Department of Sustainability and Environment

Action Statement

Flora and Fauna Guarantee Act 1988

Sooty Owl *Tyto tenebricosa*

Description and distribution

The Sooty Owl *Tyto tenebricosa* (Gould 1845) is a medium-large dark owl with short round wings, a very short tail and huge forward-facing black eyes set in a discrete rounded facial disc; its sooty black upper parts and less dark underparts are both flecked white (Hollands 1991, Olsen 1994, Schodde & Mason 1997). The female (44-51cm; 0.9-1.1kg) is substantially larger than the male (37-43cm; 0.6-0.7kg) and has larger feet and a larger bill (Schodde & Mason 1981, Jackson & Kavanagh 1997). Adults have a piercing downscale territorial call, known commonly as the 'bomb-whistle', and insect-like trilling and churring calls. Owlets utter a noisy, monotonous and insistent rasping call when soliciting food.

The Sooty Owl occurs in Australia and New Guinea. In Australia, an endemic race, *T. t. tenebricosa*, occurs in coastal central and southern Queensland, New South Wales and Victoria; an extralimital historical record from Flinders Island, Tasmania, is considered erroneous (D. Milledge *pers. comm.* to R. Loyn). In eastern Victoria, a sub- population of the Sooty Owl occurs from near Melbourne, east and north-east to the border with New South Wales; within that area, the Sooty Owl is numerically rare (1-9 individuals per 100km^2). Individuals of a small and isolated sub-population in the Strzelecki Range, South Gippsland, were most recently recorded in 1991 (Peake *et al.* in prep.). Elsewhere in Victoria, the Sooty Owl is absent or very rare (<1 individual per 100km^2): sub-populations may occur in the Grampians area (Mees 1964; Schodde & Mason 1981), Otway Ranges (Pescott 1983; Conole 1985), Wombat State Forest (Blakers *et al.* 1984) and Wilsons Promontory (Cooper 1975), but are thus far unconfirmed.

Sooty Owl *Tyto tenebricosa*
(Photo: David Hollands)

Distribution in Victoria
(source: *Atlas of Victorian Wildlife*, NRE 1999)

Victoria
The Place To Be

Extensive surveys in the Grampians, Otway Ranges and Wombat State Forest have not recorded Sooty Owl; however Wilsons Promontory has been inadequately surveyed for this species, and further investigation is needed in this area (E. McNabb *pers. comm.*).

The Sooty Owl is considered to be long-lived (decades) and mates for the life of a partner. It is sedentary, strongly territorial and occupies a large home-range. It roosts in dense shrubby vegetation, tree-hollows, caves, and ledges or crevices on rock faces; and nests in large tree-hollows and occasionally in caves. The Sooty Owl may breed every year and has a variable breeding season with autumn-winter and early spring peaks (Hyem 1979; Debus 1994); it lays only one clutch of one or two eggs in any breeding year (Schodde & Tidemann 1986) and rarely raises more than one fledgling (Peake *et al.* in prep.).

In south-eastern Australia, the Sooty Owl feeds on arboreal mammals, such as the Sugar Glider *Petaurus breviceps* and Common Ringtail Possum *Pseudocheirus peregrinus*; scansorial mammals, such as the Agile Antechinus *Antechinus agilis* and the introduced Black Rat *Rattus rattus*; and terrestrial mammals, such as the Bush Rat *R. fuscipes*, Long-nosed Bandicoot *Perameles nasuta*)and Dusky Antechinus *A. swainsonii*; birds, reptiles and invertebrates are sometimes taken (Silveira 1997: Table 1; Kavanagh & Jackson 1997; McNabb & Quin *in prep.*). Examination of regurgitated pellets containing indigestible remains of prey has shown that the proportions of arboreal and terrestrial mammals in the diet vary with locality and growth stage of the habitat (e.g. Smith 1984; Loyn *et al.* 1986; McNabb & Quin in prep.).

In Victoria, the Sooty Owl occurs in closed forests (rainforests), tall open-forests and some open-forests across a range of Ecological Vegetation Classes (EVCs):

- in East Gippsland, Cool Temperate Rainforest, Warm Temperate Rainforest, Wet Forest, Damp Forest, Riparian Forest, Montane Forest and Riparian Scrub (CRA 1996: F31);
- in the Central Highlands, Montane Wet Forest, Montane Damp Forest, Wet Forest and Riparian Forest (Lumsden *et al.* 1991; CRA 1997: 263); and
- in the North East, Damp Forest and Herb-rich Foothill Forest and, more rarely, Shrubby Dry Forest and Montane Dry Woodland (Loyn *et al.* 2001).

Within the EVCs of the North East, the Sooty Owl favours wetter sites, in gullies and mid-slopes, with many dead hollow-bearing trees and with understorey and middle storey plants such as Silver Wattle *Acacia dealbata*, Blanket-leaf *Bedfordia arborescens* and Tree-ferns *Dicksonia* and *Cyathea* (Loyn et al. 2001).

In Mountain Ash *Eucalyptus regnans* forest in the Central Highlands, Sooty Owls were found more often in old stands (>165 years) than in younger regrowth (40-80 years) (Loyn 1985; Milledge *et al.* 1991). In East Gippsland, Kutt (1994) recorded the Sooty Owl at higher densities in un-thinned 25-35 year-old regrowth forest (ten transects) than in thinned forest of the same age (11 transects) or selectively logged old forest (five transects), perhaps as a result of differing observability. In North-eastern Victoria, Loyn *et al.* (2001) recorded the Sooty Owl at 9% of Mixed Mature-Senescent sites (2 of 22), 4% of Mature sites (11 of 308) and 3% of Mixed Regrowth-Mature sites (2 of 79).

Debus (1994) tentatively estimated that there were between 2 000 and 7 000 pairs of Sooty Owl in the Australian population, and that half of those occurred in NSW. Thus, Victoria and Queensland together would contain the remaining 1 000 to 3 500 pairs.

Robinson (1989) estimated that there were fewer than 500 pairs in Victoria. Since then, systematic surveys have been conducted during which the Sooty Owl was recorded from 7.9% of owl survey sites (145 of 1 831) in eastern Victoria (Benalla/Mansfield, Central, Central Gippsland, Dandenong, East Gippsland, Tambo, Wangaratta and Wodonga FMAs) (Silveira 1997). The detection rate for the Sooty Owl during those surveys was between one detection per 40 and 89km^2 (if the survey procedure covered circular areas with radii of 1.5 or 1.0 km at each of the survey sites). Eastern Victoria had 46 381 km^2 of 'tree cover' remaining in 1996, excluding 1,728 km^2 of other public land which included large areas of pine plantation (R. Willig NRE, *in litt.*). If, for argument sake, all of that area was surveyed for the Sooty Owl, the above detection rate suggests that there would have been between 521 and 1 160 detections. Given that one detection does not necessarily indicate one breeding pair, the population size in eastern Victoria may be of the order of about 400 to 900 breeding pairs. That estimate will need to be revised after follow-up searches conducted at detection sites determine the proportion of those sites that are occupied by breeding pairs, and after the extent of potential Sooty Owl habitat is determined for eastern Victoria.

Kavanagh & Jackson (1997) radio-tracked an unpaired adult male Sooty Owl in the extensively burnt Royal National Park, NSW, and adjacent areas. They found that the home-range of the adult male over a ten-month period was 9.7km long and 5km wide, and between 2 751 and

3 481ha in area, although only about a third of that area was used. Their results contrasted with the previous estimate of 500ha per *pair* by Chafer & Anderson (1994) for the same locality. Preliminary analysis of data from another radio-telemetry study-site in NSW suggested a home-range for the Sooty Owl in the order of 600 to 700ha of good-quality habitat (R. Kavanagh *pers. comm.* to R. Loyn).

Current conservation status

Garnett (1992)	Rare (Aust.)
NRE (2000)	Vulnerable (Vic.)
SAC (1991)	Threatened (Vic.)

The Sooty Owl has been listed as a threatened species under the **Flora and Fauna Guarantee Act 1988**. The Sooty Owl is dependent on closed forests (rainforests), tall open-forests and some open-forests; clearance and logging of those habitats has probably removed or modified a significant proportion of its former habitat. In eastern Victoria, from Melbourne to the NSW border, the area of native 'forest' (all woody vegetation with a height greater than 2m and a foliar cover greater than 10%) has decreased from 85 170km^2 in 1869 to, at most, 47 207km^2 in 1987 (Woodgate & Black 1988: Tables 2, 4); an overall loss of at least45%. A decline in the population of the Sooty Owl may have already occurred commensurate with the loss of habitat (SAC 1991). This probable population decline has left the Sooty Owl more susceptible to catastrophic events (SAC 1991), such as extensive wildfire. Furthermore, habitat may now be fragmented, exposing the Sooty Owl to the threats of reduced dispersal opportunity and genetic isolation (SAC 1991). It is estimated that hollows suitable for owls do not form, even in the fastest-growing eucalypts, until they are at least 150-200 years of age (Parnaby 1995). Over much of its range, the lack of suitably large hollows is considered to be a limiting factor to successful breeding and population recruitment. The Sooty Owl is, therefore, vulnerable to land management practices that reduce the availability of these tree hollows now or in the future. The loss of hollow-bearing trees has been listed as a potentially threatening process under the Flora and Fauna Guarantee Act (SAC 1991b). In its final recommendation the Scientific Advisory Committee (SAC 1991a) determined that the Sooty Owl is:

- significantly prone to future threats which are likely to result in extinction; and
- very rare in terms of abundance or distribution.

Major Conservation Objective

For an endangered species to retain its "potential for evolutionary development in the wild" an effective population size (N_e) of 500-1 000 is considered "appropriate at this time" by Franklin & Frankham (1998), although contested as being too small by Lynch & Lande (1998). This would suggest that the Sooty Owl population should be maintained at least at its current level throughout south-eastern Australia.

At this point, the short-term conservation objective is to prevent further population decline by maintaining good-quality habitat for a population target of at least 500 breeding pairs of Sooty Owl on public land in Victoria. This strategy assumes that additional undiscovered pairs of Sooty Owl will continue to survive in areas not specifically protected. The long-term objective is to return the Sooty Owl to a secure conservation status in the wild by increasing numbers in potentially suitable areas where the Sooty Owl is now scarce. This can be achieved by maintenance and restoration of its habitat across all land tenures. This strategy follows the approach developed for Powerful Owl*s (Ninox strenua)* by Webster *et al.* (1999).

Management issues

Ecological issues specific to the taxon

The Sooty Owl requires large tree-hollows in which to nest. The provision of a continual supply of those hollows is dependent upon appropriate forest-management strategies being implemented. The species also requires suitably-sized home-ranges that incorporate preferred nesting, roosting and foraging habitats that will provide sufficient numbers of prey. Those home-ranges should be spaced sufficiently closely to ensure that individual pairs do not suffer the consequences of isolation.

Wider conservation issues

Actions implemented to conserve and protect the Sooty Owl throughout its range will benefit other threatened species that share some or all of its habitat. Those include the endangered Leadbeater's Possum *Gymnobelideus leadbeateri*, endangered Long-footed Potoroo *Potorous longipes*, endangered Square-tailed Kite *Lophoictinia isura*, vulnerable Glossy Black Cockatoo *Calyptorhynchus lathami*, endangered Powerful Owl and endangered Masked Owl *Tyto novaehollandiae*. Measures already implemented to conserve Leadbeater's Possum (Macfarlane & Seebeck 1991) will benefit the Sooty Owl in the Central Highlands by protecting large hollow-bearing trees. Similar measures to protect habitat elsewhere will also benefit the Sooty Owl. The loss of hollow-bearing trees has been listed as a potentially threatening process under the **Flora and Fauna Guarantee Act 1988** (SAC 1991) and an Action Statement is being prepared. The development of management

actions necessary to reverse the decline in the number of hollow-bearing trees across public and private land will help to conserve the Sooty Owl. Actions already being undertaken to protect vegetation communities (e.g. old-growth forest) will also help to conserve the Sooty Owl.

Previous management action

A range of forest planning processes have been designed to help conserve forest fauna including hollow-dependent species such as the Sooty Owl. These include land use decisions, creation of parks, development of Codes of Practice (e.g. NRE 1996a), Forest Management Plans (e.g. CNR 1995; NRE 1996b) and prescriptions for retaining hollow-bearing trees on logged coupes.

The following actions relate more specifically to the Sooty Owl. Surveys for the Sooty Owl were conducted opportunistically and systematically during vertebrate surveys of various Land Conservation Council study areas and various Department of Conservation, Forests and Lands (now Department of Natural Resources and Environment [NRE]) forest blocks in Victoria. A study of the distribution and ecology of the Sooty Owl was conducted in the Mountain Ash forests of the Central Highlands (Milledge *et al.* 1991; Milledge 1994, 1996) as part of a continuing program of NRE research on forest wildlife. Surveys for the Sooty Owl were conducted in East Gippsland to provide baseline information for the generation of owl conservation strategies in that region (McIntyre & Bramwell in prep.; McIntyre & Henry in prep.). The East Gippsland Forest Management Plan (FMP) (CNR 1995) mapped good-quality habitat to support 131 pairs of Sooty Owl within the East Gippsland Forest Management Area (FMA). The Central Highlands FMP (NRE 1998) proposes to protect good-quality habitat to support at least 100 pairs of Sooty Owl within the Central Highlands FMA. Surveys of the Sooty Owl were conducted in Central Gippsland, North East Victoria and the Midlands (Loyn 1996; McNabb *et al.* 1997; Loyn et al. 2001 and unpublished) to provide baseline information for the RFAs and FMPs. Sites were selected on a tenure-blind basis, that is, regardless of whether they were in conservation reserves or state forest. A targeted assessment of the Sooty Owl (Silveira 1997) was prepared from the literature, from discussions with NRE biologists then conducting owl surveys, and from discussions with other biologists, for use in the North East FMP. Data from the North East surveys were modelled to produce maps of predicted distribution of the Sooty Owl in the North East, and this model was used to aid selection of best habitat for Sooty Owl Management Areas (SOMAs).

Intended management action

Identification of owl sites

1. Identify 500 SOMAs on public land across the known Victorian range (identification of the sites in state forest will occur as part of the FMA planning process: see Action 4). SOMAs should be based on locating probable breeding areas based on the occurrence of owlets or roosting pairs of adults and on habitat identified by habitat modelling as suitable and may overlap with management areas established for other species. Habitat models will be progressively tested and refined. A notional breakdown of the number of SOMAs to be protected within FMAs to meet designated targets is shown in Table 1. Sooty Owl breeding areas in excess of the target number will also be subject to specific management requirements.

   Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division), Parks Victoria

2. Ensure that the SOMA selection criteria will result in an appropriate distribution of sites across conservation reserves and state forest, with preference given to the protection of suitable habitat within the conservation reserves. Final allocation of SOMAs will depend on the distribution of SOMAs across the range of habitats and on the protection of known breeding sites. Priority will be given to allocations in large conservation reserves

TABLE 1: Target Number Of Sooty Owl Management Areas (SOMAs) In Forest Management Areas

Forest Management Area	*Tree cover (km^2)[1]*	*Number of SOMAs*	*Proportion of State target (%)*
Central Highlands	5 754	65	13
North East	13 740	100	20
Central Gippsland	10 635	125	25
Tambo	5 266	79	16
East Gippsland	10 986	131	26
TOTAL	**46 381**	**500**	**100**

where the home-range is protected within the conservation reserve.

Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division), Parks Victoria

Protection in state forest

3. Sooty Owl Management Areas (SOMAs): Where clear-fell or seed-tree systems are used, each SOMA will comprise 500ha of forest to be managed as a Special Protection Zone (SPZ). For SOMAs based on specific records (rather than habitat-modelling), the SPZs will fall within a 3.5km radius (approximately 3 800 ha) of the record. The 500ha will be bounded by recognisable features, preferably natural, such as ridgelines; sub-catchments or groups of sub-catchments will be ideal. The 500ha will maximise habitats known to be used by the Sooty Owl, such as forest in headwaters; old-growth forest in gullies; forest with a diversity of preferred EVCs; forest of the preferred growth stages, such as Mixed Senescent-Mature, otherwise Mature or Mixed Senescent-Mature-Regrowth; forest with large and/or dead hollow-bearing trees; forest with abundant Silver Wattle, Tree-ferns and Blanket-leaf; and forest in deep gullies. The SOMAs should avoid extensive areas of forest known to be less suitable, forest <28 m tall, treeless areas, regrowth forest or any of the dry EVCs.

Responsibility: DSE (Parks and Forests Division; Regions)

4. Sooty Owl Management Areas (SOMAs): Where selective harvesting is used, manage areas of approximately 1 000ha to maintain habitat capable of supporting adequate populations of terrestrial and arboreal prey mammals to support breeding owls. SOMAs based on specific records will comprise 3ha SPZs around the records plus SMZs of about 1 000ha which will allow for modified timber harvesting practices that retain sufficient levels of habitat trees. SOMAs based on habitat modelling will comprise solely the approximately 1 000ha SMZs. Special Management Zone Plans will be prepared specifying the prescriptions to be applied within SMZs for Sooty Owl and will become part of the relevant Regional prescriptions.

Responsibility: DSE (Parks and Forests Division; Regions)

5. All confirmed nesting and roosting sites utilised recently and frequently (based on reliable observation or physical evidence such as pellets or wash) located outside SOMAs will be protected by a 3ha SPZ around the site and a 250-300m radius (or equivalent linear area) SMZ buffers around identified localities, unless they are already protected. In these cases, habitat for foraging is provided in areas excluded from timber harvesting by general prescription including wildlife corridors, steep areas and unmerchantable areas and areas protected for other management purposes.

Responsibility: DSE (Parks and Forests Division; Regions)

6. Monitor a subset of known sites at no more than two-year intervals within each five-year period to determine persistence of the Sooty Owl (and breeding success, if practical without undue disturbance to the birds).

Responsibility: DSE (Parks and Forests Division; Regions)

Protection in conservation reserves

7. Locate and protect all Sooty Owl sites within the conservation reserve system, and monitor a sample of these sites. Provide 500ha of continuous habitat free from disturbance around each Sooty Owl site in larger conservation reserves. In smaller conservation reserves, protect as much suitable habitat as possible and endeavour to obtain co-operative management from adjoining landowners. Avoid the development of intensive recreational facilities near known nest and roost trees and discourage public access to breeding areas.

Responsibility: Parks Victoria

Protection on other Crown land

8. Identify and exempt from sale other blocks of Crown land that have conservation values, such as suitable nesting, roosting, foraging and dispersal habitats, for the Sooty Owl. Subsequent site protection should include measures equivalent to those in Action 3, dependent on block size, location, viability and reservation status. Examination of Crown land for the occurrence of good-quality Sooty Owl habitat will be mandatory prior to sell-off or conversion to leasehold/freehold. Planning permit applications (Native Vegetation Retention planning amendment referrals, mining, etc.) will be assessed in line with the major conservation objective of protecting 500 SOMAs across the Victorian range of the Sooty Owl. Some applications may have to be withheld if areas of Crown land are required for protection.

Responsibility: DSE (Regions)

Protection on private land

9. Encourage and assist municipal councils to develop conservation mapping and GIS overlay systems within planning schemes to improve

information on Sooty Owl habitat and breeding sites across private land.

Responsibility: DSE (Regions)

10. Implement provisions of local planning schemes, the **Flora and Fauna Guarantee Act 1988** and the **Planning and Environment Act 1987**, to ensure that municipal councils meet objectives and obligations to protect Sooty Owl habitat on private land when considering land-use change.

Responsibility: DSE (Regions), local government authorities

11. Encourage private landowners to enter into voluntary agreements (e.g. *Trust for Nature* covenants, *Land for Wildlife* scheme) to protect Sooty Owl sites on private land. Planning permit applications (subdivision, Native Vegetation Retention, mining) will be assessed in line with the major conservation objective of protecting breeding sites on private land.

Responsibility: DSE (Biodiversity and Natual Resources Division; Regions), Trust for Nature, Catchment Management Authorities, local government authorities

Community involvement and extension

12. Prepare and distribute an information pamphlet and record card to reach potential observers through established networks, such as Birds Australia, Bird Observers Club of Australia, Field Naturalists Club of Victoria, *Land for Wildlife* scheme, Trust for Nature and the Victorian National Parks Association, to encourage the community to report known nest and roost sites, and general sightings of the Sooty Owl.

Responsibility: DSE (Biodiversity and Natual Resources Division)

Research

13. Undertake demographic studies of the Sooty Owl to determine, amongst other parameters, the annual mortality rates of adult males, adult females, sub-adults and fledglings; and the annual variation in those rates.

Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division)

14. Undertake studies to determine specific nesting, roosting, foraging and dispersal habitat requirements and ecological requirements so that management strategies can be improved on a continuous basis.

Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division)

15. Undertake studies to determine the home-range and territory sizes of the Sooty Owl in different habitat-types and in habitats of varying quality.

Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division)

Review

16. When new research information becomes available, it may be possible to refine the management approach to focus specifically on habitat elements actually used by Sooty Owls. In that case, it may be possible to meet management objectives more effectively by conserving those elements widely in the landscape, rather than through the current approach of site-based SOMAs. New information of that sort should trigger a review of this Action Statement, ahead of the statutory review period. Targeted and innovative research is the key to obtaining information needed to make such a change of strategy, and the research effort should be planned with this as a possible goal.

Responsibility: DSE (Biodiversity and Natual Resources Division, Parks and Forests Division)

Other desirable management action

17. Undertake survey and research including:

- further surveys for the Sooty Owl in the Grampians area, Otway Ranges, Wombat State Forest/Mt Macedon area, Strzelecki Range and Wilsons Promontory to determine whether sub-populations exist in those areas so that SOMAs can be identified if required. Wilsons Promontory is the highest priority for survey work.
- Population Viability Analysis modelling for the Sooty Owl in Victoria using software developed for the Powerful Owl, when sufficient data have been collected. Population targets of the Sooty Owl may be revised accordingly.
- studies to determine the suitability of artificial hollows for use as nests by the Sooty Owl.
- dietary studies in all major habitat-types occupied by the Sooty Owl in order to determine foraging habitat.
- telemetry studies to determine the extent of dispersal and recruitment of sub-adults into the established population, and movements and home-range size of breeding adults.

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: http://www.dse.vic.gov.au

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