

FPA PLANNING GUIDELINE 2008/1



An internal planning framework developed by the Forest Practices Authority for the purposes of delivering management prescriptions through the threatened fauna adviser to avoid or limit the clearance and conversion of significant habitat for threatened forest fauna.

FPA

FOREST PRACTICES AUTHORITY

(Revised October 2013)

1. INTENT OF THIS FRAMEWORK

This document provides a planning framework to avoid or limit the clearance and conversion of significant habitat of threatened fauna habitat to non-native vegetation cover such as plantations, agriculture and infrastructure. The framework does not deal with the reservation of habitat, which is addressed through other statutory mechanisms.

Nothing in this document is intended to preclude existing uses that are undertaken in such a manner that habitat for threatened fauna are maintained in the long term. It does not seek to limit or restrict the harvest of native forest types where forest management ensures the successful regeneration and long-term maintenance of habitat for threatened fauna nor does it cover the establishment of plantations on previously cleared agricultural land or existing plantations (standard operational planning and the *Forest Practices Code* will still apply in these cases). These activities are covered by endorsed management prescriptions for threatened fauna delivered via existing processes in accordance with procedures agreed between the Forest Practices Authority and Department of Primary Industry, Parks, Water and Environment (DPIPWE) (see Section D3.3, *Forest Practices Code 2000*). Specific prescriptions for the management of threatened species are detailed in the Threatened Fauna Adviser, which is subject to review by the Scientific Advisory Committee established under the *Threatened Species Protection Act 1995* and the Forest Practices Advisory Council established under the *Forest Practices Act 1985*.

This framework will be delivered via existing forest practices plan processes in accordance with procedures agreed between the Forest Practices Authority and DPIPWE. It may also be delivered through the public authority management agreement (PAMA) process under the Tasmanian *Threatened Species Protection Act 1995*.

2. BACKGROUND

The management of threatened fauna species in Tasmania is covered by legislation and processes that include the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the Tasmanian *Threatened Species Protection Act 1995*, the Tasmanian *Nature Conservation Act 2002*, and the Tasmanian *Regional Forest Agreement 1997*. These recognise that a variety of mechanisms are needed to achieve ecologically sustainable forest management with respect to fauna species of high conservation significance. There are three primary elements to the current approach in Tasmania:

- the development of a Comprehensive, Adequate and Representative (CAR) reserve system that protects (through reservation) habitat for fauna of high conservation significance
- the maintenance of a permanent native forest estate to ensure that a forest resource base is maintained for all its various values, including fauna values
- ecologically sustainable forest management practice under the *Forest Practices Code* that takes into account the requirements of current legislation, agreements, and recovery plan actions.

Applications to convert native vegetation to plantations and non-forest land use are processed by the Forest Practices Authority in accordance with the Tasmanian Government Policy for Maintaining a Permanent Native Forest Estate (September 2011) and the planning system under the *Forest Practices Act 1985* which includes the *Forest Practices Code 2000* and associated planning tools (e.g. *Biodiversity Values Database*, *Threatened Fauna Adviser* (TFA) and *Forest Botany Manuals*). These planning tools have been developed to guide and facilitate decision-making at the operational or coupe level (e.g. area covered by a single forest practices plan). Some planning work has been conducted to develop decision-making tools for the landscape-level (i.e. multiple coupes). Many of the prescriptions outlined in current operational planning tools are provided on the assumption that there will be successful native vegetation regeneration post-harvest and subsequent recovery of threatened species and their habitats. This is not the case for forest practices plan applications that seek to make long term or permanent changes to threatened species habitat through conversion to non-native vegetation. The number of applications that seek to convert threatened species habitat has declined following the amendment of the Australian Forestry Standard in 2007, which now disallows the broad scale conversion of native forest. Conversion of native forest has now ceased on State forest but continues at a reduced level on private land. The Tasmanian Government's Policy on the Maintenance of the Permanent Forest Estate permits broad scale conversion to occur within specified thresholds until 2015.

A more strategic approach to the loss of threatened species habitat is required due to the cumulative impact of previous conversion and the rate of continuing conversion within the range of threatened fauna in Tasmania. This framework addresses this issue and will assist with the maintenance of significant habitat for threatened fauna.

3. DEFINITIONS

All terminology used in this document is in accordance with definitions as outlined in the Tasmanian Regional Forest Agreement (1997), the Threatened Species Strategy for Tasmania (2000) and Tasmania's Nature Conservation Strategy (2001), unless otherwise defined below.

Adaptive Management is the acquisition of additional knowledge from research and monitoring and the application of that information to ensure the continuing improvement of management practices.

Biodiversity Values Database is a planning tool designed to assist forest planners to determine which threatened species or habitat requires consideration in the development of a Forest Practices Plan. The BVD was previously known as the Threatened Fauna Manual and then the Fauna Values Database and is formally recognised as an endorsed planning tool in Section D3.3 of the Forest Practices Code.

Conversion is the meaning instead of "clearance and conversion" as defined in s.3 of the *Forest Practices Act 1985*. It includes the clearance of native vegetation and its replacement with non-native vegetation, such as plantation forest (includes hardwood and softwood plantations), agricultural grasses and crops. It also includes clearance of native vegetation for urban and coastal sub-divisions, and other such purposes (i.e. non-forestry activities).

Core range encompasses the area, within the known range, known to support the highest densities of the species and/or thought to be of highest importance for the maintenance of breeding populations of the species.

Coupe is an area of forest that is planned for timber harvesting as a single unit. It may contain

more than one silvicultural objective, such as a number of discrete gaps or clearfells or a combination of both.

Environment Protection and Biodiversity Conservation Act 1999 relates to the protection of the environment and the conservation of biodiversity, and for related purposes.

Environment includes:

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) natural and physical resources; and
- (c) the qualities and characteristics of locations, places and areas; and
- (d) heritage values of places; and
- (e) the social, economic and cultural aspects of a thing mentioned in a, b, c or d.

Forest practices are defined as per the Tasmanian *Forest Practices Act 1985*, i.e.:

- (a) the processes involved in establishing forests, growing or harvesting timber, clearing trees or clearing and converting threatened native vegetation communities; and
- (b) works (including the construction of roads and the development and operation of quarries) connected with establishing forests, growing or harvesting timber or clearing trees.

Forest Practices Act 1985 provides for the administration of the forest practices system through the Forest Practices Authority.

Forest Practices Advisory Council (FPAC) is a representative body of stakeholders which provide technical advice, established under the *Forest Practices Act 1985*.

Forest Practices Authority is an independent statutory body responsible for administering the Tasmanian forest practices system. The system regulates the management of forest and threatened non-forest vegetation on both public and private land.

Habitat is the area, locality, site or particular type of environment, or any part of them, occupied or used by any flora or fauna.

Known range (or actual range) is the area within which the species is most likely to occur, being the area of land within a minimum convex polygon of all known localities of the species. This term is synonymous with 'extent of occurrence' as referred to in the *Guidelines for Eligibility for listing under the Threatened Species Protection Act 1995* (DPIPWE 2009).

Mature forest Forests are classified as mature when they are about 100 years old and begin to develop structural features typically found in older forests.

Native vegetation is all native forest and native non-forest vegetation.

Potential habitat is all habitat types within the potential range of a species that are likely to support that species in the short and/or long term. It may not include habitats known to be occupied intermittently (e.g. occasional foraging habitat only). *Potential habitat* is determined from published and unpublished scientific literature and/or via expert opinion, is agreed by the Threatened Species Section (DPIPWE) in consultation with species specialists.

Potential range includes the known range, but also includes the area within which the species has not been found but may occur based on environmental conditions.

Prescription: a detailed specification of the objectives, areas, procedures and standards for tasks to be undertaken.

Reserve includes all Informal and Formal reserves that form Tasmania's Comprehensive, Adequate and Representative (CAR) reserve system (CofA and SofT 1997).

Significant habitat is habitat within the known range of a species that (1) is known to be of high priority for the maintenance of breeding populations throughout the species range and/or (2) conversion, of which, to non-native vegetation is considered to result in a long term negative impact on breeding populations of the species. It may include areas that do not currently support breeding populations of the species but that need to be maintained to ensure the long-term future of the species. *Significant habitat* is determined from published and unpublished scientific literature and/or via expert opinion, agreed by the Threatened Species Section (DPIPWE) in consultation with species specialists.

Threatened fauna includes all fauna species listed on Schedules 3, 4 and 5 of the Tasmanian *Threatened Species Protection Act 1995* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threatened Fauna Adviser (TFA) is a decision-support system developed by the Forest Practices Authority, in consultation with DPIPWE, specialists and the forest industry, to deliver management recommendation for forest-dependent threatened fauna in wood production forests.

Threatened Species Protection Act 1995 is an Act to provide for the protection and management of threatened native flora and fauna and to enable and promote the conservation of native flora and fauna.

Threatened Species Section (TSS) is a section of the Biodiversity Conservation Branch of the Department of Primary Industries Park, Water and Environment (DPIPWE).

4. AIMS AND OBJECTIVES

It is generally accepted that the 'sustainable management' of threatened fauna includes the maintenance of viable populations across the species range, and the opportunity of species to interchange genetic diversity across their range. This objective is met by a combination of formal and informal reserves and by 'prescription' in 'off-reserve' areas.

The overall aim of this framework is to contribute to the maintenance of viable populations, across the species' range, by maintaining *significant habitat* of any threatened fauna species as part of the native vegetation estate taking into account for each species factors such as:

- the degree and type of areas set aside for reservation
- previous and potential loss of habitat
- threatening processes and land management within its range
- fragmentation of habitat and the impact on habitat through adjacent land use
- the life cycle and species susceptibility to human disturbance.

The framework aims to avoid the conversion of *significant habitat* to non-native vegetation cover where the conversion is assessed as having a long term and detrimental effect on the species and its habitat. This aim is in accordance with the concept of sustainable forest management, National Principles for Plantation Establishment 1995, the native vegetation clearance objectives of the Threatened Species Strategy for Tasmania 2000, actions recommended in Tasmania's Nature Conservation Strategy 2001, the Principles and Criteria of the Australian Forestry Standard (criteria 4.3.2) and the Forest Stewardship Council 2004 (criteria 6.10) and numerous other national and international level statements and policies.

The objectives of this framework are to:

- 4.1 Ensure that *significant habitat* for threatened fauna on public and private land (including remnants) is maintained as part of the permanent native vegetation estate and for broader biodiversity purposes by avoiding its conversion to non-native vegetation.
- 4.2 Foster research and strategic level planning to assist the identification of *significant habitat*, including habitat modeling and mapping, and the development of management prescriptions for species in those areas that are retained as native vegetation.
- 4.3 Monitor and review to ensure that actions to meet objectives 4.1 and 4.2 are implemented and that they are effective.

5. FAUNA SPECIES COVERED BY THIS FRAMEWORK

Table 1 lists the 32 fauna species covered by this framework. This species list includes those for whom conversion of *significant habitat* to non-native vegetation land use has been identified (in published and unpublished scientific literature or via expert opinion) as having a long-term negative impact on populations of the species. These species are listed in the Schedules of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and/or the Tasmanian *Threatened Species Protection Act 1995*. Summary information for these species is included in Appendices A and B. Each species has a *significant habitat* description endorsed by DPIPWE, as determined from published information and expert opinion reviewed during the development of the Biodiversity Values Database and the revision of the Threatened Fauna Adviser.

The current informal and formal components of the Comprehensive, Adequate and Representative (CAR) reserve system include some *significant habitat* for species in the above categories on both public and private land. The species listed in Table 1 have been identified as being at risk from further conversion of *significant habitat*.

Those threatened fauna species that are not covered by this framework are those where:

- (a) the extent and populations of the species are known to be primarily limited by threatening processes that do not relate to the physical modification of land and water (eg. hunting, fishing, predation by feral animals, diseases), and not limited by the availability of suitable land or water, and/or
- (b) existing management measures are considered adequate for the conservation of the species, and/or
- (c) conservation management is considered best covered by endorsed management prescriptions for threatened fauna delivered via existing processes in accordance with procedures agreed between the Forest Practices Authority and DPIPWE (see Section D3.3, *Forest Practices Code 2000*).

6. SPECIES REVIEW

This framework will be periodically reviewed to ensure that the species list and categories are updated on the basis of new information.

7. ACTIONS

Actions to meet the aims and objectives of this framework as detailed in Section 4 will be implemented on both public and private land.

7.1 Retention of current *significant habitat* for all species.

All *significant habitat*, as currently agreed with DPIPWE and delivered through the Biodiversity Values Database (available via FPA Services on the FPA web-site), will be maintained other than in those circumstances where ‘Exercise of Discretion’ applies (Section 9).

7.2 Surveys within *potential habitat* of all species.

Surveys may be required at the discretion of the Forest Practices Authority (following consultation with the Threatened Species Section, DPIPWE) to confirm habitat status or the presence/absence of a species and habitat status of adjacent land, to assist with decisions regarding any proposed conversion of *potential habitat*, outside of *significant habitat*. *Potential habitat* definitions are delivered through the Biodiversity Values Database (available via FPA Services on the FPA web-site).

7.3 Ongoing review of habitat descriptions (including significant habitat descriptions) and habitat maps.

Habitat descriptions (including significant habitat descriptions) and maps of species range (known, core and potential – where available) have been developed by the Forest Practices Authority, in collaboration with Threatened Species Section, DPIPWE, for all species listed in Table 1 to use in conservation planning on both private and public land. The habitat descriptions and maps will be updated and refined by the Threatened Species Section as new data become available and provided to all users through the Natural Values Atlas, DPIPWE and applied in an Adaptive Management manner. The habitat descriptions and range maps are also provided to forest planners through the Biodiversity Values Database (available via FPA web-site) and industry planning tools (eg., Conserve for State Forest).

8. IMPLEMENTATION AND REPORTING

- 8.1** This framework will be implemented through the Forest practices system under the *Forest Practices Act 1985*.
- 8.2** The Forest Practices Authority will continue to ensure that forest practices plans are certified in accordance with the provisions of this framework.
- 8.3** The Forest Practices Authority will monitor and report on implementation of this framework as part of its annual assessment of Forest practices plans and annual report to Parliament.
- 8.4** The Forest Practices Authority will take action as required under the *Forest Practices Act 1985* to ensure compliance with this framework.
- 8.5** The Forest Practices Authority will monitor the cumulative total of all areas of habitat for threatened fauna approved for conversion under forest practices plans.
- 8.6** The Forest Practices Authority, in consultation with the Threatened Species Section (DPIPWE), will make decisions based upon the data for areas converted within its forest practices plan database, except where more accurate information is available on the basis of revised mapping or assessments.

9. EXERCISE OF DISCRETION BY THE FOREST PRACTICES AUTHORITY IN CONSULTATION WITH THE THREATENED SPECIES SECTION, DPIPWE.

In exceptional circumstances the Forest Practices Authority will exercise its discretion to approve a forest practices plan where it is decided, following consultation with the Threatened Species

Section, DPIPWE that the conversion of *significant habitat* will not substantially detract from the conservation status of the species. Factors that may be taken into account will include: the quality of the habitat; the presence/absence of the species in an area (as determined from surveys); the importance of the area for the connectivity of *potential habitat* (includes *significant habitat*); and the extent to which the loss of habitat may be offset through improved conservation measures within the immediate range of the affected species.

10. APPLICATION FOR COMPENSATION WHERE CLEARANCE AND CONVERSION OF THREATENED SPECIES HABITAT IS REFUSED.

An entitlement to compensation may arise under the *Nature Conservation Act 2002* where a forest practices plan is refused or amended by the Forest Practices Authority for the purpose of protecting a threatened species or protecting a threatened native vegetation community from clearance and conversion. Where an entitlement to compensation under the Act is not paid in accordance with the provisions of the Act, the Forest Practices Authority has no power to refuse to certify a forest practices plan on the grounds that implementation of the plan would adversely affect a threatened species of flora or fauna or a threatened native vegetation community which has previously been considered by the Forest Practices Authority in respect of that plan.

11. REVIEW OF THE FRAMEWORK

- 11.1** This framework and its implementation will be reviewed by the Forest Practices Authority on an ongoing basis. Any proposed substantial changes to this framework will be submitted to the Scientific Advisory Committee and the Forest Practices Advisory Council for review and advice to the board of the Forest Practices Authority.
- 11.2** The Forest Practices Authority and forest managers will receive progressive updates and revised mapping and descriptions of *significant habitat* from the Threatened Species Section, DPIPWE. This information will be used by the Forest Practices Authority to provide a basis for monitoring changes in the extent and nature of *significant habitat*, through forestry activities, for the threatened fauna included in this framework. The results of this monitoring will be supplied to the Threatened Species Section, DPIPWE as required.

Table 1 Threatened fauna species covered by this framework.

Species	Conservation Status*	Year of listing on TSP Act
Ptunarra brown butterfly, <i>Oreixenica ptunarra</i>	v	Listed in 1995.
Giant velvet worm, <i>Tasmanipatus barretti</i>	r	Listed in 1995.
Blind velvet worm, <i>Tasmanipatus anophthalmus</i>	EN e	Listed in 1995
Burnie burrowing crayfish, <i>Engaeus yabbimunna</i>	VU v	Listed in 1995
Scottsdale burrowing crayfish, <i>Engaeus spinicaudatus</i>	EN e	Listed in 1995
Central north burrowing crayfish, <i>Engaeus granulatus</i>	EN e	Listed in 2005
Hydrobiid snail, <i>Beddomeia briansmithi</i>	v	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. capensis</i>	e	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. fromensis</i>	e	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. lodderae</i>	v	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. ronaldi</i>	e	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. turnerae</i>	r	Listed in 1995.
Hydrobiid snail, <i>B. waterhouseae</i>	e	Listed in 1995. Uplisted in 2008.
Hydrobiid snail, <i>B. wiseae</i>	v	Listed in 1995. Uplisted in 2008.
Broad-toothed stag beetle, <i>Lissotes latidens</i>	EN e	Listed in 1995.
Burgundy snail, <i>Helicarion rubicundus</i>	r	Listed in 1999.
Bornemisszas stag beetle, <i>Hoplogonus bornemisszai</i>	CR e	Listed in 1999.
Vandershoors stag beetle, <i>Hoplogonus vanderschoori</i>	VU v	Listed in 1999.
Simsons stag beetle, <i>Hoplogonus simsoni</i>	VU v	Listed in 1995.
Swan galaxiid, <i>Galaxias fontanus</i>	EN e	Listed in 1995.
Wedge-tailed eagle, <i>Aquila audax fleayi</i>	EN e	Listed in 1995.
White-bellied sea eagle, <i>Haliaeetus leucogaster</i>	v	Listed in 2004.
Forty-spotted pardalote, <i>Pardalotus quadragintus</i>	EN e	Listed in 1995.
Grey goshawk, <i>Accipter novaehollandiae</i>	e	Listed in 1995. Uplisted in 2000.
Swift parrot, <i>Lathamus discolor</i>	EN e	Listed in 1995. Uplisted in 2000.
New Holland mouse, <i>Pseudomys novaehollandiae</i>	VU e	Listed in 1995. Uplisted in 2000.
Dwarf galaxias, <i>Galaxiella pusilla</i>	VU v	Listed in 1995. Uplisted in 2008.
Skemps snail, <i>Charapiolae</i> sp.	r	Listed in 1999.
Mt Mangana stag beetle, <i>Lissotes menalcas</i>	v	Listed in 1995. Downlisted in 2012.
Keeled snail, <i>Tasmaphena lamproides</i>	r	Listed in 1999.
Tasmanian Masked owl, <i>Tyto novaehollandiae castanops</i>	VU e	Listed in 2002.

* CR = critically endangered under Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), EN and e = endangered under Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Tasmanian *Threatened Species Protection Act 1995* (TSP Act), respectively. VU and v = vulnerable under EPBC Act and TSPA Act, respectively. r = rare under TSPA Act.

Appendix A

Background information on the species covered by this guideline is provided here. See also Background document 2 from the Threatened Fauna Adviser Review (available on the FPA web-site).

Current potential and significant habitat descriptions can be found on the FPA Biodiversity Values Database (www.fpa.tas.gov.au) or following the link [here](#). Range boundaries for each species can be found on the FPA Biodiversity Values Database through the link to the web map. Click [here](#) to be taken to the web map.

VERTEBRATES

1. Grey goshawk, *Accipiter novaehollandiae*

1.1 Conservation status

Uplisted in 2000. Endangered (Tasmanian *Threatened Species Protection Act 1995*), due to continuing decline in numbers of mature individuals and all individuals in single population of less than 250 mature individuals. A high proportion of core habitat is in unprotected areas.

1.2 Range, potential and significant habitat

See the Biodiversity Values Database

1.4 Impacts of conversion.

One of the key threats for the grey goshawk is widespread native vegetation clearance, especially conversion to plantation or non-forest land use leading to permanent loss of mature forest. This eliminates nest sites and reduces the availability of prey items.

1.5 References

Brereton, R 1993, *The grey goshawk (Accipiter novaehollandiae) in Southern Tasmania*, a report to the Forestry Commission, Tasmania.

Brereton, R and Mooney, NJ 1994 'Conservation of the nesting habitat of the grey goshawk *Accipiter novaehollandiae* in Tasmanian State forests', *Tasforests* 6: 79-91.

Mooney, NJ and Holdsworth, M 1988, 'Observations on the use of habitat by the grey goshawk in Tasmania', *Tasmanian Bird Report* 17: 1-12.

Mooney, NJ 1981 Reasons for size differences in forest hawks. *Tasmanian Bird Reort.* 11:4-11.

Olsen, PD, Debus, SJS, Czechura, GV, and Mooney, NJ 1990, 'Comparative feeding ecology of the grey goshawk, *Accipiter novaehollandiae* and brown goshawk *Accipiter fasciatus*', *Australian Bird Watcher*, 13, 178-192.

1.6 Specialists consulted

Nick Mooney, DPIPWE.

Bill Brown, DPIPWE.

Mark Holdsworth, DPIPWE.

Ray Brereton, Hydro Consulting.

Chris Spencer, Forest Practices Authority.

2. Swift parrot, *Lathamus discolor*

2.1 Conservation status

Uplisted in 2000. Endangered (Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to small population size and loss of habitat (foraging and breeding).

2.2 Range, potential and significant habitat

See the Biodiversity Values Database

2.4 Impacts of conversion

- 2.4.1 One of the key threats for the species is widespread conversion of foraging and nesting habitat. The conversion of native vegetation results in a permanent loss of nesting areas and foraging trees. Under short rotation regimes of plantations, these values will not regenerate and therefore conservation is reliant on a strategic approach to ensure retention/reservation of nesting and foraging habitat.
- 2.4.3 Principle management objectives, consistent with the species recovery plan and the RFA, are to protect all foraging and nesting habitat.

2.5 References

- Brereton, R 1997, '*Management Prescriptions for the Swift Parrot in Production Forests*', Report to the Tasmanian RFA Environment and Heritage Technical Committee.
- Brereton, R, Mallick, S and Kennedy, SJ 2004, 'Foraging preferences of Swift Parrot on Tasmanian Blue gum: tree size, flowering frequency and flowering intensity', *Emu*, 104: 377-383.
- Brown, PB 1989, 'The Swift Parrot *Lathamus discolor*: A report on its ecology, distribution and status, including management considerations', Department of Lands Parks and Wildlife.
- Mallick, S, James, D, Brereton, R and Plowright, S 2004, 'Blue-gums *Eucalyptus globulus* in north-west Tasmania: an important food resource for the endangered Swift Parrot *Lathamus discolor*'. *Victorian Naturalist*, 101(1).
- Munks, SA, Richards, K, Meggs, JM and Brereton, R 2004, 'The importance of adaptive management in 'off reserve' conservation for forest fauna: Implementing, monitoring and upgrading swift parrot *Lathamus discolor* conservation measures in Tasmania', *Conservation of Australia's Forest Fauna* (2nd Edition) Ed. Dan Lunney, Royal Zoological Society of NSW, Mosman, NSW.
- Swift Parrot Recovery Team 2001, 'Swift Parrot Recovery Plan', Department of Primary Industries Water and Environment, Hobart.
- Tilyard, P and Potts, B 2003, 'Flowering phenology of *Eucalyptus globulus* in Swift Parrot habitat in eastern Tasmania', Confidential report to Nature Conservation Branch, DPIPWE, Hobart.
- Webb, M, Holdsworth, M and Voogdt, J in prep, 'Nesting requirements of the Swift Parrot in eastern Tasmania', Unpublished report to DPIPWE.
- Wilson, J and Bennet, A 1999, 'Patchiness of a floral resource: flowering of Red Ironbark *Eucalyptus tricarpa* in a box and ironbark forest', *Victorian Naturalist*, 116: 48-53.

2.6 Specialists consulted

Mark Holdsworth, DPIPWE.

Matt Webb, DPIPWE.

Ray Brereton, Hydro Consulting.

Phil Bell, DPIPWE.

3. Wedge-tailed eagle, *Aquila audax fleayi*

3.1 Conservation status

Uplisted in 2000. Endangered (Tasmanian *Threatened Species Protection Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to a low number of successful breeding pairs, loss and disturbance of breeding habitat and high mortality due to persecution and human-related accidents.

3.2 Range, potential and significant habitat

See the Biodiversity Values Database

3.4 Impacts of conversion

- 3.4.1 The wedge-tailed eagle is a very timid nester and is likely to desert a nest if disturbed by forestry activities during the breeding season. If a nest is deserted due to forestry disturbance, the eagles will usually build another nest nearby, adding to forestry activities-nest management issues. Thus, it is important to minimize disturbance to ensure the nest is protected to keep breeding pairs where they were first found. With proper conservation disturbed nests will usually be reused in later years. Natural attrition of nests and changes to behaviour, territory use and turnover of individuals all have influence outside the control of nest management.
- 3.4.2 One of the key threats for this species is widespread native vegetation clearance, especially conversion to plantation. This eliminates potential nest sites for breeding pairs.
- 3.4.3 Ongoing activities associated with plantation and agricultural management can result in nest desertion. Plantation conversion also removes potential for future nests due to short rotation and ongoing disturbance from forest management activities.

3.5 References

Fox, JC, Regan, TJ, Bekessy, S, Wintle, BA, Brown, MJ, Meggs, JM, Bonham, K, Mesibov, R, McCarthy, MA, Munks, SA, Wells P, Brereton RJ, Graham, K, Hickey, J, Turner, P, Jones, M, Brown, WE, Mooney, NJ, Grove, S, Yamada, K and Burgman, MA 2004, '*Linking landscape ecology and management to population viability analysis*', a report prepared by Melbourne University for Forestry Tasmania.

Mooney, NJ 1988, 'Guidelines for alleviating the effects of forestry operations on raptors 2. Wedge-tailed eagle, *Aquila audax*', *Australasian Raptor Association News*, 9:7-10.

Mooney, NJ 2000, '*Appearances vs performance; managing endangered Tasmanian wedge-tailed eagles in Forestry operations*', In: RD, Chancellor and BU, Meyburg (eds), *Raptors at Risk*, Hancock House, WWGBP, Blaine, Washington; Berlin, Germany.

Mooney, NJ and Holdsworth, M 1991, The effects of disturbance on nesting wedge-tailed eagles (*Aquila audax fleayi*) in Tasmania, *Tasforests*, 3:15-31.

Mooney, NJ and Taylor, RJ 1996, 'Value of nest site protection in ameliorating the effects of forestry operations on wedge-tailed eagles in Tasmania', in DM, Bird, DE, Varland and JJ Negro (eds), *Raptors in Human Landscapes*, Academic Press Inc., San Diego, California.

Olsen, P 1998, 'Australia's raptors: diurnal birds of prey and owls', Conservation Statement No.2, Birds Australia, Hawthorn East, Victoria.

Threatened Species Unit 2005, 'Fauna Recovery Plan: Threatened Tasmanian Eagles 2005-2009', Department of Primary Industries, Water and Environment, Hobart.

3.6 Specialists consulted

Nick Mooney, DPIPWE.

Bill Brown, DPIPWE.

Mark Holdsworth, DPIPWE.

4. White-bellied sea eagle, *Haliaeetus leucogaster*

4.1 Conservation status

Listed in 2004. Vulnerable (Tasmanian *Threatened Species Protection Act 1995*) as total population estimated to be less than 1000 mature individuals.

4.2 Range, potential and significant habitat

See the Biodiversity Values Database

4.4 Impacts of conversion

- 4.4.1 This species of eagle is a timid nester and is likely to desert a nest if disturbed by forestry activities during the breeding season. If a nest is deserted due to forestry disturbance, the eagles will usually build another nest nearby, adding to forestry activities-nest management issues. Thus, it is important to keep them where they were first found. With proper conservation disturbed nests will usually (natural attrition of nests and changes to behaviour, territory use and turnover of individuals all have influence outside the control of nest management) be reused in later years.
- 4.4.2 One of the key threats for this species is widespread native vegetation clearance, especially conversion to plantation. This eliminates potential nest sites for breeding pairs.
- 4.4.3 Ongoing activities associated with plantation and agricultural management can result in nest desertion. Plantation conversion also removes potential for future nests due to short rotation and ongoing disturbance from forest management activities.

4.5 References

Olsen, P 1998, 'Australia's raptors: diurnal birds of prey and owls', Conservation Statement No.2, Birds Australia, Hawthorn East, Victoria.

Threatened Species Unit 2006, 'Fauna Recovery Plan: Threatened Tasmanian Eagles 2006-2010', Department of Primary Industries and Water, Hobart.

Wiersma, J 2001, 'Some Affects of Sea-cage Fish Farms on White-bellied Sea Eagles in Tasmania', Honours thesis, University of Tasmania.

Wiersma, JM, Nermut, W and Shephard JM 2001 'A Variation on the 'Noosed Fish' method and its suitability for trapping the white-bellied sea-eagle *Haliaeetus leucogaster*', *Corella* 25 (4): 97-99.

4.6 Specialists consulted

Nick Mooney, Bill Brown, Mark Holdsworth DPIPWE.

Jason Wiersma, Forest Practices Authority.

5. Forty-spotted pardalote, *Pardalotus quadragintus*

5.1 Conservation status

Listed in 1995. Endangered (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Tasmanian *Threatened Species Protection Act 1995*) due to area of occupancy totaling less than 500 km² which is severely fragmented and a continuing decline in the projected extent of habitat.

5.2 Range, potential and significant habitat

See the Biodiversity Values Database

5.4 Impacts of conversion

- 5.4.1 Even minor disturbance to *significant habitat* can be detrimental to the forty-spotted pardalote. Conversion will result in the loss of nest hollows and the loss of foraging habitat. Clearing can also result in fragmentation of habitat and loss of connectivity between colonies, further reducing the species' long-term viability. Fragmentation also provides favourable habitat for competitors for nest hollows such as the common starling and aggressive species such as the noisy miner.

5.8 References

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- Bryant, SL 1992, '*Long term survival of the forty-spotted pardalote on Bruny Island*', WWF Final Report, Project No. 157, Parks, Wildlife and Heritage, Tasmania.
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- Bryant, SL 1998, 'Little bird in a big package', *Wingspan* 8(3):12 – 15.
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- Threatened Species Unit 1998, 'Listing statement: Forty-spotted pardalote *Pardalotus quadragintus*', Parks and Wildlife Service, Dept of Environment and Land Management, Hobart.
- Threatened Species Section 2006, 'Fauna Recovery Plan: Forty-Spotted Pardalote 2006-2010', Department of Primary Industries and Water, Hobart.

5.9 Specialists consulted

- Phil Bell, DPIPWE.
- Sally Bryant, Go Wild, Tasmania.
- Mark Holdsworth, DPIPWE.
- Matt Webb, DPIPWE.

6. New Holland mouse, *Pseudomys novaehollandiae*

6.1 Conservation status

Uplisted in 2000. Endangered (Tasmanian *Threatened Species Protection Act 1995*) Vulnerable (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to its restricted habitat and population severely fragmented.

6.2 Range, potential and significant habitat

See the Biodiversity Values Database

6.4 Impacts of conversion

- 6.4.1 One of the threats for the species is clearance of habitat. This permanently eliminates breeding and foraging habitat.

6.5 References

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- Lazenby, BL 1999, 'Vegetation associations and spatial relations in the New Holland Mouse, *Pseudomys novaehollandiae* (Rodentia: Muridae) in Tasmania', Unpublished honours thesis, University of Tasmania.
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Norton, TW 1983, 'Habitat utilization by small mammals in north-eastern Tasmania', Honours thesis, University of Tasmania.

Norton, TW 1987, 'The ecology of small mammals in north-eastern Tasmania II: *Pseudomys novaehollandiae* and the introduced *Mus musculus*', *Australian Wildlife Research*, 14, 435-31.

Pye, T 1991, 'The New Holland Mouse (*Pseudomys novaehollandiae*) (Rodentia: Muridae) in Tasmania: a Field Study', *Wildlife Research*, 18, 521-31.

Seebeck, JH, Menkhorst, PW, Wilson, BA and Lowe, KW 1996, 'New Holland Mouse (*Pseudomys novaehollandiae*)', Flora and Fauna Guarantee – Action Statement No. 74, Department of Natural Resources and Environment, Victoria.

6.6 Specialists consulted

Billie Lazenby, DPIPWE.

Phil Bell, DPIPWE.

7. Masked Owl, *Tyto novaehollandiae castanops*

7.1 Conservation status

Listed in 2002. Endangered (Tasmanian *Threatened Species Protection Act 1995*) Vulnerable (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to the small population size and ongoing habitat loss.

7.2 Range, potential and significant habitat

See the Biodiversity Values Database

7.4 Impacts of conversion

Ongoing loss of nesting habitat through forest harvesting and conversion has been identified as a threat to the masked owl.

7.5 References

Bell, P, Mooney, N and Wiersma, J 1997, '*Predicting Essential Habitat for Forest Owls in Tasmania*', Report to the Tasmanian RFA Environment and Heritage Technical Committee, Commonwealth of Australia & State of Tasmania.

Bell, P and Mooney, N 2002, 'Distribution, habitat and abundance of Masked Owls (*Tyto novaehollandiae*) in Tasmania', In: *Ecology and Conservation of Owls*, eds: I, Newton, R, Kavanagh, J, Olsen and I, Taylor, CSIRO Publishing, Collingwood, Victoria, Australia.

Cann, B, Williams, J, and Shields, JM 2002 'Monitoring large forest owls and gliders after recent logging in production regrowth forest in the mid-north coastal region of New South Wales', In: *Ecology and Conservation of Owls*, eds: I, Newton, R, Kavanagh, J, Olsen and I, Taylor, CSIRO Publishing, Collingwood, Victoria, Australia.

Kavanagh, R and Murray, M 1996, 'Home range, habitat and behaviour of the Masked Owl near Newcastle, New South Wales', *Emu* 96: 250 – 257.

Kavanagh, R and Stanton, M 2002, 'Response to habitat fragmentation by the Powerful Owl, Sooty Owl Masked Owl and other nocturnal fauna in south-eastern Australia', In: *Ecology and Conservation of Owls*, eds: I, Newton, R, Kavanagh, J, Olsen and I, Taylor, CSIRO Publishing, Victoria, Australia.

McNabb, EG, McNabb, J and Barker, K 2003, 'Post-nesting home range, habitat use and diet of a female Masked Owl *Tyto novaehollandiae* in western Victoria', *Corella* 27(4), 109-117.

Mooney, N 1997, 'Habitat and seasonality of nesting Masked owls in Tasmania', In: *Australasian Raptor Studies II - Birds Australia Monograph 3*, eds. G, Czechura and S, Debus, Birds Australia, Melbourne.

7.6 Specialists consulted

Phil Bell, DPIPWE.

Rod Kavanagh, NSW State Forests.

Nick Mooney, DPIPW.

8. Dwarf galaxiid, *Galaxiella pusilla*

8.1 Conservation status

Listed in 1995, uplisted in 2008. Vulnerable (Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Act 1999*), due to limited distribution and unprotected sites.

8.2 Range, potential and significant habitat

See the Biodiversity Values Database

8.4 Impacts of conversion

Extensive conversion of native vegetation, and associated management activities, in catchments where the species occurs can impact on habitat quality for this species and the long-term viability of populations through changes to hydrology and stream quality, erosion, historical stream channel engineering/straightening and loss of wetland/swamp habitat through draining, infilling etc.

8.5 References

Inland Fisheries Service, 'Dwarf Galaxias', IFS Freshwater Fish Fact Sheet No 9.

Wager, R and Jackson, P 1993, 'The Action Plan for Australian Freshwater Fishes', Australian Nature Conservation Agency, Canberra.

Threatened Species Section 2006, 'Recovery Plan: Tasmanian Galaxiidae 2006-2010', Department of Primary Industries and Water, Hobart.

8.6 Specialists consulted

Jean Jackson, Private Biological Consultant.

Peter Davies, Freshwater Systems.

Dave Jarvis, Inland Fisheries Service.

9. Swan galaxias, *Galaxias fontanus*

9.1 Conservation status

Listed in 1995. Endangered (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Tasmanian *Threatened Species Protection Act 1995*), due to its decline, limited distribution and locally small and at-risk populations. It is eliminated by introduced brown trout and redfin perch, when these species invade or are introduced into the same stream reaches.

9.2 Range, potential and significant habitat

See the Biodiversity Values Database.

9.4 Impacts of conversion

9.4.1 Extensive conversion of native vegetation, and associated management activities, where the species occurs can impact on habitat quality for this species and the long term viability of populations, through changes to hydrology and stream quality and the effectiveness of barriers at downstream margins to upstream invasion by trout and redfin perch.

9.5 References

Inland Fisheries Service 2006 , 'Freshwater Fish Fact sheets', Inland Fisheries Service, Hobart Tasmania.

Wager, R and Jackson, P 1993 'The Action Plan for Australian Freshwater Fishes', Australian Nature Conservation Agency, Canberra.

Threatened Species Section 2006, 'Recovery Plan: Tasmanian Galaxiidae 2006-2010', Department of Primary Industries and Water, Hobart.

9.6 Specialists consulted

Jean Jackson, Private Biological Consultant.

Peter Davies, Freshwater Systems.

Dave Jarvis, Inland Fisheries Service.

Appendix B

INVERTEBRATES

1. Skemps snail, (undescribed species in the family Charopidae)

1.1 Conservation status

Listed in 1999. Rare (Tasmanian *Threatened Species Protection Act 1995*), due to its localised distribution and threatened by ongoing processes over much of its range.

1.2 Range, potential and significant habitat

See the Biodiversity Values Database

1.4 Impact of conversion

1.4.1 This species has not been found within plantations and conversion is considered to cause the loss of habitat and fragmentation of habitat patches.

1.4.2 A large proportion of *potential habitat* within the range of Skemps snail has already been converted to agriculture or hardwood or softwood plantation, or has been identified as having plantation potential.

1.5 References

Forest Practices Board 2002, 'Threatened Fauna Manual for production forests', Forest Practices Board, Hobart.

Bonham, KJ 2003, 'Biogeography of Tasmanian Native Land Snails', PhD thesis, University of Tasmania.

1.6 Specialists consulted

Kevin Bonham, University of Tasmania.

Karen Richards, Forest Practices Authority.

2. Bornemisszas stag beetle, *Hoplogonus bornemisszai*

2.1 Conservation status

Listed in 1999. Critically Endangered (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) Endangered (Tasmanian *Threatened Species Protection Act 1995*), due to its restricted distribution, low population densities and loss of habitat.

2.2 Range, potential and significant habitat

See the Biodiversity Values Database

2.4 Impact of conversion and existing conservation measures

2.4.1 Surveys have failed to find the Bornemisszas stag beetle in pine plantations established close to known localities of the species. This is likely to be a consequence of the divergence of these forest's microhabitats from the natural forest habitat of the species and the intensive nature of plantation forest management. The latter includes a high level of soil disturbance that is likely to have a significant impact on the edaphic larvae. This impact will be exacerbated over successive rotations (15-30 year intervals), having a significant cumulative impact on populations of the beetles.

2.4.2 Munks *et al.* (2004) recommend a moratorium on conversion within the range of Bornemisszas stag beetle. No potential habitat for this beetle has been converted since 1996.

2.5 References

Richards, K 1999, 'Occurrence of *Hoplogonus bornemisszai* (Bornemisszas stag beetle) and *H. vanderschoori* (Vanderschoors stag beetle) in priority coupes, north-east Tasmania', Unpublished report to Forestry Tasmania and the Forest Practices Board.

Meggs, JM, Munks, SA and Corkrey, R 2003, 'The distribution and habitat characteristics of a threatened lucanid beetle, *Hoplogonus simsoni*, in north-east Tasmania', *Pacific Conservation Biology*, 9: 172-186.

Munks, SA, Richards, K, Meggs, J, Wapstra, M and Corkrey, R 2004, 'Distribution, habitat and conservation of two threatened stag beetles, *Hoplogonus bornemisszai* and *H. vanderschoori* (Coleoptera:Lucanidae) in north-east Tasmania', *Australian Zoologist* 32 (4): 586 – 596.

2.6 Specialists consulted

Karen Richards, Forest Practices Authority.

3. Vanderschoors stag beetle, *Hoplogonus vanderschoori*

3.1 Conservation status

Listed in 1999. Vulnerable (Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to its restricted distribution, low population densities and loss of habitat.

3.2 Range, potential and significant habitat

See the Biodiversity Values Database

3.4 Impact of conversion and existing conservation measures

3.4.1 Surveys have failed to find Vanderschoors stag beetle in plantations. This is due to direct destruction of microhabitats on which the species depends and the intensive nature of plantation management. The latter includes a high level of soil disturbance that is likely to have a significant impact on the edaphic *Hoplogonus* larvae. This impact may be exacerbated over successive rotations (15-30 year intervals), having a significant cumulative impact on populations of the beetles. The impact is considered permanent and irreversible.

3.4.2 Munks *et al.* (2004) recommend a moratorium on conversion within the range of Vanderschoors stag beetle.

3.5 References

Richards, K 1999, 'Occurrence of *Hoplogonus bornemisszai* (Bornemisszas stag beetle) and *H. vanderschoori* (Vanderschoors stag beetle) in priority coupes, north-east Tasmania', Unpublished report to Forestry Tasmania and the Forest Practices Board.

Meggs, JM, Munks, SA and Corkrey, R 2003, 'The distribution and habitat characteristics of a threatened lucanid beetle, *Hoplogonus simsoni*, in north-east Tasmania', *Pacific Conservation Biology* 9: 172-186.

Munks, SA, Richards, K, Meggs, J, Wapstra, M and Corkrey, R 2004, 'Distribution, habitat and conservation of two threatened stag beetles, *Hoplogonus bornemisszai* and *H. vanderschoori* (Coleoptera:Lucanidae) in north-east Tasmania' *Australian Zoologist* 32 (4): 586 – 596.

3.6 Specialists consulted

Karen Richards, Forest Practices Authority.

4. Simsons stag beetle, *Hoplogonus simsoni*

4.1 Conservation status

Listed in 1995. Vulnerable (Tasmanian *Threatened Species Protection Act 1995* Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*), due to its restricted distribution, low population densities and loss of habitat.

4.2 Range, potential and significant habitat

See the Biodiversity Values Database

4.4 Impact of conversion and existing conservation measures

- 4.4.1 Meggs *et al.* (2003) conclude that conversion of areas of native forest to plantation or other non-forest land use is likely to have a negative impact on this species. This is likely to be a consequence of the divergence of these forest's microhabitats from the natural forest habitat of the species and the intensive nature of plantation forest management. The latter includes a high level of soil disturbance that is likely to have a significant impact on the edaphic *Hoplogonus* larvae. This impact will be exacerbated over successive rotations (15-30 year intervals), having a significant cumulative impact on populations of the beetles.

4.5 References

Fox, JC, Regan, TJ, Bekessy, SA, Wintle, BA, Brown, MJ, Meggs, JM, Bohman, K, Mesibov, R, McCarthy, MA, Munks, SA, Wells, P, Brereton, R, Graham, K, Hockey, J, Turner, P, Jones, M, Brown WE, Mooney, N, Grove, S, Yamanda, K and Burgman, MA 2004, 'Linking landscape ecology and management to population viability analysis – Part 2' Report to Forestry Tasmania.

Meggs, JM 1997, 'Simons stag beetle, *Hoplogonus simsoni*, in north-east Tasmania: distribution, habitat characteristics and conservation requirements', Unpublished report to the Forest Practices Board and Forestry Tasmania.

Meggs, JM 2003, 'Threatened stag beetles in Tasmania's production forests', MSc thesis, University of Tasmania, Hobart, Tasmania, Australia.

Meggs, JM, Munks, SA, Corkrey, R and Richards, K 2004, 'Development and evaluation of predictive habitat models used in the conservation management of a threatened lucanid beetle, *Hoplogonus simsoni*, in north-east Tasmania', *Biological Conservation*, 118, 501-511.

Meggs, JM, Munks, SA, and Corkrey, R 2003, 'The distribution and habitat characteristics of a threatened lucanid beetle, *Hoplogonus simsoni*, in North-east Tasmania', *Pacific Conservation Biology*, 9:172-186.

4.6 Specialists consulted

Jeff Meggs, Environmental Consultant.

Karen Richards, Forest Practices Authority.

5. Mt Mangana stag beetle, *Lissotes menalcas*

5.1 Conservation status

Listed in 1995, downlisted in 2012. Vulnerable (Tasmanian *Threatened Species Protection Act 1995*), due to its restricted distribution, low population densities and loss of habitat.

5.2 Range, potential and significant habitat

See the Biodiversity Values Database

5.4 Impact of conversion

- 5.4.1 Mt Mangana stag beetle appears to tolerate wildfire, clearfelling and regeneration burning provided coarse woody debris is retained and there is adequate recruitment of this habitat. However, conversion in areas of *potential habitat* will most likely lead to the local extinction of Mt Mangana stag beetle populations due to the virtual elimination of rotting logs.

5.5 References

Fauna Strategic Planning Group 2006, 'Strategic Plan for *Lissotes menalcas* (Mt Mangana stag beetle) in areas subject to a Forest practices plan in South East Tasmania', Draft plan prepared by Fauna Strategic Planning Group.

Grove, SJ, Meggs, J, and Goodwin, A 2002, 'A review of biodiversity conservation issues relating to coarse woody debris management in the wet eucalypt production forests of Tasmania', Forestry Tasmania, Hobart.

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Meggs, JM 1998, '*A Two-week Field Survey for Lissotes menalcas (Mt Mangana Stag Beetle) (Coleoptera; Lucanidae)*', A report to Forestry Tasmania and the Tasmanian Parks and Wildlife Service.

Meggs, JM and Taylor, RJ 1999, 'Distribution and conservation status of the Mt Mangana stag beetle, *Lissotes menalcas* (Coleoptera: Lucanidae)', *Papers and Proceedings of the Royal Society of Tasmania* 133: 23-28.

Meggs, JM 2003, 'Threatened stag beetles in Tasmania's production forests', MSc thesis, University of Tasmania, Hobart.

Meggs, JM 2002, '*Survey to determine the presence/absence of Lissotes menalcas (Mt Mangana Stag Beetle) at the Proposed Integrated Timber Processing Site (Southwood) Lonnvale*', A report to Forestry Tasmania.

Threatened Species Section 2006, 'DRAFT Fauna Recovery Plan: Threatened Tasmanian Stag Beetles 2006-2011', Department of Primary Industries and Water, Hobart.

5.6 Specialists consulted

Jeff Meggs, Environmental Consultant.

Karen Richards, Forest Practices Authority.

6. Broad-toothed stag beetle, *Lissotes latidens*

6.1 Conservation status

Listed in 1995. Endangered (Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*) due to restricted distribution, low population density and habitat loss.

6.2 Range, potential and significant habitat

See the Biodiversity Values Database

6.4 Impact of conversion and existing conservation measures

6.4.1 Meggs and Munks (2003) conclude that conversion of areas of native forest to plantation is likely to have a negative impact on this species.

6.5 References

Meggs, JM, and Munks, SA 2003, 'Distribution, habitat characteristics and conservation requirements of a forest-dependent Invertebrate *Lissotes latidens* (Coleoptera: Lucanidae)', *Journal of Insect Conservation* 7: 137-152.

Meggs, JM 1999, '*Surveys for Lissotes latidens (Broad-toothed stag beetle) in priority coupes on the Forestier and Tasman Peninsulas*', Report to Forestry Tasmania and the Forest Practices Board.

Meggs, JM 1999, '*Distribution, habitat characteristics and conservation requirements of the Broad toothed stag beetle Lissotes latidens (Coleoptera: Lucanidae)*', A report to the Forest Practices Board and Forestry Tasmania.

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Michaels, K Undated '*The occurrence of the endangered stag beetle Lissotes latidens (Westwood) (Coleoptera: Lucanidae) in selected areas in the Wielangta Forest Block, Tasmania*', Unpublished report.

Richards, K, Munks, SA, Spencer, C and Wapstra, M 2006, '*Monitoring the effectiveness of conservation measures for the broad-toothed stag beetle, Lissotes latidens, in south-east Tasmania. June 2006*', Forest Practices Authority Scientific Report No 3, Forest Practices Authority, Hobart.

Blake, G 1994, '*An Invertebrate Survey of the Wielangta State Forests, Tasmania*', unpublished report to the University of Tasmania.

6.6 Specialists consulted

Jeff Meggs, Environmental Consultant.

Karen Richards, Forest Practices Authority.

7. Burgundy snail, *Helicarion rubicundus*

7.1 Conservation status

Listed in 1995. Rare (Tasmanian *Threatened Species Protection Act 1995*), due to its limited distribution.

7.2 Range, potential and significant habitat

See the Biodiversity Values Database

7.4 Impact of conversion

7.4.1 This species has been found in one *Eucalyptus seiberi* plantation (at least 20 years old), however, conversion is considered likely to result in local elimination or severe local population decline based on results of a study of a related species burgundy snail.

7.5 References

Threatened Species Section 2006, '*Draft Fauna Recovery Plan: Threatened Tasmanian Land Snails 2006 2010*', Department of Primary Industries and Water, Hobart.

Bonham, KJ 1998, '*Reassessment of the status of Tasmanian native land snails*', Report to the Threatened Species Unit, Parks and Wildlife Service, Tasmania.

Bonham, KJ, Mesibov, R, and Bashford, R 2002, 'Diversity and abundance of some ground dwelling invertebrates in plantation versus native forest in Tasmania, Australia', *Forest Ecology and Management* 158: 237-247.

Bonham, KJ 200, 'Biogeography of Tasmanian Native Land Snails', PhD thesis, University of Tasmania.

Forest Practices Board 2002, '*Threatened Fauna Manual for production forests*. Forest Practices Board', Hobart.

Otley, HM 1999, 'Survey report for Burgundy snail (*Helicarion rubicundus* (Pulmonata:Helicarionidae), a rare land snail', *Papers and Proceedings of the Royal Society of Tasmania* 125:27-28.

7.6 Specialist consulted

Kevin Bonham, Consultant biologist.

8. Keeled snail, *Tasmaphena lamproides*

8.1 Conservation status

Listed in 1999. Rare (Tasmanian *Threatened Species Protection Act 1995*), because its extent of occurrence is less than 2000 km² and its population densities are usually very low (i.e. 5-10 live adults/hectare).

8.2 Range, potential and significant habitat

See the Biodiversity Values Database

8.4 Impact of conversion

- 8.4.1 Conversion is known to result in temporary loss of habitat. There are anecdotal reports of individuals in young plantations near to known localities. However, there are records in older plantations.
- 8.4.2 A significant proportion of *potential habitat* within the species' range has already been converted to hardwood or softwood plantation, or has been identified as having plantation potential.

8.5 References

- Bonham, K, and Taylor, RJ 1997, 'Distribution and habitat of the land snail *Tasmaphena lamproides* (Pulmonata: Rhytididae) in Tasmania, *Molluscan Research*, 18:1-10.
- Bonham, K 1999, '*Range boundary survey for the keeled snail Tasmaphena lamproides*', Report to Forestry Tasmania.
- Bonham, K 2000, '*Distribution and habitat characteristics of Tasmaphena lamproides (Keeled Snail) on private land*', Report to Forest Practices Board and Threatened Species Unit, DPIPWEE.
- Bonham, KJ 2003, 'Biogeography of Tasmanian Native Land Snails', PhD thesis, University of Tasmania.
- Forest Practices Board 2002, '*Threatened Fauna Manual for production forests*', Forest Practices Board, Hobart.
- Regan, T, Bonham, K, Regan, H, Taylor, R, Tuson, D and Burgman, M 1999, '*Forest management and conservation of Tasmaphena lamproides in north-west Tasmania: use of population viability analysis to evaluate management options*', Final report to Forestry Tasmania, Hobart.
- Taylor, RJ, Regan, T, Regan, H, Burgman, M and Bonham, K 2003, 'Impacts of plantation development, harvesting schedules and rotation lengths on the rare snail *Tasmaphena lamproides* in northwest Tasmania: a population viability analysis', *Forest Ecology and Management*, 175: 455-466.
- Threatened Species Section 2006, 'Draft Fauna Recovery Plan: Threatened Tasmanian Land Snails 2006-2010', Department of Primary Industries and Water, Hobart.

8.6 Specialists consulted

Kevin Bonham, Consultant Biologist.

9. Ptunarra brown butterfly, *Oreixenica ptunarra*

9.1 Conservation status

Listed in 1995. Vulnerable (Tasmanian *Threatened Species Protection Act 1995*), due to loss of habitat.

9.2 Range, potential and significant habitat

See the Biodiversity Values Database

9.4 Impact of conversion

- 9.4.1 Conversion is known to result in loss of habitat for this species.

9.5 References

- Bell, PJ 1997, '*Ptunarra Brown Butterfly Oreixenica ptunarra Recovery Program - Summary of actions undertaken 1996/97 and recommendations for future management and monitoring*', Internal Report, Threatened Species Unit, Parks and Wildlife Service, Tasmania.
- Bell, PJ 1999, '*Review of the recovery process for the Ptunarra Brown Butterfly*', Report prepared on behalf of the Ptunarra Brown Butterfly Recovery Team for Environment Australia, Endangered Species Program.
- Bell, PJ 1998, '*Ptunarra Brown Butterfly Recovery Plan 1998-2003*', Department of Primary Industries, Water and Environment, Hobart.

Couchman, LE 1953, 'Notes on some forms of *Oreixenica* Waterhouse and Lyell (Lepidoptera, Satyridae), with description of new forms', *Proceedings of the Royal Entomological Society of London. (B)* 22, 73-84.

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McQuillan, PB, and Ek, CJ 1997, 'A biogeographical analysis of the Tasmanian endemic Ptunarra Brown Butterfly, *Oreixenica ptunarra* Couchman L.E. 1953 (Lepidoptera: Nymphalidae: Satyrinae)', *Australian Journal of Zoology* 44: 21-37.

Neyland, MG 1993, 'The ecology and conservation management of the Ptunarra Brown butterfly *Oreixenica ptunarra* (Lepidoptera: Nymphalidae: Satyrinae) in Tasmania, Australia', *Papers and Proceedings of the Royal Society of Tasmania*, 127: 43-48.

Neyland, MG 1992, 'The Ptunarra brown butterfly *Oreixenica ptunarra*', Conservation Research Statement. Department of Parks, Wildlife and Heritage, Tasmania, Scientific Report, 92/2.

Neyland, MG 1991, 'The Ptunarra Brown Butterfly Recovery Plan: Management Phase', Department of Parks Wildlife and Heritage.

9.6 Specialists consulted

Phil Bell, Threatened Species Section, DPIPWE.

10. Giant velvet worm, *Tasmanipatus barretti*

10.1 Conservation status

Listed in 1995. Rare (Tasmanian *Threatened Species Protection Act 1995*), due to its restricted distribution at unprotected sites.

10.2 Range, potential and significant habitat

See the Biodiversity Values Database

10.4 Impact of conversion and existing conservation measures

10.4.1 Conversion is known to impact on this species, resulting in the loss of microhabitat and local populations.

10.5 References

Bryant, S and Jackson, J 1999, '*Tasmania's Threatened Fauna Handbook: What, Where and How to Protect Tasmania's Threatened Animals*', Threatened Species Unit, Parks and Wildlife Service, Hobart.

Fox, JC, Mesibov, R, McCarthy, MA and Burgman, MA 2004, 'Giant Velvet Worm (*Tasmanipatus barretti*) in Tasmania, Australia' in AkÁakaya, HR, Burgman, MA, Kindvall, O, Wood, CC, Sj–green-Gulve, P, Hatfield, JS and McCarthy, MA, eds, *Species Conservation and Management. Case Studies*, New York, Oxford University Press.

Horner, DJ 1995, '*The Ecology of Two Parapatric Species of Tasmanipatus (Onychophora), T. barrette and T. anophthalmus*', unpublished Honours thesis, Department of Zoology, University of Tasmania.

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Mesibov, R 1987, '*Distribution and Conservation Status of Two Undescribed Onychophoran Species in North-East Tasmania*', Unpublished report to the Plomley Foundation.

Mesibov, R 1988, '*Report of new distribution mapping, with a catalog of all known locality records for the Blind Velvet Worm, Giant Velvet Worm, 'Euperipatoides leuckarti' and 'Ooperipatellus insignis'*', A Report for the Department of Lands, Parks and Wildlife.

Mesibov, R 1990, 'Velvet worms: a special case of fauna conservation', *Tasforests* 2: 53-56.

- Mesibov, R 1991, 'A Report on Cable-Logging Operations in Progress in the Haley's Creek Wildlife Priority Area', unpublished report to Forestry Commission.
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10.6 Specialists consulted

Bob Mesibov, Private Consultant.

Marie Yee, Forestry Tasmania.

11. Blind velvet worm, *Tasmanipatus anophthalmus*

11.1 Conservation status

Listed in 1995. Endangered (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, Tasmanian *Threatened Species Protection Act 1995*), due to its restricted distribution and loss of habitat.

11.2 Range, potential and significant habitat

See the Biodiversity Values Database

11.4 Impact of conversion

- 11.4.1 This species may be eliminated by conversion of native vegetation to plantation or non-forest land use through removal of the rotting log habitat.

11.5 References

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11.6 Specialist consulted

Bob Mesibov, Environmental consultant.

12. Burnie burrowing crayfish, *Engaeus yabbimunna*

13.1 Conservation status

Listed in 1995. Vulnerable (Tasmanian *Threatened Species Protection Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*), due to its very restricted distribution at unprotected sites and the fragmentation of populations.

13.2 Range, potential and significant habitat

See the Biodiversity Values Database

13.4 Impact of conversion

13.3.1 Extensive conversion of native vegetation, and associated management practices, in catchments where Burnie burrowing crayfish occurs can impact on habitat quality for this species and the long term viability of populations.

13.5 References

Doran, N 1999, 'The Burnie Burrowing crayfish, *Engaeus yabbimunna*: assessment of the Seabrook Creek catchment for the CAR Private Reserve System', Report to the RFA Private Land Reserve Program, Department of Primary Industry, Water and the Environment.

Doran, NE 2000, 'Burrowing Crayfish (*Engaeus*) Group Recovery Plan 2001-2005', Threatened Species Unit, DPIPW, Hobart.

Doran, NE, and Richards, K 1996, 'Management Requirements for Rare and Threatened Burrowing Crayfish in Tasmania', unpublished report to the Tasmanian RFA Environment and Heritage Technical Committee.

Horwitz, P 1990a, 'A taxonomic revision of species in the freshwater crayfish genus *Engaeus* Erichson (Decapoda: Parastacidae)', *Invertebrate Taxonomy*, 4: 427-614.

Horwitz, P 1990b, 'The Conservation Status of Australian Freshwater Crustacea (with a Provisional List of Threatened Species, Habitats and Potentially Threatening Processes)', Report Series No. 14, Australian National Parks and Wildlife Service, Canberra.

13.6 Specialists consulted

Niall Doran, Environmental consultant.

Alastair Richardson, University of Tasmania.

Karen Richards, Forest Practices Authority.

13. Scottsdale burrowing crayfish, *Engaeus spinicaudatus*

13.1 Conservation status

Listed in 1995. Endangered (Tasmanian *Threatened Species Protection Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*), due to its very restricted distribution and disturbance of habitat.

13.3 Range, potential and significant habitat

See the Biodiversity Values Database

13.5 References

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13.6 Specialists consulted

Niall Doran, Environmental consultant.

Alastair Richardson, University of Tasmania.

Karen Richards, Forest Practices Authority.

14. Central north burrowing crayfish, *Engaeus granulatus*

14.1 Conservation status

Listed in 2004. Endangered (Tasmanian *Threatened Species Protection Act 1995* and Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*), due to its restricted distribution at unprotected sites and the fragmentation of populations.

14.2 Range, potential and significant habitat

See the Biodiversity Values Database

14.4 Impact of conversion

There has been extensive conversion of native vegetation in catchments where central north

burrowing crayfish occurs. Such conversion has impacted on the quality of habitat for this species and the long term viability of populations.

14.5 References

- Doran, NE 2000, '*Burrowing Crayfish (Engaeus) Group Recovery Plan 2001-2005*', Threatened Species Unit, DPI/PWE, Hobart.
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- Richardson, AS, Hopgood-Douglas, S, Munks, SA, Doran, N and Peters, D in pres, 'Predicting the distribution of a threatened freshwater burrowing crayfish: *Engaeus granulatus* in central northern Tasmania', *Freshwater Crayfish* 16.

14.6 Specialists consulted

- Niall Doran, Environmental consultant.
- Alastair Richardson, University of Tasmania.
- Karen Richards, Forest Practices Authority.

15. Hydrobiid snails, *Beddomeia* spp. (8 species listed in Table 1)

15.1 Conservation status

Four species listed as endangered, three as vulnerable and one rare (*Tasmanian Threatened Species Protection Act 1995*), due to their restricted distributions and ongoing threats.

15.2 Range, potential and significant habitat and land tenure

See the Biodiversity Values Database

The Hydrobiidae is the most diverse family of freshwater molluscs in the world. All of the species included in this Policy have extremely restricted distributions.

The majority of these species live in headwater streams (Class 3 and 4 streams and drainage lines).

15.4 Impact of conversion

Extensive conversion of native vegetation in catchments where these hydrobiid snails occur can impact on habitat quality for this species through the loss of riparian vegetation, changes to water quality and quantity and subsequent changes to the geomorphology of the stream. This in turn can have a negative impact on the long term survival of populations.

15.5 References

Ponder, WF, Clark, GA, Miller, AC, and Toluzzi, A 1993, "On a major radiation of freshwater snails in Tasmania and eastern Victoria: a preliminary overview of the *Beddomeia* group (Mollusca : Gastropoda : Hydrobiidae)", *Invertebrate Taxonomy* 7(3) 501 – 750.

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Schreiber, ESG, Quinn, GP, and Lake, PS 2003, 'Distribution of an alien aquatic snail in relation to flow variability, human activities and water quality', *Freshwater Biology*, 48(6), 951.

Boulton, AJ, Humphreys, WF, Eberhard, SM 2003, 'Imperiled Subsurface Waters in Australia: Biodiversity, Threatening Processes and Conservation Special Issue Freshwater Biodiversity in Australia', *Aquatic Ecosystem Health & Management*, 6(1), 41 – 54.

15.6 Specialists consulted

Karen Richards, Forest Practices Authority.

Peter Davies, Consultant biologist, Freshwater systems.

Document Control Log Table**Document Summary Information**

Document name	FPA planning guideline 2008/1 An internal planning framework developed by the forest practices authority for the purposes of delivering management prescriptions through the threatened fauna adviser to avoid or limit the clearance and conversion of significant habitat for threatened forest fauna.
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Version Control

Version	Date	Author(s)	Summary of changes
1.0	September 2008	FPA	Original document
1.1	March 2011	Chris Grove	Added hardcopy warning and document control information. Trim record 2011/37235.
1.2	April 2013	Anne Chuter, Sarah Munks	<ul style="list-style-type: none"> Updated species conservation status and referred to BVD significant habitat descriptions in Appendix. Removed giant freshwater crayfish as dealt with through the revised Threatened Fauna Adviser/agreed procedures. Removed tables 1, b, c and d, removed appendix c as out of date. Edited in line with FPA style guide, inserted hyperlinks to the BVD and FPA web map for species ranges. New trim record.

Stages required for release outside FPA

Category of advice		A2	A2
Stages	Required/not required	Completed (date) for version 1.1	Completed (date) Version 1.2
Specialist	Required	September 2008	April 2013
Line Manager	Required	September 2008	April 2013
Peer/FPO/stakeholder review	Required	September 2008	June 2012
CFPO	Required	September 2008	October 2013 - Minor revisions endorsed and other referrals not necessary (see CFPO e-mail 15/1013 – TRIM 2013/141350) .
FPAC	Required	September 2008	Not required as minor update to V 1.1
Board	Required	September 2008	Not required as minor update to V 1.1

