



Fauna Technical Note No. 17: Identifying masked owl 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. The planner will use expert judgement and available information to determine the extent and nature of field survey work required to meet decision-making requirements.

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

1. Introduction

The Tasmanian masked owl (*Tyto novaehollandiae castanops*) is a subspecies which occurs only in Tasmania, and is larger and darker than its mainland counterpart. The Tasmanian masked owl is listed as 'vulnerable' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, 'endangered' under the Tasmanian *Threatened Species Protection Act 1995*, and is a 'priority species requiring consideration' under the Tasmanian Regional Forest Agreement 1997. The masked owl is listed due to its small population size and ongoing habitat loss. Estimates of population size have included 200–400 breeding pairs (Bell and Mooney 2002) and 1300 mature individuals (Garnett *et al.* 2011).

The main threats to the masked owl include clearing of nesting/roosting habitat (particularly mature trees supporting hollows), secondary poisoning, and competition with other bird and mammal species for the limited number of suitable nesting hollows (TSS, 2014).

This technical note provides details on how to identify masked owl potential and significant habitat in the context of planning forestry operations.

2. Masked owl distribution

Masked owls can be found in a wide range of habitats across Tasmania, with owl densities varying geographically. The highest densities are suggested to be in the east and north of Tasmania, while the lowest densities occur at elevations above 600 m above sea level (asl) (Bell and Mooney, 1996; Bell *et al.*, 1997; Todd, 2012).

The potential range of the masked owl is the whole state, except the Bass Strait islands (Figure 1).

The core range of the masked owl includes all areas that occur at low elevation (<600 m asl) (Figure 1). The definition for core range was derived from data on masked owl density (Todd, 2012).

The latest information on the masked owl range boundaries can be found at:

- the Natural Values Atlas (<https://www.naturalvaluesatlas.tas.gov.au>) or
- the FPA Biodiversity Values Database (a tool designed for forest planners with data sourced from the NVA) (<http://www.fpa.tas.gov.au>).

3. Masked owl habitat

Masked owls are found in a range of environments, including wet and dry sclerophyll forests, agricultural areas and urban environments. Higher densities of masked owls have been found in lowland areas, areas with a large component of undisturbed mature forest and areas of dry forest (Todd, 2012). The open structure of mature dry forest may enhance the species foraging ability (Debus, 1993; Kavanagh, 1996; Bell *et al.*, 1997).

Masked owls generally roost in large hollows in old trees, but can also roost in dense understorey vegetation and in heavily foliated shrubs (Bell *et al.*, 1997; Todd, 2012). Individual owls change roost

sites regularly and so will use more than one hollow-bearing tree (Todd, 2012). Nesting generally occurs in large tree hollows in large living or dead trees (Mooney, 1997). Masked owls can and will nest and roost in both intact forest and modified land if suitable habitat is available. For example masked owls have been found roosting in paddock trees, even trees inhabited by other species such as brushtail possums.

Potential habitat for the masked owl is defined as all areas that have trees with large hollows (≥ 15 cm entrance diameter). It can be difficult to detect suitable hollows from the ground, so tree size can be used as a substitute for hollow availability (Koch, 2008; Koch et al., 2008). Trees over 100cm dbh have a higher probability of containing hollows suitable for masked owls than smaller diameter trees (Koch et al., 2008).

Significant habitat for the masked owl includes native dry forest areas that contain trees with large hollows (≥ 15 cm entrance diameter). Remnants and paddock trees in agricultural areas may also constitute significant habitat if they include large old hollow-bearing trees.

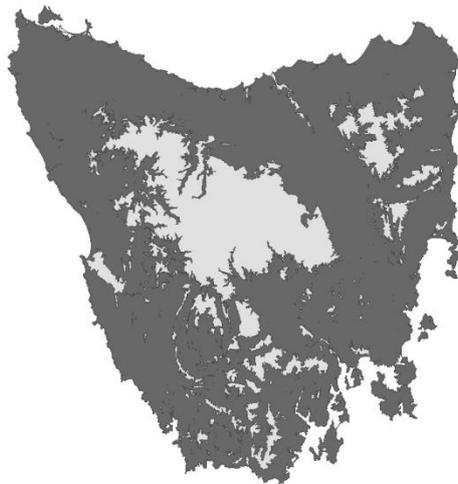


Figure 1. The core (dark grey) and potential (both light and dark grey) range of the Tasmanian masked owl, derived from work by Todd (2012).

4. Assessing masked owl habitat

Assessment of masked owl habitat should ideally be done in the field as it is the most accurate method for assessing potential habitat. However, masked owls are highly mobile and have large territories in the order of 1000–2000 hectares (Young, 2006; Todd, 2012), so consideration of mapped habitat availability in the broader landscape is necessary in some circumstances. Mapping layers are known to be variable in accuracy so on-ground assessments will not always correspond to available mapping information.

For compliance reasons it is important to document in your biodiversity evaluation how decisions were made on habitat identification, and indicate on the field assessment map where areas of potential and/or significant habitat are located.

Field assessment

As defined above, any tree with a large hollow (≥ 15 cm entrance diameter) should be considered potential habitat for masked owls, with habitat quality determined by the density of these trees.

However, hollows can be difficult to identify from the ground and it is generally not possible to determine if a hollow has dimensions suitable for use by masked owls unless a detailed examination can be made. Hollows are more likely to be found in large old trees, so tree diameter is a useful surrogate for hollow availability. Trees less than 100 cm dbh are unlikely to contain hollows suitable for masked owls.

Not all large trees will contain hollows suitable for use by masked owls, so the likelihood of a suitable hollow occurring in an area increases with both tree age/size and the number of large trees. Therefore

areas with the largest trees and areas with the greatest densities of large trees constitute higher quality habitat than areas with fewer or smaller trees.

Large forest patches with at least eight trees per hectare over 100 cm dbh are considered to generally be high quality potential habitat, although there are exceptions. Not all trees over 100 cm dbh are old or senescent enough to contain hollows suitable for use by masked owls (e.g. large regrowth poles), and some areas of very large trees at low densities may comprise excellent habitat for masked owls (e.g. scattered large old trees in a regrowth dominated area). Therefore people doing on-ground assessments for masked owl habitat in large forest patches (>1ha) should think about the relative quality of masked owl habitat when identifying areas for retention.

Significant habitat for the masked owl is defined as native dry forest areas containing mature trees with large hollows (≥ 15 cm entrance diameter). Again, areas of significant habitat will vary in quality, increasing with both tree size and the density of large trees. In some landscapes remnants and paddock trees may also constitute significant habitat for masked owls if they include large hollow-bearing trees, so again the intent of the management approach should be considered when identifying significant habitat. If in doubt contact FPA or DPIPWE specialists for advice.

Habitat assessments in continuous forest should be conducted at approximately a 1 ha scale. It is expected that masked owl habitat assessments be conducted during normal coupe assessments. As with any habitat mapping it is understood that it can be difficult to ensure every hectare of the map is accurately assessed, but planners need to be confident with the standard they have achieved.

Remote assessment

One of the key tools to remotely identify potential habitat for masked owls is the FPA 'mature habitat availability map'. The mature habitat availability map identifies areas as high, medium, low or negligible mature habitat availability, based on aerial photograph interpretation of mature crown density and senescence. Higher map categories on average have a greater likelihood of containing hollow-bearing trees and so are more likely to contain hollows suitable for use by masked owls. However, some areas of low density mature forest can provide excellent habitat, and occasionally superior habitat for masked owls. The remote assessments for potential and significant habitat, as outlined below, are intended to capture the higher quality habitat in the majority of situations. However users with local knowledge of the area surrounding their operation are encouraged to think about habitat quality, and can include local information in their assessment of habitat context instead of just mapped spatial information.

For desktop assessments *potential habitat* is considered to be all areas with at least 20% mature eucalypt crown cover (PI-type mature density class 'a', 'b', or 'c') unless mapping indicates there is no senescence in this area (Table 1). For desktop assessments *significant habitat* for the masked owl is considered to be all areas of dry forest (TASVEG dry eucalypt forest and woodland) with at least 20% mature eucalypt crown cover (PI-type mature density class 'a', 'b', or 'c') unless mapping indicates there is no senescence in this area).

As acknowledged above, there are inaccuracies in the spatial information used to identify masked owl habitat. For example, some areas with lower densities of mature trees (e.g. 'd density' in Table 1) may contain larger trees than areas of higher density trees (e.g. 'a' and 'b' density in Table 1), meaning some areas mapped as low habitat availability actually provide higher quality habitat for masked owls than areas mapped as high habitat availability. These inaccuracies are currently unavoidable. Therefore the spatial information should primarily be used to make landscape-scale assessments of habitat availability rather than assessments at the stand level.

At the stand-level the availability and distribution of hollow-bearing trees across a coupe or operation area is best determined from a ground-based assessment as the actual distribution and quality of habitat at this scale may be different to that indicated by the spatial information.

The mature habitat availability map is available from the FPA on request, or a map can be accessed from the habitat context assessment tool on the FPA website or from the Biodiversity Values Database web-map. Alternatively, mapping layers used in the construction of the mature habitat availability map can be assessed using the approach outlined in FPA Fauna Technical Note 2, or by the simplified approach provided in Table 1.

Nest and roost site assessment

Hollows suitable for use by masked owls are large (>15 cm entrance diameter and deep and spacious enough to provide protection for an adult bird and potentially growing chicks). Large hollows are typically found in large old trees, so they are probably quite rare in the landscape (Koch et al., 2008). Nests are usually located in large trees with large hollows/spouts (Figure 2a), and may have evidence of use (e.g. pellets of regurgitated skin and bones; feathers; droppings) (Figure 3) at the base of the tree (within the canopy drip-zone). While pellets may be present at nest/roost trees they should not be relied upon as a sign of activity or use of a tree. Roost sites can be associated with similar habitat features but may also occur in understorey shrubs with dense canopies (e.g. native cherry, sheoaks, banksia in dry forests) or rocky outcrops with overhangs, ledges and caves (Figure 2b). Such sites may also show evidence of use.

Table 1. Potential nesting-habitat density for desktop assessment

Potential nesting-habitat density class	Mapping layer categories for desktop assessment ^a	
	PI-type 'E' class (mature eucalypt crown cover)	SenCode mapping layer ^b
High	a and b (>40%)	All except nil
Medium	c (20-40%)	All except nil
Low	d and f (1-20%)	All categories
	OR	
	a, b and c (>20%)	Nil
Negligible	PI-types with no E class density	All categories

^a These are the mapping categories used to construct the Mature Habitat Availability Map (www.fpa.tas.gov.au). Both crown cover and senescence assessments are based on aerial photo interpretation of the forest canopy and are depicted in the PI-type and SenCode mapping layers respectively.

^b SenCode mapping layer represents the areas of native eucalypt forest containing mature trees showing visible signs of senescence, interpreted from aerial photography.

6. Management of known sites and potential habitat

FPOs and forestry planners should consult the Threatened Fauna Adviser (2014) for details on the management recommendations for masked owls. Information on the range boundary category, known sites and occurrence of potential or significant habitat is required to run the Threatened Fauna Adviser. Information on range boundaries and known sites can be obtained from the FPA Biodiversity Values Database, Forestry Tasmania's (FT's) Conserve or direct from the Natural Values Atlas.

Management of masked owls involves protection of known sites, and managing masked owl habitat availability in the broader landscape. Hollows suitable for use by masked owls are probably quite rare in the landscape, so it is important to manage known nest sites recorded on the Natural Values Atlas or elsewhere. Given that masked owls have large territories and nest/roost sites are hard to locate and few are known, management of masked owl habitat needs to also consider habitat availability in the broader landscape. Hollows suitable for masked owls are found in very old trees so we need to ensure that we retain areas of older trees to maintain nesting hollows both now and into the future.

The management approach for masked owls considers habitat availability within the planning area and at a 1km and/or 5km radius around the operation. Ground based surveys should be done to assess habitat availability within the planning area, and the habitat context assessment tool on the FPA website can be used to assess habitat availability in the surrounding area.

7. Details to supply to FPA Biodiversity Program if advice is required

In addition to standard details that are required as part of the biodiversity evaluation, the following details should be supplied:

1. Operational areas:
 - show the planned operation areas on an FPP planning map.
2. Any known masked owl nesting or roosting records within 500 m of the coupe:
 - show location of records from Biodiversity Values Database (FT's Conserve or NVA)
 - Note any new observations of nesting activity.
3. Potential habitat availability:
 - indicate on 1:10 000 vegetation map the areas of potential and significant habitat, indicating differences in habitat quality where relevant
 - information on modelled mature habitat availability within a 1km and 5km radius, which can include a map showing the location of potential habitat. This information can be obtained from the FPA habitat context assessment tool.



Figure 2. a) An example of a masked owl nest tree (photo: Dyke) and (b) roost site (photo: C Bond).



Figure 3. An example of a masked owl pellet (photo: S Fearn).

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Version Control

Version	Date	Author(s)	Summary of changes
0.1	August 2015	Amy Koch, with comments from J Wiersma and S Munks	Draft technical note
0.2	September 2015	Comments from FT, FPOs, Phil Bell and TSS	Minor edits
1.0	September 2015		Referred to Board
1.1	October 2015	Sarah Munks	Board amendments made– That the Masked Owl Technical Note be amended as follows: a.By labelling it “Draft Technical Note No 17” b.By including a summary of the best available information on population numbers in the introduction.
1.2	November 2015	Amy Koch	Make FPAC recommended changes: formatting. Make changes from DPIPWE feedback, edit the ‘field assessment’ section to discuss habitat quality rather than ‘re-defining’ the terms potential and significant habitat. Include an objective in the introduction.
1.3	November 2015	Amy Koch	Minor typos, receive final endorsement
1.4	February 2016	Amy Koch	Change definition to significant habitat, as agreed with DPIPWE and species experts; remove reference to the need for a predominantly mature open structure. This is more focused towards foraging habitat whereas the management in forestry areas is focused on nesting habitat. D16/27940 & D16/34930.

Stages required for release outside FPA

Category of advice (A1, A2, B1, B2, B3 or C):		B2
Stages	Required/not required	Completed (date)
Specialist	Required	12/8/15
Line Manager	Required	6/8/15
Peer/FPO/stakeholder review	Required	14/8/15
CFPO	Required	10/9/15
FPAC	Required	26/10/15
Board	Required	20/11/15