



Fauna Technical Note No. 10: Identifying Tasmanian devil and spotted-tailed quoll habitat



The Fauna Technical Note Series provides information for Forest Practices Officers on fauna management in production forests. These technical notes are advisory guidelines and should be read in conjunction with the requirements of the Forest Practices Code.

Technical notes can be accessed on the Forest Practices Authority's website: www.fpa.tas.gov.au

1. Introduction

Tasmanian devils and spotted-tailed quolls occupy an important place in the Tasmanian landscape as the largest ground-dwelling native carnivores. Being higher order carnivores, they play a role in stabilising the ecosystem and 'cleaning up' weak, dying and dead animals. Both species are found across the mainland of Tasmania but certain landscape features and vegetation types provide better habitat than others.

The inclusion of the Tasmanian devil and spotted-tailed quoll in the Threatened Fauna Adviser 2014 has prompted a requirement for planners to identify potential and significant habitat in forestry operations and manage appropriately. This technical note provides guidance on identifying potential Tasmanian devil and spotted-tailed quoll habitat, in particular features that indicate potential denning habitat, and recommendations for the management of these areas in forestry operations. As both species commonly occupy home ranges far greater than an average forestry coupe, this technical note also offers guidance on designing effective habitat retention networks across the broader landscape (e.g. coupe context unit, multiple coupes or whole property).

2. Species conservation status and ecology

2.1 Tasmanian devil

Tasmanian devils are listed as Endangered on the Tasmanian *Threatened Species Protection Act 1995* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* primarily due to the ongoing population decline attributed to Devil Facial Tumour Disease (DFTD). DFTD is estimated to have caused population declines of up to 95% in some areas (Hawkins *et al.* 2006, McCallum *et al.* 2007) and is now known from most of the eastern, southern and central parts of the state but has not yet been found on the west or northwest coasts. The disease is continuing to spread westwards across the state at a rate of approximately 7-10km/year (DPIPWE 2010).

DFTD is causing significant changes in Tasmanian devil population and life history patterns. When DFTD reaches a new area, older devils tend to get infected and die first. Progressively younger devils are infected over time, although the disease can be present in all age classes simultaneously (Lachish *et al.* 2007). It is now rare for female devils to produce more than one litter before they die from DFTD (Jones *et al.* 2008). With a reduced population size, devils have a reduced resilience to other threats such as roadkill, illegal culling and habitat loss (DPIPWE 2010). For devils to persist in the landscape, they must have an adequate food supply, enough den sites for breeding and daily movements, and structural features for refuge and foraging (Jones *et al.* 2003).

Habitat loss and fragmentation have been identified as possibly the most important conservation issues for marsupial carnivores (Jones *et al.* 2003). However, Tasmanian devils are thought to be less susceptible to habitat loss and fragmentation than other species as they are highly mobile (home range size 4-27 km² [400-2700ha]) and are generalists in terms of habitat preferences (DPIPWE 2010). Despite their broad habitat use, suitable denning habitat may be sparse in some areas, and if

maternal dens are destroyed there may be a significant effect on the abundance of devils in a particular area (Owen and Pemberton 2005). In areas where Tasmanian devil numbers are already reduced (due to DFTD) and females are only producing one litter in a lifetime, the loss of a cluster of maternal dens could have a substantial impact on the local population.

2.2 Spotted-tailed quoll

The Tasmanian spotted-tailed quoll is listed as Rare on the Tasmanian *Threatened Species Protection Act 1995* and Vulnerable on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Spotted-tailed quolls are a forest dependent species with large area requirements; male ranges overlap but female ranges are largely exclusive. The home range of female spotted-tailed quolls was recently estimated to vary from 150 to 500 ha (Troy, in prep), probably in relation to vegetation cover, rainfall and temperature (Troy, pers comm.). Recent research has shown that spotted-tailed quolls spend the majority of their time foraging close to one of their many den sites distributed throughout their territory (Troy, in prep).

Adult female spotted-tailed quolls are territorial, while the home ranges of adult males overlap with other males and multiple females. Adult females produce up to six young, but only one or two are raised to independence. Whilst juvenile males disperse away from their mothers and sisters to establish a home range, presumably as a method to avoid inbreeding, juvenile females tend to establish territories in close proximity to their mothers. This means that if breeding females are lost from an area (through roadkill, competition, persecution, habitat loss, etc), it can take many years (generations) for the area to be recolonised by a new adult female. Because spotted-tailed quolls naturally live at low densities with limited recolonisation of areas once depopulated, they are especially vulnerable to habitat loss and fragmentation. The loss of denning habitat is considered to significantly reduce the likelihood of spotted-tailed quolls using an area.

3. Assessing habitat

When the Biodiversity Values Database (BVD) indicates that the coupe/planning unit falls within the range of the Tasmanian devil and/or spotted-tailed quoll, the planner must determine if potential habitat is present. If potential habitat is present, the next step is to consult the Threatened Fauna Adviser 2014 to determine the appropriate habitat management recommendations for the Tasmanian devil and spotted-tailed quoll.

3.1 Potential habitat

Tasmanian devil

Potential habitat for the Tasmanian devil includes all terrestrial native habitats, forestry plantations and pasture. Tasmanian devils are found across the entire mainland of Tasmania but densities are higher in coastal scrub and sclerophyll forest (Guiler 1970), especially in mixed patches of grazing land and open forest or woodland and in coastal heathland and scrub (Jones & Rose 1996). Dense wet eucalypt forest and rainforest, alpine areas, dense wet heath and open grassland all support only low densities of devils (Jones *et al.* 2004). Tasmanian devils also avoid steep slopes and rocky areas (Jones & Barmuta 2000), and do not occur in areas of extensive pasture with no natural vegetation (Guiler 1970). Tasmanian devils require shelter (e.g. dense vegetation, hollow logs, burrows or caves) and hunting habitat (open understorey mixed with patches of dense vegetation) within their home range.

Spotted-tailed quoll

Potential habitat for the spotted-tailed quoll includes coastal scrub, riparian areas, rainforest, wet forest, damp forest, dry forest and blackwood swamp forest (mature and regrowth), particularly where structurally complex areas are present. Remnant vegetation in cleared agricultural land can also be important for this species. Finer scale habitat preferences for the spotted-tailed quoll in Tasmania are less well understood. Recent research suggests that spotted-tailed quolls prefer to use native vegetation cover and avoid open areas (Troy, in prep).

3.2 Potential denning habitat

With such large home ranges and such a diverse range of vegetation types supporting these species, protection of all potential habitat is both unrealistic and unnecessary. Instead, management in areas subject to production forestry should focus on the retention of **potential denning habitat** where such habitat is rare in the landscape for Tasmanian devils, or within the core range for spotted-tailed quoll. As both species can use similar denning habitat and are often opportunistic in their selection of den sites, in most cases the same habitat may be targeted for both species and managed appropriately.

For coupes or planning units that contain potential habitat for devils and/or spotted-tailed quolls, planners should assess the coupe or planning unit area for **potential denning habitat**. **Potential denning habitat** for the Tasmanian devil includes areas of well-drained soil, log piles or sheltered overhangs such as cliffs, rocky outcrops or rock piles, knolls, caves and earth banks, free from risk of inundation and with at least one entrance through which a devil could pass. **Potential denning habitat** for the spotted-tailed quoll includes 1) any forest remnant (>0.5ha) in a cleared landscape that is structurally complex (high canopy, with dense understorey and ground vegetation cover), free from the risk of inundation, or 2) a rock outcrop, rock crevice, rock pile, burrow with a small entrance, hollow logs, large piles of coarse woody debris and caves.

Tasmanian devils and spotted-tailed quolls may dig their own burrows, and both species may take advantage of existing vacant wombat and rabbit burrows. Studies of Tasmanian devil dens in soft, burrowable soils have shown some preference for denning under vegetation (Smith, 2012). The root systems of the vegetation reinforce the den entrance and low-hanging foliage can help disguise the den entrance. Tasmanian devil and spotted-tailed quoll dens are notoriously difficult to confirm without the assistance of tracking technology (e.g. remote camera, hair capture trap, radio/GPS tracking etc) and so all refuges with an entrance size big enough for a devil or quoll to pass through can be considered suitable.

Planners should note any sites that show evidence of use such as scats (distinguishable from herbivores as they will contain fur, bones, claws and/or skin), footprints, prey remains (including feathers, bones, claws), wear around an entrance hole and sometimes a distinct smell. An absence of these signs is not proof that an area is unused, as studies have suggested that some maternal dens may have an absence of evidence to better disguise and protect their young. Sites that show use should be prioritised for protection above those that appear disused.



Above: A devil or quoll scat

3.3 Significant habitat

Tasmanian devil

Significant habitat for the Tasmanian devil is a patch of potential denning habitat where a 'cluster' of three or more entrances (large enough for a devil to pass through) occur within 100m of each other and where no other clusters may be found within a 1km radius (i.e. an isolated cluster). These are given the highest priority for protection because (a) there is the potential for multiple individuals to be breeding there, so disturbance could have a particularly high local impact and (b) these features would imply that denning habitat is limited in the area, and its loss would be most likely to exert a high long-term impact on the local population.

Spotted-tailed quoll

For spotted-tailed quolls, significant habitat is all potential denning habitat within the core range. Spotted-tailed quolls appear to be opportunistic in their den selection (though maternal dens are likely to be selected from the highest quality den sites), so any potential denning habitat retained for Tasmanian devils should suffice for spotted-tailed quolls in most cases.

4. Landscape management

The overarching management objective for these species is to implement actions that will assist the maintenance of populations throughout the range of the species, primarily through the maintenance of potential habitat, and protection of den sites. This can be achieved through application of the Threatened Fauna Adviser recommendations.

For operations encompassing a large area (e.g. whole property, coupe context unit or multiple plantations), it can be helpful to design a broad-scale management strategy, such as a habitat network, for Tasmanian devils and spotted-tailed quolls. The primary aim of a habitat network is to maintain Tasmanian devils and spotted-tailed quolls across the landscape, facilitate their dispersal to maintain genetic diversity, and preserve potential denning habitat.

The habitat network should include features to support sheltering sites such as potential denning habitat as described in 3.2, and structurally complex vegetation (canopy cover, with dense understorey and some ground cover). This network can be created by using existing formal and informal reserves (e.g. wildlife habitat strips), widening streamside reserves (if required) and connecting wildlife habitat clumps.

Information to provide to FPA with a notification for Tasmanian devil and/or spotted-tailed quoll:

- Any known den site locations should be indicated on the planning map.
- Description of habitat within the coupe/planning unit area and any signs of potential den sites observed (include photos if possible).
- Proposed management options, such as areas proposed for retention and areas proposed for harvesting/clearing.

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Appendix 1: Potential devil and spotted-tailed quoll den entrances



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