote cameras, traps and/or GPS/radio tracking. These methods require specialist equipment and training and require a permit to take threatened fauna for scientific purposes, issued under the *Nature Conservation Act 2002*.

Plate 2. Eucalypt Woodland edges are prime habitat for *Dasyurus maculatus* subsp. *maculatus*

Image © Karen Fagg (NRE Tas)

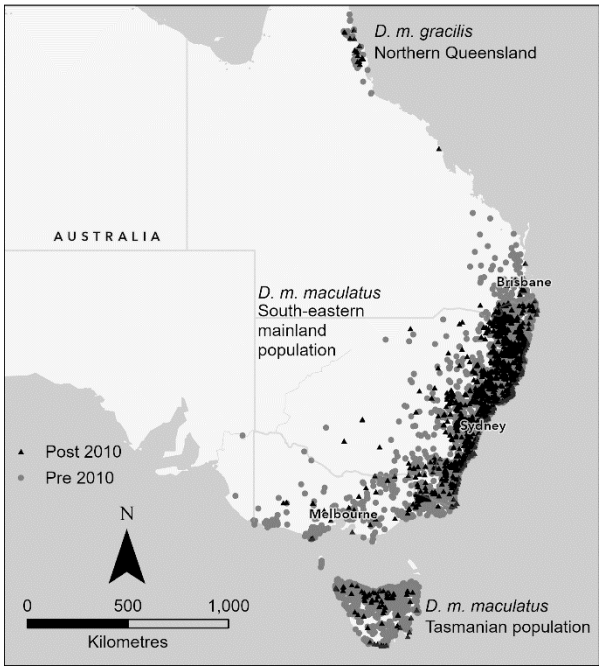


Plate 3. Distribution of *Dasyurus maculatus* and its subspecies in Australia (data from the Atlas of Living Australia) Map © Karen Fagg (NRE Tas)

Taxonomic issues

Despite the distinctive genetic difference between the Tasmanian and south-eastern mainland populations and recommendations to separate by subspecies status (Firestone et al. 1999), formal taxonomic recognition of the Tasmanian spotted-tailed quoll population has not yet occurred. The Tasmanian and south-eastern mainland populations have different conservation status listings under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*.

Confusing species

The long, spotted tail distinguishes the spotted-tailed quoll from all other Australian mammals, although they may be confused with other similar sized species or the superficially similar eastern quoll, by inexperienced observers. The eastern quoll is smaller with a more pointed muzzle, fur colouring is either fawn or black, and spots cover the body and head but are absent from the tail (DELWP 2015).

DISTRIBUTION AND HABITAT

Dasyurus maculatus subsp. *maculatus* occurs across eastern Australia (Plate 3), distributed patchily from north-eastern Queensland, through New South Wales, Victoria, and Tasmania. The species is now presumed extinct in South Australia. Spotted-tailed quolls are widely but sparsely distributed across mainland Tasmania (Figure 1). The spotted-tailed quoll appears to occur at highest abundance in the north and north-west of the state. It also previously occurred on King and Flinders Island until the early 20th century but is now believed to be extinct there (Peacock et al. 2018). As knowledge on genetic variation of spotted-tailed quolls within Tasmania is limited, further population genetic analysis would be useful in helping determine if there are any distinctive spotted-tailed quoll subpopulations within Tasmania (Troy 2014). A list of geographic areas considered to be of importance to the long-term population viability and/or monitoring of the spotted-tailed quoll is provided in Table 1.

Table 1. Important populations of *Dasyurus maculatus* subsp. *maculatus* within Tasmania

Population	NRM region
Freycinet National Park[1]	South
Central-north Tasmania (including Great Western Tiers to Narawntapu)[1,2]	North/ North West
Cradle Mountain National Park[1,2]	North West
Far northwestern Tasmania (including the Smithton and Marrawah regions) [1, 2]	North West
Takone to Upper Natone (south-south west of Burnie) [1,2]	North West
Eastern Tiers/northern Midlands (including Nugent and Ross regions) [2]	North / South
South forests/South Coast (including the Hastings region) [2]	South
Gordon River system[2]	South/ North West
South-west Cape[2]	South

Source of data: *Recovery Plan for the Spotted-Tailed Quoll* Dasyurus maculatus (DELWP, 2016). Populations were classified as being of core importance to the long-term survival and recovery of the species if they are: [1] "Research populations" that have been the focus of long-term research and hence have good base-line data that will increase the understanding of the species' ecology; [2] "stronghold populations" within a region (i.e., areas of high abundance).

The spotted-tailed quoll has historically been considered forest dependent with a preference for rainforest and wet and dry eucalypt forest, while also utilising eucalypt woodland, coastal scrub and heath, non-eucalypt forest and woodland, and the fringes of pastoral areas (Green & Scarborough 1990; Jones & Rose 1996).

More contemporary research in areas where foxes are absent or in low density, has shown habitat use to be more flexible, with similar use of fragmented and agricultural landscapes (Troy 2014; Henderson et al. 2022; 2023).

Limited studies into the species' space use patterns suggests that the home range of Tasmanian and mainland spotted-tailed quolls are comparable in size. One study estimated the home range of seven female spotted-tailed quolls to be between 191 and 470 ha (1.91–4.7 km^2) which is comparative to similar research on the mainland (Troy 2014). Another study found three females to have home ranges of between 148–609 ha, with males' home ranges double the size (Anderson et al. 2020). Den preference includes clumps of grass and vegetation, hollows in trees or logs and underground burrows, located within their core home range (Troy 2014).

Belcher and Darrant (2006) also found spotted-tailed quolls will opportunistically use landscape features and substrates such as windrows, burrows, logs, and rock features for denning, but with a strong preference for rock dens. Dens of the spotted-tailed quoll are difficult to identify without radio-tracking and den entrances with suggestion that the species takes care to avoid signs of wear and use at den entrances (Belcher & Darrant 2006).

POPULATION PARAMETERS

Number of subpopulations: There are no separate subpopulations of spotted-tailed quoll formally recognised in Tasmania
Number of locations: Not assessed
Extent of occurrence: 75,696 km^2
Area of occupancy (as per IUCN criteria) = 4,536 km^2
Number of mature individuals: ~5,700 individuals

Largest subpopulation: Specific numbers are unknown, but a higher abundance of spotted-tailed quolls in the north and northwest of Tasmania is linked with the occurrence of warm annual mean temperatures, low elevation and predictable rainfall (Jones & Rose 1996; Troy 2014).

Jones and Rose (1996) made a preliminary population size estimate of 3,646 (± 521) mature individuals, based on the results of environmental domain modelling of the species' predicted core and peripheral distribution. It was estimated under the assumption of population density of 3–4 mature individuals per km^2. Jones & Rose (1996) stress that this should be taken as a first estimate, and that the underlying assumptions are based on very few data.

Troy (2014) estimated the spotted-tailed quoll population to be 5,691 (1,612–14,632 CI) mature individuals, also iterating caution in utilising this estimate to measure population trends.

RESERVATION STATUS

The spotted-tailed quoll is widely distributed across mainland Tasmania where land is reserved under the *Nature Conservation Act 2002* in National Parks, Conservation Areas, Conservation Covenants and Nature Reserves. Research and stronghold populations (Table 1) occur in National Parks or other reserved land.

A large portion of habitat in the north and northwest where density is highest is not reserved. Troy (2014) predicted private land to make up nearly 70% of core distribution in suitable habitat for the northern slopes IBRA region. The spotted-tailed quoll also occurs widely in the Tasmanian Wilderness World Heritage Area (TWWHA), which is a large (1.58 million ha/15,800 km^2) area of reserved land encompassing southwest Tasmania.

The large area requirements of the spotted-tailed quoll necessitate landscape scale conservation management of populations across a range of land tenures, rather than relying solely on reserves for conservation (Belcher & Darrant 2004; Troy 2014).

CONSERVATION STATUS

In 2003, *Dasyurus maculatus* subsp. *maculatus* was listed as rare on the Schedules of the Tasmanian *Threatened Species Protection Act 1995* because it met Criterion B (the total population consists of fewer than 10,000 mature individuals). The species was estimated to have approximately 3,600 individuals in Tasmania, largely forest dependent and threatened by high rates of clearance of core habitat.

In 2004, the Tasmanian population of *Dasyurus m. maculatus* was listed as Vulnerable under the Federal *Environmental Protection and Biodiversity Conservation Act 1999*. In the same year, the southeast mainland population of *Dasyurus m. maculatus* was listed as Endangered under this Act.

In 2015, *Dasyurus m. maculatus* (Tasmanian and southeast mainland populations) was listed as Near Threatened on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.

THREATS, LIMITING FACTORS AND MANAGEMENT ISSUES

The spotted-tailed quoll has intrinsic biological and ecological traits that render it particularly susceptible to threatening processes. These include large area requirements, female territoriality, low population density, short life span, and low lifetime fecundity (Jones et al. 2003). These traits mean that the spotted-tailed quoll has a limited ability to rapidly recover from population declines or to colonise, or recolonise, suitable habitat.

Habitat loss / land conversion: Causes of habitat loss include urban, residential, and agricultural development, conversion of forest to pasture, plantation, or other non-native vegetation and road construction. Timber harvesting has been implicated in localised population declines and extinctions of the mainland spotted-tailed quoll (Mansergh 1984), but populations do also continue to exist in some selectively logged forests (Belcher 2000).

It has been suggested that silviculture practices that remove or reduce prey or habitat features such as hollow bearing trees, hollow logs, vegetation structural complexity, and rock or burrow den sites, may make habitat less suitable

for spotted-tailed quolls and reduce the abundances of their vertebrate prey (Watt 1993; Belcher 2000; Glen & Dickman 2006a; Belcher 2007). Hamer (2019) found increased spotted-tailed quoll abundance to have a strong association with the presence of old-growth vegetation and mid and understorey cover.

The spotted-tailed quoll is locally extinct on King Island due to anthropogenic factors including extensive habitat clearing which commenced in the late 1800s (Peacock et al. 2018). Approximately 70% of the islands native vegetation has been cleared for agricultural development (Threatened Species Section 2012). Research in the Tasmanian Midlands (which has experienced a 70% loss of woodland forest over 200 years of agricultural development) has stressed the value of retaining structural elements in the landscape, even if small and isolated, to provide connectivity between desirable habitat (Jones et al. 2021).

Fragmented populations: Recent research has demonstrated comparable spotted-tailed quoll densities between fragmented and forested landscapes, highlighting the importance of preserving forest fragments for conservation (Henderson et al. 2022). Regardless, habitat loss and fragmentation continue to threaten the integrity of populations of native predators (Henderson et al. 2022), and represent a significant threat to spotted-tailed quolls in Tasmania (Jones et al. 2003). Habitat fragmentation may isolate populations and render them vulnerable to decline and extinction from random events, such as fire or disease. Habitat fragmentation also exposes animals to other threats such as road mortality, predator, and human persecution (Jones et al. 2003).

Human persecution: Spotted-tailed quolls prey upon free ranging (or poorly housed) domestic poultry, ducks, birds, and small pets. Visits are usually repeated until all prey are killed, or the spotted-tailed quoll is (illegally) killed or trapped and relocated by the landholder (Green & Scarborough 1990).

Population impacts of persecution are unknown, but likely to be exacerbated by small population size and habitat loss and fragmentation. The demise of the spotted-tailed quoll on King Island is attributed to human persecution in conjunction with habitat clearing (Peacock et al. 2018).

Road mortality: Spotted-tailed quolls experience a high incidence of road mortality (Green & Scarborough 1990; Jones & Rose 1996; Jones et al. 2003). They are highly susceptible to road mortality because they scavenge the carcasses of other road-killed fauna. Males and dispersing juveniles are also at risk due to their long-range movements, which increases the probability of encountering roads (Green & Scarborough 1990; Jones et al. 2003). Road mortality is known to have a significant impact on local populations of the eastern quoll (Jones 2000), northern quoll (Oakwood 2000) and western quoll (Orell & Morris 1994) and is likely to be a factor in the decline of all quoll species populations.

Primary and secondary poisoning: The use of 1080 poison baits to control pest animals has been implicated in spotted-tailed quoll deaths although they are less susceptible than the intended targets (DELWP 2016). When 1080 was used extensively in efforts to eradicate the European red fox (*Vulpes vulpes*) (hereafter 'fox') from Tasmania in the earlier 2000s the risk to spotted-tailed quolls was mitigated by burying baits to a depth of 10 cm. The use of 1080 has decreased and is no longer used by the forest industry but is still in use in agricultural areas. Spotted-tailed quolls are at risk from ingesting rat poison (second generation anticoagulant rodenticides: SGARs) either directly or through predation and scavenging of poisoned rats and mice or wildlife (Lawrence & Wiersma 2019).

Competition with other predators: The spotted-tailed quoll is Tasmania's second largest mesopredator, following the Tasmanian devil, with whom it appears to co-exist (Troy 2014).

Cats *(Felis catus)* have evidently not contributed to declines in spotted-tailed quoll populations, however juveniles may be vulnerable to cat predation (Glen & Dickman 2013).

A recent study by Hamer et al. (2021) highlighted the substantial increase in predation pressure cats have on prey species shared with the spotted-tailed quoll. This gives cause for concern as to the persistence of native prey in areas where cats and spotted-tailed quolls share habitat in the absence of cat control management actions (Hamer et al. 2021).

Fire regimes that cause declines in biodiversity: An increase in fire frequency, intensity and season can cause direct and indirect declines in ecological communities (DAWE 2022). Spotted-tailed quoll population recovery following fire is likely to depend upon the effect of the fire on prey and den abundance, and the availability of refugia. In a Tasmanian study, spotted-tailed quoll activity was significantly less in forested areas 4.5 years after bushfire than in unburnt forested areas (Driessen et al. 2022). Research from mainland Australia has shown spotted-tailed quolls to adapt their diet after fire, taking advantage of the short-term carrion increase and longer-term changes in food availability (Dawson et al. 2007).

Climate change and severe weather events: In areas with low rainfall, home ranges are larger, and population densities are lower. Higher energic costs are an implication of increased home range size for the spotted-tailed quoll (Hamer et al. 2022). Climate change interactions with fire regimes causes increased pressure on species and reduces resilience of species and ecological communities (DAWE 2022).

Disease: It is possible spotted-tailed quolls could be impacted in the future by emerging diseases, in a similar fashion to the effect of DFTD on Tasmanian devil populations.

A species' ability to respond to a wide range of disease is lessened by a loss of genetic diversity due to habitat loss and the introduction of non-native species (Jones et al. 2014). A significant decline in Tasmanian carnivorous marsupials in the early 1900's was attributed to an unconfirmed disease, potentially transmitted by cats (*Felis catus*), although this has not been substantiated (Peacock & Abbott 2014).

Low detectability: The large home range size of the spotted-tailed quoll means that the probability of detecting the species during surveys is low, which can lead to false absences and unreliable estimates of abundance.

MANAGEMENT STRATEGY

Management objectives: The main objectives for the recovery of *Dasyurus maculatus* subsp. *maculatus* are to (i) increase knowledge on population status including distribution and abundance, (ii) improve understanding of the significance and management of threatening processes, and (iii) reduce the negative effects of threatening processes on the species (DELWP 2016).

What has been done?

- **National Recovery plan:** The first National Recovery Plan for the species was published in 2016 by the Commonwealth Department of Environment, Land, Water and Planning and details the spotted-tailed quolls' ecology, conservation status, threats, and recovery actions for ensuring long term survival (DELWP 2016).
- **Targeted surveys and monitoring:** Tasmania-wide spotlight survey transects for wildlife have been conducted since 1975 in Tasmania (Driessen & Hocking 1992). Systematic trapping surveys for Tasmanian devils in response to DFTD and the development of long-term sites for monitoring commenced in 2003 (Lazenby et al. 2018). Spotted-tailed quolls are often captured when trapping for Tasmanian devils and basic information and genetic sampling has occurred, with information uploaded to the Natural Values Atlas Database.

A landscape-scale monitoring program of priority species including the spotted-tail quoll has been established in the TWWHA (Driessen et al. 2020; 2022). Data arising from monitoring and researchers trapping for scientific studies has improved knowledge on the species' ecology and management.

- **Management prescriptions:** Management prescriptions have been developed for biodiversity evaluations including land management and planned burns associated with forest practices through the Forest Practice Authority's "Threatened Species Adviser" (FPA 2021). The NRE Tas website also provides general advice on living with spotted-tailed quolls (NRE Tas 2022).
- **Management of other threats:** Competition with, and predation from, the fox is implicated in the decline of mainland spotted-tail quoll populations. A Tasmanian Fox Free Taskforce was established in 2001 which evolved into the Fox Eradication Program from 2006–2013. Since 2013 Biosecurity Tasmania has managed the risk of further fox incursions into Tasmania.
- **Roadkill reduction measures**: These have involved increasing public awareness, as well as the testing and implementation of traffic-slowing structures and speed limits (Jones 2000; Lawrence & Wiersma 2019). Public reporting of roadkill has been encouraged via different platforms, and virtual fence devices have been deployed strategically to mitigate local 'hot-spot' roadkill impacts.
- **National Recovery Team:** A National Recovery Team for the spotted-tailed quoll was formed in 2023, which includes spotted-tailed quoll experts with representation from State and Federal Government, Scientists, and captive specialists. The Recovery Team will be tasked with a review of the Recovery Plan and determining the next steps forward for spotted-tailed quoll recovery.

What is needed?

- To reduce the rate of habitat loss and fragmentation on private land:
  - Provide information to landholders in areas where spotted-tailed quolls are known to occur and encourage them to protect and manage habitat on their land through voluntary conservation agreements.
  - Maintain and restore habitat corridors on freehold land.
- Improve gaps in the understanding of the distribution and density of spotted-tailed quoll populations throughout the range, and identify key threats and implement threat abatement management actions:
  - Undertake field surveys and mapping in areas where the distribution and status of populations is poorly known.
  - Develop and implement a population monitoring program at representative sites throughout the species' range to gauge populations' habitat requirements and key threats.
- Investigate key aspects of the biology and ecology of the spotted-tailed quoll to acquire targeted information to aid recovery:
  - Collect and collate life history data to facilitate population viability modelling and conservation management, particularly: age-specific survival rates, juvenile dispersal, and reproductive life span.
  - Conduct genetic analyses to determine genetic variation between populations and identify appropriate genetic management units.
- To evaluate and manage the risk posed by silviculture practices:
  - Evaluate the effectiveness of current habitat retention prescriptions at providing habitat for viable spotted-tailed quoll populations.

  - Review and update habitat retention prescriptions in commercially harvested forests based on outcomes from the above.

- To determine and manage the impact of fire regimes on spotted-tailed quoll populations:
  - Investigate the impact of inappropriate fire regimes on populations.
  - Research into the impacts of climate change on the spotted-tailed quoll.
- To reduce the frequency of spotted-tailed quoll road mortality:
  - Utilise citizen science to identify sections of road where spotted-tailed quolls are frequently killed.
  - Evaluate mitigation strategies to reduce road deaths.
  - Develop and implement mitigation measures at road-kill hotspots.
- To increase community awareness of the spotted-tailed quoll and decrease persecution:
  - Investigate avenues for raising public awareness, develop a communication and public education strategy based on the findings.
  - Compile education resources and distribute to the identified target audience.
  - Increase awareness of the risks to spotted-tailed quolls and other wildlife from the use of poisons, and advocate options which minimise these risks.
  - Increase measures to control feral cat populations.

BIBLIOGRAPHY

Andersen, G. E., Johnson, C. N., Barmuta, L. A., & Jones, M. E. (2017a). Use of anthropogenic linear features by two medium-sized carnivores in reserved and agricultural landscapes. *Scientific Reports,* 7(1): 1 – 11.

Andersen, G.E., Johnson, C.N., Barmuta, L.A., & Jones, M.E. (2017b) Dietary partitioning of Australia's two marsupial hypercarnivores, the Tasmanian devil and the spotted-tailed quoll, across their shared distributional range. *PLoS ONE*, 12(11): e0188529. https://doi.org/10.1371/journal.pone.0188529

Andersen, G.E., Johnson, C.N. & Jones, M.E. (2020). Space use and temporal partitioning of sympatric Tasmanian devils and spotted-tailed quolls. *Austral Ecology,* 45: 355–365.

Andrew, D.L. (2005). *Ecology of the Tiger Quoll* Dasyurus maculatus maculatus *in coastal New South Wales.* M.Sc thesis, University of Wollongong, Wollongong, NSW.

Belcher, C. (1994). *Studies on the Diet of the Tiger Quoll* (Dasyurus maculatus). M.Sc. Thesis, La Trobe University, Bundoora, VIC.

Belcher, C.A. (1995) Diet of the Tiger Quoll *(Dasyurus maculatus)* in East Gippsland, Victoria. *Wildlife Research*, 22: 341–357.

Belcher, C.A. (2000). *The Ecology of the Tiger Quoll,* Dasyurus maculatus, *In South-Eastern Australia.* PhD thesis, La Trobe University, Bundoora, VIC.

Belcher, C.A. (2003). Demographics of tiger quoll (*Dasyurus maculatus maculatus*) populations in southeastern Australia. *Australian Journal of Zoology*, 51: 611–626.

Belcher, C.A. & Darrant, J.P. (2004). Home range and spatial organization of the marsupial carnivore, *Dasyurus maculatus maculatus* (Marsupialia: Dasyuridae) in south-eastern Australia. *Journal of Zoology London*, 262: 271–280.

Belcher, C.A & Darrant, J.P. (2006). Den use by the spotted-tailed quoll *Dasyurus maculatus* in south-eastern Australia. *Australian Mammalogy*, 28.
doi: 10.1071/AM06007.

Belcher, C.A., Nelson, J. L., & Darrant, J.P. (2007). Diet of the Tiger Quoll *Dasyurus maculatus* in south-eastern Australia. *Australian Journal of Zoology*, 55: 117–122.

Burnett, S. (2001). *The Ecology and Conservation Status of the Northern Spot Tailed Quoll* Dasyurus maculatus *With Reference to the Future of Australia's Marsupial Carnivores*. Ph.D thesis, James Cook University of North Queensland, Townsville, QLD.

Cunningham C.X., Johnson C.N., Barmuta L.A., Hollings T, Woehler E.J., Jones M.E. (2018). Top carnivore decline has cascading effects on scavengers and carrion persistence. *Proc. R. Soc.* B, 285: 20181582.

DAWE (Department of Agriculture, Water and the Environment) (2022) *Fire regimes that cause declines in biodiversity as a key threatening process*, Department of Agriculture, Water and the Environment, Canberra, April. CC BY 4.0.

Dawson, J.P., Claridge, A.W., Triggs, P. & Paull, D.J. (2007). Diet of a native carnivore, the spotted-tailed quoll (*Dasyurus maculatus*), before and after an intense wildfire. *Wildlife Research*, 34: 342–351.

DELWP (Department of Environment, Land, Water and Planning) (2015). *Conservation Advice Dasyurus viverrinus eastern quoll.* Australian Government, Canberra, ACT.

DELWP (Department of Environment, Land, Water and Planning) (2016). *National Recovery Plan for the Spotted-tailed Quoll Dasyurus maculatus.* Australian Government, Canberra, ACT.

Driessen, M.M. & Hocking, G.J. (1992). *Review and Analysis of Spotlight Surveys in Tasmania, 1975-1990*. Department of Parks, Wildlife and Heritage, Hobart, Tasmania.

Driessen, MM, Visoiu, M, Dewar, E, Bonham, K and Gales, R (2020). *Monitoring priority wildlife in the Tasmanian Wilderness World Heritage Area: A pilot survey on the Central Plateau. Nature Conservation Report 20/1*. Department of Primary, Industries, Parks, Water and Environment: Hobart, Tasmania.

Driessen, M, Dewar, E, Leonard, S, Visoiu, M, Bonham, K and Gales, R (2022). *Monitoring Priority Wildlife in the Tasmanian Wilderness World Heritage Area: Central Plateau. Nature Conservation Report 22/1*. Natural Resources and Environment Tasmania.

Edgar, R. & Belcher, C. (1995). *Spotted-tailed Quoll.* In *The Mammals of Australia*. d. R Strahan. Australia Museum and Reed Books, Sydney. pp. 67–69.

Firestone, K.B., Elphinstone, M.S., Sherwin, W.B. & Houlden, B.A. (1999). Phylogeographical population structure of tiger quolls *Dasyurus maculatus* (Dasyuridae: Marsupialia), an endangered carnivorous marsupial. *Molecular Ecology*, 8: 1613–1625.

Fleay, D. (1948). Australia's marsupial "Tiger Cat". *Animal Kingdom*, 51: 36–41.

FPA (Forest Practices Authority) (2021), *Threatened Species Adviser.* Decision Support System, Forest Practices Authority, Hobart, Tasmania.

Glen, A.S. & Dickman, C.R. (2006a). Home range, denning behaviour and microhabitat use of the carnivorous marsupial *Dasyurus maculatus* in eastern Australia. *Journal of Zoology, London*, 268: 347–354.

Glen, A S. & Dickman, C.R. (2006b). Diet of the spotted-tailed quoll (*Dasyurus maculatus*) in eastern Australia: effects of season, sex and size. *Journal of Zoology*, 269: 241–248.

Glen A. S. & Dickman C. R. (2013). Population viability analysis shows spotted-tailed quolls may be vulnerable to competition. *Australian Mammalogy*, 35: 180–183.

Green, R.H. & Scarborough, T.J. (1990). The spotted-tailed quoll *Dasyurus maculatus* (Dasyuridae, Marsupialia) in Tasmania. *The Tasmanian Naturalist*, 100: 1–14.

Hamer, Rowena (2019). *Restoring farmland for biodiversity: a carnivorous perspective.* PhD Thesis. University of Tasmania, Hobart. Tasmania.
https://doi.org/10.25959/100.00033362

Hamer R.P., Gardiner R.Z., Proft K.M., Johnson C.N. and Jones M.E. (2021) A triple threat: high population density, high foraging intensity and flexible habitat preferences explain high impact of feral cats on prey *Proc. R. Soc. B*, 288: 20201194. http://doi.org/10.1098/rspb.2020.1194

Hamer R.P., Andersen G.E., Hradsky B.A., Troy S.N., Gardiner R.Z., Johnson C.N., Jones M.E. (2022). Differing effects of productivity on home-range size and population density of a native and an invasive mammalian carnivore. *Wildlife Research*, 49: 158–168.

Hawkins, C.E., Baars, C., Hesterman, H., Hocking, G.J., Jones, M.E., Lazenby, B., Mann, D., Mooney, N., Pemberton, D., Pyecroft, S. and Restani, M, (2006). Emerging disease and population decline of an island endemic, the Tasmanian devil *Sarcophilus harrisii*. *Biological Conservation*, 131(2): 307–324.

Henderson, T., Fancourt, B.A., Rajaratnam, R., Vernes, K. and Ballard, G, (2022). Density estimates reveal that fragmented landscapes provide important habitat for conserving an endangered mesopredator, the spotted-tailed quoll. *Scientific Reports*, 12(1): 1–10.

Henderson, T., Fancourt, B. A., Rajaratnam, R., Vernes, K., and Ballard, G. (2023). Habitat use by the endangered spotted-tailed quoll in a fragmented landscape. *Mammal Research*, 68: 93–103. doi: 10.1007/s13364-022-00660-4.

Jarman, P.J., Allen, L.R., Boschma, D.J. & Green, S.W. (2007). Scat contents of the spotted-tailed quoll *Dasyurus maculatus* in the New England gorges, north-eastern New South Wales. *Australian Journal of Zoology*, 55: 63–72.

Jones, M.E. (1996). *'Guild structure of the large marsupial carnivores in Tasmania',* PhD thesis, University of Tasmania, Hobart, Tasmania.

Jones, M.E. (1997). Character displacement in Australian dasyurid carnivores: size relationships and prey size patterns. *Ecology*, 78: 2569–2587.

Jones, M.E. (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research*, 27: 289–296.

Jones, M.E. & Barmuta, L.A. (1998). Diet overlap and relative abundance of sympatric dasyurid carnivores: a hypothesis of competition. *Journal of Animal Ecology*, 67: 410–421.

Jones, M.E. & Rose, R.K. (1996). *Preliminary Assessment of Distribution and Habitat Associations of the Spotted Tailed Quoll (*Dasyurus maculatus maculatus*) and Eastern Quoll (*D. viverrinus*) in Tasmania to Determine Conservation and Reservation Status.* Nature Conservation Branch, Parks and Wildlife Service. Report to the Tasmanian RFA Environment and Heritage Technical Committee, Hobart, Tasmania.

Jones, M & Rose, R & Burnett, S. (2001). *Dasyurus maculatus*. *Mammalian Species*, 676: 1–9. doi: 10.2307/0.676.1.

Jones ME, Bain GC, Hamer RP, Proft KM, Gardiner RZ, Dixon KJ, Kittipalawattanapol K, Zepeda de Alba AL, Ranyard CE, Munks SA, Barmuta LA, Burridge CP, Johnson CN, Davidson NJ (2021). Research supporting restoration aiming to make a fragmented landscape 'functional' for native wildlife. *Ecol Manag Restor* 22(S2): 65–74.

Jones, M & Burnett, S & Claridge, A & Fancourt, B & Körtner, G & Morris, K & Peacock, D & Troy, S & Woinarski, J. (2014). Australia's surviving marsupial carnivores: threats and conservation. *Carnivores of Australia*, 9: 197–240, CSIRO Publishing.

Jones, M.E., Oakwood, M., Belcher, C.A., Morris, K., Murray, A.J., Woolley, P. A., Firestone, KA., Johnson, B. & Burnett, S. (2003). Carnivore concerns: Problems, issues and solutions for conserving Australasia's marsupial carnivores. In: *Predators with Pouches: The Biology of Carnivorous Marsupials*. Eds. M. E. Jones, C. R. Dickman, and M. Archer. CSIRO Publishing, Collingwood, Victoria. pp. 422–434.

Körtner, G., Gresser, S., Mott, B., Tamayo, B., Pisanu, P., Bayne, P. & Harden, R. (2004). Population structure, turnover and movement of spotted-tailed quolls on the New England Tablelands. *Wildlife Research*, 31: 475–484.

Lawrence, C. & Wiersma, H.F. (2019). *DFTD is a killer but what about other threats? In 'Saving the Tasmanian devil: recovery through science based management'*. (Eds. C.J. Hogg, S. Fox, D. Pemberton and K. Belov). CSIRO Publishing, Melbourne, VIC. pp. 131–138.

Lazenby, B.T., Tobler, M.W., Brown, W.E., Hawkins, C.E., Hocking, G.J., Hume, F., Huxtable, S., Iles, P., Jones, M.E., Lawrence, C. & Thalmann, S. (2018). Density trends and demographic signals uncover the long-term impact of transmissible cancer in Tasmanian devils. *Journal of Applied Ecology*, 55(3): 1368–1379.

Mansergh, I. (1984). The status, distribution and abundance of *Dasyurus maculatus* (Tiger Quoll) in Australia with particular reference to Victoria. *Australian Zoologist*, 21: 109–122.

Menkhorst, P.W & Knight, F (2004). *Field Guide to the Mammals of Australia*. Oxford University Press, Australia.

Nelson, J.L. (2007). *The Development of a Survey Protocol Using Hair Tubes to Detect a Rare Marsupial Carnivore, the Spotted Tailed Quoll* Dasyurus maculatus. PhD thesis, Melbourne University, Parkville, VIC.

NRE Tas (Department of Natural Resources and Environment Tasmania) (2022). *Living with Tasmanian Devils and Quolls,* Department of Natural Resources and Environment Tasmania. Living with Tasmanian Devils and Quolls | Department of Natural Resources and Environment Tasmania (nre.tas.gov.au)

Accessed October 11th, 2023.

Oakwood, M. (2000). Reproduction and demography of the northern quoll, *Dasyurus hallucatus,* in the lowland savanna of northern Australia. *Australian Journal of Zoology*, 48: 519–539.

Orell, P. & Morris K. (1994). *Chuditch Recovery Plan, 1992–2001.* Western Australian Department of Conservation and Land Management, Western Australian Wildlife Research Centre, Wildlife Management Program Report No. 13.

Peacock, D.E, Fancourt, B.A, McDowell, M.C & Abbot, I (2018) Survival histories of marsupial carnivores on Australian continental shelf islands highlight climate change and Europeans as likely extirpation factors: implications for island predator restoration. *Biodiversity Conservation*, 27: 2477–2494.

Settle, G.A. (1978). The quiddity of Tiger Quolls. *Australian Natural History*, 19: 165–169.

Threatened Species Section (2012). *King Island Biodiversity Management Plan.* Department of Primary Industries, Parks, Water and Environment, Hobart.

Triggs, B (1996). *Tracks, Scats and other Traces. A field guide to Australian Mammals.* Oxford Press.

Troy, SN (2014). *Spatial ecology of the Tasmanian spotted-tailed quoll.* PhD thesis, University of Tasmania, Hobart, Tasmania.

UTas (University of Tasmania) (2022). *Innovative Camera Network keeps close eye on Tassie Wildlife*, *University of Tasmania*. University of Tasmania.https://www.utas.edu.au/about/news-and-stories/articles/2022/1204-innovative-camera-network-keeps-close-eye-on-tassie-wildlife

Accessed 11 October 2023.

Watt, A. (1993). *Conservation Status and Draft Management Plan for* Dasyurus maculatus *and* D. hallucatus *in Southern Queensland.* Department of Environment and Heritage, Queensland.

Prepared by the Threatened Species Section in 2023 under the provisions of the Tasmanian *Threatened Species Protection Act 1995*.

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View: www.naturalvaluesatlas.tas.gov.au

https://nre.tas.gov.au/conservation/threatened-species-and-communities/lists-of-threatened-species/full-list-of-threatened-species
www.threatenedspecieslink.tas.gov.au

Contact details: Threatened Species Section, Department of Natural Resources and Environment Tasmania, GPO Box 44, Hobart, Tasmania, Australia 7001.

Ph: 1300 368 550.

threatenedspecies.enquiries@nre.tas.gov.au

Permit: It is an offence under Tasmanian legislation to collect, catch, damage, injure, destroy, or kill a threatened species listed under the *Threatened Species Protection Act 1995,* without a permit

Attachment A – Listing Assessment for *Dasyurus maculatus* subsp. *maculatus*

ASSESSMENT PARAMETERS

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	5,691	1,612	14,632	Based on the estimate (with the minimum and maximum plausible value representing the lower and upper confidence interval) given by Troy (2014).
Trend	Unknown.			No formal data on population trends is available.
Generation length (years)	2	1	3	Estimate based on breeding information as described by a number of researchers (Settle 1978; Belcher 1995, 2003; Burnett 2001; Andrew 2005; Jones *et al.* 2001; Nelson 2007)
Extent of occurrence	75,696 km^2	75,696 km^2	Unknown	EOO calculated using a convex hull around all records of occurrence verified from the Natural Values Atlas (2023).
Trend	Inferred Decline.			EOO has decreased since European Settlement due to the local extinction on King Island (Peacock et al. 2018) and is also inferred due to habitat loss / fragmentation.
Area of Occupancy	4,536 km^2	4,536 km^2	Unknown	Estimate based on occupied 2 x 2 km grid squares (excluding locally extinct historical records).
Trend	Unknown.			There is a paucity of data available to indicate changes to AOO of the spotted-tailed quoll, outside of the local extinction on King Island.
Number of subpopulations	Unknown	Unknown	Unknown	There are no separate subpopulations of spotted-tailed quoll formally recognised in Tasmania.
Trend	Unknown.			
Basis of assessment of subpopulation number	Subpopulations have not been defined for the spotted-tailed quoll due to a lack of genetic research and natural low density due to large area requirements, female territoriality, short life span and low lifetime fecundity (Jones et al. 2003).			
No. locations	Not assessed	Not assessed	Not assessed	
Trend	Unknown.			
Basis of assessment of location number	Locations have not been quantified for this assessment, due to its wide distribution across mainland Tasmania, and relative low density.			

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Fragmentation	The spotted-tailed quoll is not considered to be severely fragmented, due to its wide distribution across mainland Tasmania at low densities. Contemporary research has shown its habitat use across fragmented and agricultural landscapes to be more flexible than previous thought (Troy 2014; Henderson et al. 2022; 2023).			
Fluctuations	There are no documented extreme fluctuations in EOO, AOO, number of subpopulations, locations, or mature individuals. There is a lack of data over time on the number of mature individuals to assess fluctuations, outside of assumptions on reduced abundance since European settlement, due to habitat loss, and human induced impacts such as persecution and road mortality (Jones et al. 2003).			

IUCN ASSESSMENT

Overall assessment result:

Criterion for Critically Endangered, Endangered or Vulnerable not met. The spotted-tailed quoll could be considered to qualify as Near Threatened, as it partially meets Criterion 3 Vulnerable. Estimated number of mature individuals falls under the threshold for the Vulnerable category for Criterion 3. While declines in population numbers have not been well substantiated, the species is considered to be particularly susceptible to threatening processes. It has intrinsic biological and ecological traits which include large area requirements, female territoriality, low population density, short life span, and low lifetime fecundity (Jones et al. 2003). These traits mean that the spotted-tailed quoll has a limited ability to rapidly recover from population declines or to colonise, or recolonise, suitable habitat. Under the *Threatened Species Protection Act 1995*, the spotted tail quoll meets the criteria for rare.

CRITERION 1:

Population size reduction (reduction in total numbers)

Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	**≥ 90%**	**≥ 70%**	**≥ 50%**
A2, A3, A4	**≥ 80%**	**≥ 50%**	**≥ 30%**

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Assessment result

Data deficient.

Justification

There is insufficient evidence to demonstrate a substantial population size reduction.

CRITERION 2:

Geographic distribution is precarious for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	**Endangered Restricted**	**Vulnerable Limited**
B1. Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2. Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	**= 1**	**≤ 5**	**≤ 10**
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (number of mature individuals			

Assessment result

Criterion for Critically Endangered, Endangered or Vulnerable not met.

Justification

EOO is larger than 20,000 km² and AOO is larger than 2,000 km².

CRITERION 3:

Small population size and decline				
		Critically Endangered **Very low**	**Endangered** **Low**	**Vulnerable** **Limited**
Estimated number of mature individuals		**< 250**	**< 2,500**	**< 10,000**
AND either (C1) or (C2) is true				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future	**Very high rate** **25% in 3 years or 1 generation** **(whichever is longer)**	**High rate** **20% in 5 years or 2 generation** **(whichever is longer)**	**Substantial rate** **10% in 10 years or 3 generations** **(whichever is longer)**
C2	An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	**≤ 50**	**≤ 250**	**≤ 1,000**
(a)	(ii) % of mature individuals in one subpopulation =	**90 – 100%**	**95 – 100%**	**100%**
(b)	Extreme fluctuations in the number of mature individuals			

Assessment result

Criterion partially met. This supports the spotted-tailed quoll's current assessment status as Near Threatened, due to the proximity to meeting the criteria for Vulnerable. While the estimated number of mature individuals meets the criteria for Vulnerable, but further research is required to estimate future decline / fluctuations.

Justification

Limited population size estimates (Jones & Rose 1996, Troy 2014) have been estimated at < 10,000 which meets the criterion for Vulnerable. There is insufficient data available to quantify future decline to meet the criteria for C1 or C2.

CRITERION 4:

Very small population			
	Critically Endangered **Extremely low**	**Endangered** **Very Low**	**Vulnerable** **Low**
Number of mature individuals	**< 50**	**< 250**	**< 1,000**

Assessment result

Criterion not met.

Justification

Estimated population size >1000.

CRITERION 5:

Quantitative Analysis			
	Critically Endangered **Immediate future**	**Endangered** **Near future**	**Vulnerable** **Medium-term future**
Indicating the probability of extinction in the wild to be:	**≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)**	**≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)**	**≥ 10% in 100 years**

Assessment result

Data deficient.

Justification

No quantitative analysis of extinction risk has been undertaken.

RARE A taxon of native flora or fauna may be listed as rare if it has a small population in Tasmania that is not endangered or vulnerable but is at risk. (Section 15(4) of the Act).

The following criteria may provide evidence of the level of threat. In order to be considered as rare at least ONE of the criteria A-B should apply.

(A) A taxon of limited distribution or numbers, threatened by existing on-going processes occurring over sufficient of their range to suggest that they would satisfy the indicative criteria for vulnerable unless the threatening process was abated based on (and specifying) any one of the following:

1. the extent of occurrence is less than 80x80 km or 2,000 km^2;

Assessment result

Criterion not met

Justification

Extent of occurrence is > 2,000 km^2

2. the area of occupancy is not more than 0.5 km^2 (50 hectares);

Assessment result

Criterion not met

Justification

Area of occupancy is > 0.5km km^2

3. taxa that are not B1 or B2 above, but that have very small and localised subpopulations wherever they occur (generally no subpopulation with an area of occupancy greater than 0.01 km2 (1 hectare) and no more than 1,000 mature individuals).

Assessment result

Data deficient

Justification

Subpopulations have not been quantified for the spotted-tailed quoll in Tasmania

(B) Total population small or restricted and at risk in the form of EITHER of the following:

1. the total population consists of fewer than 10,000 mature individuals, and no more than 2,500 mature individuals occur on land that is in an area free from sudden processes capable of causing largely irreversible loss of individuals or habitat;

Assessment result

Criterion met

Justification

Population size estimates (Jones & Rose 1996, Troy 2014) have both been estimated at < 10,000.

The spotted-tailed quoll has intrinsic biological and ecological traits that render it particularly susceptible to threatening processes. These include large area requirements, female territoriality, low population density, short life span, and low lifetime fecundity (Jones *et al.* 2003). These traits mean that the spotted-tailed quoll has a limited ability to rapidly recover from population declines or to colonise, or recolonise, suitable habitat.

OR

2. 90% of mature individuals occur in 15 or fewer subpopulations or locations and no more than 5 of these occur in an area that is free from sudden processes capable of causing largely irreversible loss of individuals or habitat.

Assessment result

Data deficient

Justification

Subpopulations have not been quantified for the spotted-tailed quoll in Tasmania.