

# Forest Management Prescriptions for Avifauna in the Buckland Military Training Area

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## Abstract

A bird survey was undertaken in the Buckland Military Training Area, south-eastern Tasmania, as part of the development of an Environmental Impact Assessment for the area. The survey identified 56 species of birds from 28 families, including 10 of the 11 Tasmanian endemics and one species that breeds only in Tasmania. This total equates to that expected in similar habitats during the non-breeding season. The wedge-tailed eagle and swift parrot, classified as Vulnerable, utilise the area and require specific management considerations. The breeding and feeding requirements of most other birds in the Buckland Military Training Area are categorised and prescriptions for habitat protection and bird conservation during forest management and timber harvesting practices are provided.

## Introduction

Much of the Buckland Military Training Area (BMTA) is typical of the cool, dry temperate forests of eastern Tasmania. The most extensive vegetation type is the eucalypt-dominated open sclerophyll forests with sparse, mid-dense or dense understoreys (Wells *et al.* 1977). There are also small areas of sedgeland, low scrub, relict rainforest and arable and cleared pastureland. Past disturbance and fires in the area have produced a mosaic of vegetation types and ages which in turn provides a range of habitats for many Tasmanian bird species.

Wells *et al.* (1977) and Gowland (1977) identified the major vegetation types in the

BMTA and produced a comprehensive list of flora and fauna. The bird inventory included both migratory and resident species and represented a collection of birds of prey, sedgeland and grassland species, mixed forest species and waterfowl. Of the 48 species identified, 25 were considered common, 20 uncommon and three as rare, with several other species suggested as visiting the area on a seasonal basis. Only five of the 11 Tasmanian endemic species and one breeding endemic were recorded in the study area even though all except two occur in suitable habitat within the region. Several other reports have produced inventories of birds in the vicinity of the BMTA, namely Woodsdale, Tooms Lake and Mount Morrison (Pattimore 1977, 1980; Coulson and Coulson 1981; Wilson 1981; Dickinson *et al.* 1986) and a recent study on the swift parrot has highlighted this species' distribution throughout and surrounding the BMTA (Brown 1989).

Two species occurring in the BMTA that are particularly prone to the impact of forestry operations are the swift parrot (*Lathamus discolor*) and the Tasmanian subspecies of wedge-tailed eagle (*Aquila audax fleayi*). Both species are classified as Vulnerable, that is, species believed likely to move into the Endangered category in the near future if the causal factors continue to operate (Brouwer and Garnett 1990). The swift parrot breeds in the south-east of the State, with dense breeding populations from Triabunna to Little Swanport adjacent to the BMTA (Brown 1989). The swift parrot is reliant on Tasmanian blue gum (*Eucalyptus globulus*) as

its main feeding tree and will usually only breed where blue gum is flowering. Up until the late 1980s, sawlog and pulpwood operations removed between 500 and 1000 ha of swift parrot habitat annually (Brown 1989). More recently, however, the value of *E. globulus* stands to swift parrots has been recognised, resulting in much reduced harvest levels (R. Taylor, pers. comm.).

The Tasmanian population of the wedge-tailed eagle is estimated to be between 60 and 80 breeding pairs (Mooney 1988a). Although at sustainable levels now, a combination of persecution, habitat removal and disturbance are continually reducing the effective population size (i.e. total number of breeding adults) and gradually placing the long-term viability of the species at risk (Mooney and Holdsworth 1991). To conserve the wedge-tailed eagle in Tasmania, it is vital to protect nest sites from the effects of primary disturbances, such as removal of nest trees or nesting habitat, or secondary disturbances such as increased human activity near nest sites and changes in land use.

This report assesses the nature conservation value of the BMTA in the light of forestry operations and provides recommendations to ensure that the diversity and viability of bird populations does not diminish. The duration and timing of the study were restricted by the guidelines set for an Environment Impact Assessment (EIA) for the area commissioned by the Department of Defence (Hepper-deGryse Team 1991). However, the survey did enable a more complete bird species inventory to be obtained and also the identification of areas requiring special conservation measures.

## Methods

### *Study site*

The BMTA is located in the south-east of Tasmania (42°25'S, 147°45'E), approximately 50 km from Hobart. The region is underlain by extensive sheets of Jurassic dolerite, with

smaller patches of Triassic quartz sandstone in the north-western and south-western corners (Wells *et al.* 1977) and has a moist subhumid climate (Gentilli 1972). The area comprises 23 414 ha of land of which approximately 2800 ha are Commonwealth freehold, the remainder being leased from the State. The Department of Defence controls the area as a military training base and the Forestry Commission manages the site as a wood production zone for sawlog and pulpwood extractions, with two areas being earmarked as Recommended Areas for Protection (RAPs) (Working Group for Forest Conservation 1990).

Only small areas of the BMTA have escaped disturbance. Approximately 1000 ha (4%) are leased and managed specifically for grazing. Between 1971 and 1978, over 4500 ha (19%) of the BMTA were clearfelled. Additional coupes around Bluestone Tier were logged in 1990. The northern region of the BMTA was burnt regularly by leaseholders prior to Army occupation and most of the region experienced an intense fire in 1967. The central and eastern portions of the BMTA have undergone regular firing since 1967 as part of forestry operations, Tasmania Fire Service hazard reduction burns and leaseholders' grazing practices. In association with these disturbances, roads, tracks, quarries, firebreaks and small areas cleared specifically for military use have added to the disturbance of the region.

### *Survey*

The survey was conducted in April 1991 over a period of six days, including two nights of spotlighting for nocturnal species. Twenty-one bird surveys were conducted in the habitats shown in Table 1 and species were recorded as for the Australian Bird Counts (Blakers *et al.* 1984; Loyn 1986). This method involves walking slowly through a defined but unmarked area (about 3 ha) counting birds of each species seen or heard in 20 minutes. Birds observed outside the census area are excluded from analysis. Wedge-tailed eagle nests were located by searching

Table 1. Avifauna in relation to habitat type in the BTMA. (I = number of individuals, S = number of species, F = number of families)

| Map grid<br>1 : 25000 | Location        | I  | S  | F | Vegetation<br>type     | Burnt | Geology   |
|-----------------------|-----------------|----|----|---|------------------------|-------|-----------|
| 564100 303900         | Dolans Marsh    | 34 | 10 | 7 | *wetland               | 1991  | dolerite  |
| 565400 301500         | Wrights Marsh   | 32 | 13 | 6 | *wetland               | 1967  | dolerite  |
| 564500 310800         | NW boundary     | 33 | 12 | 7 | *wetland               | 1967  | sandstone |
| 565600 299300         | Baldt Creek     | 21 | 9  | 7 | relict rainforest      | 1967  | dolerite  |
| 563200 293800         | Back River      | 35 | 9  | 5 | mountain ash forest    | 1973  | sandstone |
| 566500 300900         | Maclaines Creek | 57 | 12 | 7 | mountain ash forest    | 1976  | dolerite  |
| 564000 296000         | Back River      | -  | 12 | 8 | mountain ash forest    | 1967  | dolerite  |
| 563200 295000         | Back River      | 40 | 9  | 5 | stringybark forest     | 1967  | sandstone |
| 559400 299500         | Bluff River     | 25 | 12 | 7 | stringybark forest     | 1985  | dolerite  |
| 562100 299600         | Bluff River     | 31 | 11 | 6 | stringybark forest     | 1967  | dolerite  |
| 571200 301900         | Barren Jack     | 25 | 14 | 8 | stringybark forest     | >1967 | dolerite  |
| 568800 304800         | Bluestone Tier  | 46 | 16 | 9 | stringybark forest     | 1973  | dolerite  |
| 557500 298200         | Bluff River     | -  | 14 | 7 | stringybark forest     | 1982  | sandstone |
| 568600 311800         | Pepper Creek    | 73 | 16 | 7 | peppermint forest      | >1967 | dolerite  |
| 561400 302800         | Pig Tier        | -  | 11 | 7 | peppermint forest      | 1983  | dolerite  |
| 570300 296700         | Maclaines Creek | -  | 21 | 9 | peppermint forest      | >1967 | dolerite  |
| 566500 308500         | Canadian Creek  | -  | 16 | 9 | § peppermint forest    | 1980  | dolerite  |
| 565200 309500         | Pepper Creek    | 20 | 8  | 5 | § peppermint forest    | 1967  | sandstone |
| 568800 310600         | Happy Valley    | 52 | 15 | 8 | grassland              | 1967  | sandstone |
| 562300 303600         | Pig Tier        | 11 | 5  | 5 | gum-top stringy forest | 1991  | dolerite  |
| 566600 299900         | Bluestone Tier  | -  | 6  | 6 | callistemon forest     | 1976  | dolerite  |

\* = closed shrubland, sedgeland or rushes on wetter site; § = grazed

on the ground and by using light aircraft (Mooney 1988b). A total list of all species observed during the survey was compiled including information collected from surrounding landowners and a literature search.

## Results

The survey identified 56 species of birds from 28 families. Ten of the 11 endemic Tasmanian species were recorded, the eleventh being the forty-spotted pardalote which is unlikely to occur in the area (Brown 1986). One of the two Tasmanian breeding endemics, the swift parrot, was recorded in the area whereas the breeding range of the second, the orange-bellied parrot, is restricted to western Tasmania. This total equates to what should be expected in similar habitats at this time of the year. A complete list of birds in the

BTMA and surrounding area is being prepared by the authors.

Five wedge-tailed eagle nests and one peregrine falcon breeding site were located within and on the boundary of the BTMA. Information on the location of nests is retained by the Department of Parks, Wildlife and Heritage.

Table 1 shows the number of species according to vegetation type, fire age and geological substrate. The size and duration of the study made it impractical to calculate a diversity index; however, results suggest that for this time of year species diversity is probably uniform across habitats. Most species were widespread in all forested areas but occurred with higher concentrations along watercourses than on ridge tops. This tendency has been noted by other workers (Loyn *et al.* 1980; Recher *et al.* 1980). During the breeding season, however, it is likely that species will be more concentrated in old vegetation types because of



Photo 1. *The scrubtit, a Tasmanian endemic species from Category 1 (see text).*

the need for nest hollows. This has important implications for management of birds.

The BMTA experiences small scale regional differences in climatic conditions but these are unlikely to influence the distribution of bird species other than by vegetation type. A small central area of relict rainforest did not contain a specific avian fauna (a situation typical of rainforest in Tasmania, Taylor 1991) and most species occurring there were generally represented throughout the BMTA.

## Discussion

Much of the BMTA has been disturbed, primarily by forestry operations but also by repeated firing and overgrazing. The value of the area for nature conservation lies with its retention of relatively old and undisturbed pockets of vegetation. This intact vegetation in association with regenerating forests provides a diversity of habitats for birds.

### *Threats to avifauna*

The greatest threat to avifauna in the BMTA is forestry operations. Many of the species

identified such as the parrot, cockatoo and owl species are dependent on oldgrowth forest for their breeding success and/or holes for nesting (Pattemore 1980; Wilson 1981). As it may take 50 to 100 years for holes to form and attain a suitable size, a forest industry based on a rotation cycle shorter than this may never achieve a full complement of forest fauna (Disney and Stokes 1976; Loyn 1980, 1985; Coulson and Coulson 1981). Provided certain prescriptions are followed, however, mature forest bird communities can and will re-establish in regrowth areas with time (Pattemore 1980; Loyn 1985; Braithwaite *et al.* 1989).

A further threat to avifauna is fire, either from escaped hazard reduction or regeneration burns conducted as part of forestry operations or from the unpredictable ignition source of wildfire from adjoining properties. Statham (1984) found the number of ground and understorey birds increased in the short term following hot wildfires but canopy dwellers showed a marked decline. This effect was noted at Dolans Marsh (in the study area) burnt in 1991 where primarily only insectivorous birds such as kookaburras, fairy wrens, robins, pardalotes and grey

shrike-thrushes were recorded. Providing places of refuge can do much to assist small birds, and the arboreal fauna in general, to recover from the effects of fire.

*Sensitivity of avian communities to disturbance from forest operations*

Species in the BMTA most affected by logging and habitat change have been categorised in Table 2. This table includes notes on the special requirements for successful breeding of each species. Information has been compiled from Pattemore (1980), Statham (1984) and personal observations. It should be noted that this list relates specifically to the BMTA so some species are categorised differently from the way that would be expected in other areas of the State. For example, the scrubtit is uncommon in the east of the State (Thomas 1979) and is highly sensitive to disturbance in a regional context. The species will utilise regrowth in wet sclerophyll areas (Pattemore 1980) but not in dry sclerophyll forest. The removal or reduction of habitat in the east of the State may result in localised extinction.

**Category 1.** — Species intolerant of major habitat change. These species have a restricted range, and breeding success is reliant on a specific vegetation type. If the habitat is removed or substantially reduced, the species will no longer occur in the BMTA. Total protection of habitat is the only management strategy able to sustain these species in the BMTA.

**Category 2.** — Species intolerant of major change within breeding habitats. These species have certain requirements for breeding success such as nest hollows, tree cavities, large horizontal branches or tall over-mature trees, all of which are usually associated with mature forest types. The management strategy for protecting these species is based on reservation of breeding habitats from logging. The extent of reservation depends on the species' requirements. The wedge-tailed eagle and yellow-tailed black cockatoo, for example, require mature, undisturbed forest surrounding nest trees, whereas the masked owl and green rosella will utilise small copses of trees, providing nest hollows are available.



*Photo 2. Tree holes characteristic of old vegetation are important nesting sites and are utilised by several bird species including the Australian owl-nightjar shown here.*

**Category 3.** — Species with a low tolerance to major habitat change but resilient. These will be totally excluded or substantially reduced in number following clearfelling. However, providing there are viable populations close to clearfelled areas, it is likely they will recolonise within 10 years (Pattemore 1980; Wilson 1981). Provision of wildlife corridors, streamside reserves and other undisturbed sites should provide adequate reservoirs enabling recolonisation by these species.

Species recorded in the BMTA but not included in these categories have no special requirements for breeding success. Most are either tolerant of habitat change, advantaged by habitat change, or utilise habitats such as grassland or wetland which are not usually affected by forestry operations.

#### *Wedge-tailed eagle nests in the BMTA*

The BMTA is one of the most secure areas for wedge-tailed eagle nests in the south-east of Tasmania because of the restrictions imposed by the Army and its continuity of land tenure. However, the nests are situated in forests that have potentially high value for forestry production and therefore the sites must be actively protected. Management prescriptions for nest sites are detailed below under Wildlife Priority Areas.

#### *Management prescriptions*

The most important management recommendations for the BMTA are those associated with the conservation of wedge-tailed eagle nest sites, retention of oldgrowth forest for nesting hollows, protection of *Eucalyptus globulus* for the swift parrot and the maintenance of habitat reserves to protect and ensure species diversity. Other management prescriptions recommended are to improve the status of the avian fauna under current land-use practices.

#### *The Forest Practices Code and fauna guidelines*

Under the Forest Practices Code for fauna (Taylor 1990), application of the following

protective measures are prescribed for birds in the BMTA:

- *Wildlife Priority Areas (wedge-tailed eagle and peregrine falcon nest sites)*

All wedge-tailed eagle and peregrine falcon nest sites require zoning as Wildlife Priority Areas of high conservation value. This is of particular urgency as some sites are designated for logging in 1992.

Mooney (1988a) recommends that wedge-tailed eagle nests be protected by a zone of original habitat for a radius of at least 250 m. Eagles are less tolerant of disturbance uphill from a nest so the zone should be larger in this direction than downhill of the nest. An area of 10 ha of oldgrowth eucalypt forest should be regarded as a minimum reliable copse size for breeding although an additional area to 20 ha is preferable (Mooney and Holdsworth 1991). The ridge top should not be cleared or any form of disturbance permitted. Reservation of timber should also be biased toward the windward side of the nest tree in order to provide shelter.

Peregrine falcons are less sensitive to disturbance than wedge-tailed eagles; however, the area surrounding nest sites requires protective measures to ensure breeding success. Peregrine falcons utilise cliff sites for nesting, and providing clearfelling or other major activity does not occur within 200 m of the nest site or during the breeding season (October to December) then peregrines will breed successfully. Disturbance out of sight of the nest during the non-breeding period will have little effect on the species, therefore forestry operations can be undertaken close to the cliff without risk of desertion. These measures can usually be incorporated into streamside reserves or as an extension to them.

- *Streamside reserves*

The Bluff River and Back River constitute Class 1 watercourses and require a

Table 2. Special requirements of birds sensitive to habitat change in the BMTA (listed in taxonomic order). Descriptions of the categories are provided in the text.

| Common name                  | Special requirements   |
|------------------------------|--|
| <i>Category 1</i>            |  |
| White's thrush               | oldgrowth forest with low understorey                            |
| scrubtit                     | wet fern gullies   |
| pink robin                   | dense wet forest   |
| <i>Category 2</i>            |  |
| grey goshawk                 | oldgrowth wet forest > 10 ha (not recorded breeding in the BMTA) |
| brown goshawk                | tall nest trees in gullies                                       |
| *collared sparrowhawk        | tall to medium nest trees in gullies                             |
| white-bellied sea-eagle      | tall nest trees with no disturbance within 250 m radius          |
| wedge-tailed eagle           | tall nest trees with no disturbance within 250 m radius          |
| peregrine falcon             | sandstone cliffs with low human activity                         |
| brown falcon                 | tall to medium nest trees (dependent on raven nests)             |
| common bronzewing            | dry open woodland understorey trees                              |
| brush bronzewing             | dense scrub or wet forest  |
| yellow-tailed black cockatoo | oldgrowth forest with nest hollows                               |
| sulphur-crested cockatoo     | forest with nest hollows   |
| musk lorikeet                | woodland with nest hollows                                       |
| swift parrot                 | forest with nest hollows   |
| green rosella                | forest with nest hollows   |
| eastern rosella              | woodland with nest hollows                                       |
| blue-winged parrot           | woodland with nest hollows                                       |
| southern boobook             | woodland or forest with nest hollows                             |
| masked owl                   | woodland or forest with nest hollows                             |
| tawny frogmouth              | woodland with horizontal branches                                |
| *Australian owl-nightjar     | woodland with nest hollows                                       |
| tree martin                  | forest with nest hollows   |
| black-faced cuckoo shrike    | woodland with horizontal branches                                |
| flame robin                  | woodland with nest hollows and cavities                          |
| scarlet robin                | woodland with nest hollows and cavities                          |
| dusky robin                  | woodland with nest hollows and cavities                          |
| olive whistler               | dense wet scrub  |
| golden whistler              | mid-dense dry understorey trees                                  |
| grey shrike-thrush           | woodland or forest with cavities                                 |
| satin flycatcher             | tall trees with horizontal branches                              |
| spotted pardalote            | woodland or forest with nest hollows                             |
| striated pardalote           | woodland or forest with nest hollows                             |
| beautiful firetail           | dense tall scrub for nesting                                     |
| dusky woodswallow            | woodland with nest hollows and cavities                          |
| <i>Category 3</i>            |  |
| pallid cuckoo                | populations of host birds  |
| fan-tailed cuckoo            | populations of host birds  |
| Horsefield's bronze-cuckoo   | populations of host birds  |
| shining bronze-cuckoo        | populations of host birds  |
| grey fantail                 | riverine scrub   |
| *spotted quail-thrush        | dry open woodland  |
| white-browed scrubwren       | dense wet scrub  |
| brown thornbill              | dense ground vegetation  |
| Tasmanian thornbill          | dense ground vegetation  |
| yellow wattlebird            | flowering food plants  |
| little wattlebird            | flowering food plants  |
| yellow-throated honeyeater   | flowering food plants  |
| strong-billed honeyeater     | flowering food plants  |
| black-headed honeyeater      | flowering food plants  |
| crescent honeyeater          | flowering food plants  |
| New Holland honeyeater       | flowering food plants  |
| eastern spinebill            | flowering food plants  |

\* totally dependent on commercial forest types (Taylor 1991)

minimum of 40 m reserve zone free from disturbance (80 m in total width). This will protect the endemic scrubtit occurring in wet fern gullies along the Back River without creating additional reserves. Pepper Creek, Baldy Creek and Maclaines Creek and their tributaries are Class 2 or Class 3 watercourses and require at least 20 to 30 m (40 to 60 m in total width) protection from logging and disturbance. This will provide refuge sites for small avifauna such as honeyeaters, robins, thornbills, wrens and finches until the surrounding vegetation has regenerated.

- *Wildlife Habitat Strips*

Wildlife Habitat Strips alone or in conjunction with streamside reserves are required to protect larger bird species such as the parrots, currawong, grey shrike-thrush and whistlers. These species have large foraging areas which include regenerating forest and oldgrowth forest, and many require tall trees for nest sites. Wildlife Habitat Strips must be protected from disturbance and be at least 100 m in width as specified by Taylor (1990). Wherever possible, habitat strips and streamside reserves should be linked to provide corridors, thus providing a continuity of habitat for the movement of small passerines. This reduces the need to move into cleared areas, which increases the risk of predation (Loyn 1980).

- *Nesting areas*

Retention of overmature trees in all logging coupes is required to retain nesting hollows. It has been suggested that up to 20 hollows per hectare may be sufficient to provide habitat for arboreal mammals and birds in Tasmania (Statham 1984). Trees should be clumped in copses to minimise wind impact and provide shelter. In areas where *Eucalyptus globulus* is being logged, a percentage of trees, preferably oldgrowth, should remain uncut on each coupe. It is recommended that the trees are clumped every 3 to 5 ha

and that five large trees plus 10 medium trees per hectare remain uncut for this purpose (Brown 1989; Taylor 1990). Ridge-top trees are often wind- and fire-pruned, and readily form hollows, therefore retention of ridge-top timber, especially when adjacent to *E. globulus*, will provide for many hollow-nesting species, for example the swift parrot (Brown 1989).

- *Tree species used in regeneration*

During reseedling, *Eucalyptus globulus*, *E. ovata* and *E. viminalis* should be included wherever possible. These three species occur naturally in the BMTA and all are important food and nesting trees for the swift parrot and four other endemic species, the green rosella, dusky robin, yellow wattlebird and forty-spotted pardalote (Wilson 1984; Brown 1986). They have an added advantage of being resistant to *Phytophthora cinnamomi* (Forestry Commission 1987).

### *Fire*

Intense hot fires in heavy fuel loads are capable of igniting material high in the vegetation and reach nests which would otherwise be safe from fire. This is most likely to occur in a wildfire. The destruction of nests by fire will mean the loss of eggs and dependant young, thereby reducing productivity.

The breeding season for most birds in Tasmania occurs from August to February (Blakers *et al.* 1984), therefore fuel or hazard reduction burning should not be undertaken during this period. Prescribed fire should be excluded from designated oldgrowth forests, wildlife conservation areas and other reserves defined under the Forest Practices Code. A strict regime of prescribed burns and control of wildfires in other areas can assist in providing a high diversity of habitats. The rotation period of prescribed burning should be long enough to allow the maintenance of the diversity of understorey



species and not disadvantage the eucalypt overstorey. The regrowth forest should then achieve a mature structure similar to that which it replaces. Pattenmore (1980) suggests that by 30 years of age, wet forest regrowth provides birds with a habitat closely comparable to mature forest but a period much longer than this is required for nest hollows to form (at least 80 years, Disney and Stokes 1976). Without protection from hot wildfires, these habitats will not attain a mature forest structure.

Road and track excavation, fire trails and the construction of firebreaks may help prevent the spread of wildfire but also facilitate movement of introduced, feral and native predators within an area.

### Management recommendations

Management recommendations for the BMTA are that:

1. Areas surrounding wedge-tailed eagle and peregrine falcon nests should be designated as Wildlife Priority Areas for conservation and appropriate measures taken to ensure their security prior to the commencement of logging operations.
2. Investigations be undertaken to establish the size of the breeding population of the swift parrot in the BMTA. Breeding areas should be reserved as Wildlife Priority Areas and additional stands of *Eucalyptus globulus* be retained in conjunction with breeding areas to enhance feeding.
3. No decline should occur in the representation of *Eucalyptus globulus* in regenerating forests compared with the pre-logged situation.

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4. Logging rotation lengths should be at least 150 years or greater, and staggered in space and time to allow development of nest hollows to accommodate a wide range of bird and arboreal mammal species.
5. Fire should be prevented in oldgrowth forests and areas designated as Wildlife Priority Areas. Prescription fires should not be undertaken between August and February.
6. A follow-up survey during the breeding season is required to determine the diversity and abundance of many bird species in the area.

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