

4 Lowland Woodland Fauna

4.1

Introduction

The crescent of temperate eucalypt woodland that stretched from southern Queensland to South Australia provided animals with a diversity of habitats. Woodland fauna includes birds, bats, reptiles, amphibians, ground dwelling and arboreal mammals, and invertebrates. The hollows developed in older tree trunks and branches, together with fallen wood, provide essential shelter for many of these species. Loose bark provides shelter for some of the invertebrates that provide food and nesting material (e.g. spider web) for birds. Healthy, mature woodland trees are an important source of nectar and their open canopies allow the development of a species-rich understorey of tussock grasses and forbs, which is habitat for a range of fauna and is grazed by the larger marsupials. Many fauna species found in woodlands also occur in other habitats such as forests, riparian zones or grasslands. Some species, however, are restricted almost entirely to woodland habitats.

More recent additions to woodland fauna include the Dingo, which was brought to Australia by humans around 3500–4000 years ago (Corbett 1995), and several domestic and feral species that were introduced either deliberately or inadvertently following European settlement. Domestic species include cattle, sheep and horses, whereas feral animals include pigs, rabbits, hares, cats, foxes, dogs, mice, Starlings and Common Mynahs.

4.2

Fauna as Part of the Woodland Ecosystem

Woodland animals are an intrinsic part of the overall functioning of woodland ecosystems. They are essential for pollination and dispersal of many

woodland plants and are involved in nutrient recycling and maintenance of soil condition. Loss of species can alter ecosystem processes, which may adversely affect the health of the ecosystem. Some of the factors now contributing to the decline of ecosystem health in temperate eucalypt woodlands have been outlined in Chapter 2. The well-known phenomenon of rural tree dieback is a notable example of an altered ecosystem process that has resulted in widespread impact at the landscape level. One of the possible explanations for the increasing occurrence and severity of insect-mediated dieback is a reduction in the abundance and efficacy of natural controls of damaging insects, in particular the decline in insectivorous birds and insect parasitizers of pasture scarabs (Reid and Landsberg 2000; Martin and Green 2002). The health of woodlands is in large measure dependent on retention of woodland fauna assemblages.

It is beyond the scope of this Strategy to provide detailed information for all woodland animal species. In discussing woodland fauna and its conservation, this Strategy places an emphasis on woodland birds. The reasons for this are:

- Birds are valuable indicators of habitat modification and ecosystem health. This is because they occupy a diversity of niches, often at the apex of the food chain, and their species composition and abundance may reflect the underlying state of the ecosystem.
- Actions aimed at conservation of woodland bird species and habitat will also benefit other woodland fauna.
- Birds are highly visible and the strong community interest and skill in observing birds means more information is generally available on species composition and abundance than for other types of animals.
- The effects on birds of habitat loss and modification are relatively well studied compared to other faunal groups.
- The eight threatened woodland animal species in the ACT are all birds (see Table 4.1), and this *Strategy* incorporates the Action Plans for these species.

4.3

Threats to Fauna

Widespread clearing, habitat modification and fragmentation of woodlands since European settlement (see Chapter 2) have had a severe impact on the habitat of woodland animals. Other threats include increased predation by introduced predators and human disturbance. These threats to woodland fauna are described in more detail in the following sections.

4.3.1 Continued Removal and Fragmentation of Habitat

Clearance of native vegetation still remains the most significant threat to terrestrial biodiversity despite apparently tight legislative controls (Australian State of the Environment Committee 2001) and is listed as a key threatening process in NSW and nationally. Expanding urban development increases pressure on remnants of native vegetation, while construction of roads and other urban infrastructure leads to increased fragmentation of habitat. There is an extensive literature on the effects of fragmentation on fauna, especially birds and mammals (Andren 1994). The effects of habitat removal and fragmentation have been particularly noticeable for birds, a relatively well studied woodland fauna group (e.g. Robinson and Traill 1996; Freudenberger 1999; Reid 1999; Garnett and Crowley 2000; NLWRA 2002). Land clearance has affected over 82 percent of all bird taxa from mainland Australia and Tasmania, with almost half of the affected taxa occurring in temperate or subtropical woodlands (Garnett and Crowley 2000). More than 25% of the landbirds of woodlands are either threatened or in apparent decline (Robinson and Traill 1996, Reid 1999). It has been estimated that 1000–2000 birds permanently lose their habitat for every 100 ha of woodland that is cleared (Australian State of the Environment Committee 2001).

The size of remnants is critical for many animal species. The Brown Treecreeper and Hooded Robin have declined or disappeared from fragments of less than 300 ha (Freudenberger 1999; Garnett and Crowley 2000) and many more species are absent from remnants below 20 ha (Traill 2000). Larger terrestrial predators such as the Lace Monitors may require home ranges of 500 ha or more. Minimum patch size for bats and arboreal and ground dwelling mammals to persist in the short term is likely to be approximately 10 ha in good quality habitat and a

larger area in poor quality or degraded habitat. Animal populations too small to be viable in the long term may persist for some time in remnants following habitat fragmentation, resulting in a time lag (in some cases years or decades) between habitat disturbance and species decline (Recher and Lim 1990; Saunders *et al.* 1991; Traill 2000). Such time lags can occur if individuals are long-lived (but may not be breeding) or if the habitat is sufficient to satisfy the requirements of the species during good conditions, but not during or following major environmental disturbances such as drought or fire.

The degree of isolation or connectivity of a remnant determines its potential for recolonisation and is a critical issue for fauna conservation. Connectivity has been defined as 'the degree to which the landscape facilitates or impedes movements among patches' (Bennett 1999). Distance from other remnants is important for less mobile species (e.g. reptiles and amphibians) or species reluctant to cross large open areas (e.g. the Brown Treecreeper (*Climacteris picumnus*), Squirrel Glider (*Petaurus norfolcensis*), Sugar Glider (*Petaurus breviceps*) and Common Ringtail Possum (*Pseudocheirus peregrinus*)). Lack of connectivity in highly fragmented woodlands is clearly a threat to the long-term viability of animal populations (Smith and Hellmann 2002), though the best means of rebuilding connectivity is subject to debate and depends upon the species in question.

The value of corridors has been debated on the basis of adequate width, high cost and edge effects. An alternative is closely spaced patches forming 'stepping stones' (Beier and Noss 1998; Martin and Green 2002; Freudenberger 2001). Stepping stones are likely to benefit species that are sufficiently mobile to cross areas of unsuitable habitat (such as some birds) but may not benefit less mobile species such as many reptiles and small ground-dwelling mammals such as *Antechinus*. Even amongst highly mobile species, fragmentation can result in the necessity to move greater distances between resources, such as between feeding and breeding habitats. This has apparently occurred for the Superb Parrot (*Polytelis swainsonii*), which is also reluctant to cross large areas of open ground in local foraging movements (Higgins 1999). Movement between fragments can also increase exposure to risks such as predation or road collision (e.g. ground-feeding parrots, kangaroos in the Canberra urban area, and migrating Eastern Snake-necked Turtles (*Chelodina longicollis*)).

4.3.2 Degradation of Existing Habitat

The major threat to animals in existing habitat, even where the habitat may have sufficient area and connectivity, is the degradation of that habitat and especially loss of habitat diversity. Ecosystems with a complex 'architecture' support more species than ecosystems that have been simplified, and many species require a complex vegetation structure to meet their habitat requirements (Mac Nally 1995). Structural complexity is created by the presence of trees of different ages, tree hollows, standing dead trees, a patchy shrub layer, a species-rich understorey of grasses and forbs, fallen timber and water, all of which provide shelter, food or nesting sites for animals (Martin and Green 2002). A reduction in habitat complexity (or quality) occurs through removal of mature trees, fallen timber and rocks, grazing by stock at an intensity that reduces floral diversity of the ground layer and prevents tree and shrub regeneration, inappropriate fire regimes, invasion by weeds and soil erosion. Removal of dead standing and fallen timber, removal of bush rock and high-frequency fire regimes are listed in NSW as key threatening processes.

Studies by Er (1995) show that the vertical complexity of woodland is vital to supporting a diversity of native birds. Habitat quality is at least as important as woodland patch size in maintaining bird species richness for patches larger than 6 ha (Barrett *et al.* (1994). In a study in the Boorowa area, NSW (north of the ACT), Freudenberger (2001) found few 'declining' woodland birds in simplified habitats that have little understorey other than exotic pasture. Thirty-seven bird species sensitive to habitat simplification required at least some understorey, comprising a combination of native tussock grasses, fallen timber, low shrubs and/or regenerating trees or tall wattles. Boehm (1982) discussed the considerable decline in Brown Treecreeper numbers as a result of removal of large amounts of fallen timber from an area of woodland near Bower in South Australia. At another study site, Boehm (1982) found that stacks of timber, such as off-cuts from timber cutting for fence posts, attracted many Brown Treecreeper individuals and when the timber was removed the number of individuals dropped considerably. Mac Nally *et al.* (in press) showed that experimental addition of fallen timber to an area was associated with an increase in numbers of Brown Treecreepers.

Fallen timber, leaf litter and other ground cover provides important habitat for a range of invertebrates, many of which depend on dead wood and leaves for their survival. These invertebrates, together with microbial organisms and fungi, are important in the breakdown of timber (Araya 1993) and recycling of nutrients back into the soil. In turn, invertebrates provide the main food source for a range of woodland birds, reptiles, amphibians and some mammals. Indeed, many reptiles, small mammals, and birds found in woodlands are strongly associated with a well-developed ground cover (Martin and Green 2002), which provides shelter, cover from predation, and food (invertebrates).

Altered fire regimes can cause changes in vegetation composition and structure, resulting in modified habitat for fauna (Hobbs 2002). Inappropriate fire regimes are a concern for at least 51 nationally threatened bird taxa (Woinarski 1999). Fire regimes since European settlement have disadvantaged a number of mammal species that require particular successional vegetation stages (Bauer and Goldney 2000). Christensen (1998) suggests that medium size mammals benefit from a fire regime that results in a mosaic of burnt and unburnt patches to provide feeding and refuge areas. Frequent burning that results in a reduction in leaf litter and fallen timber is likely to impact on the abundance of small ground-dwelling mammals, reptiles and invertebrates.

Mistletoe (*Amyema* spp.) in high density can contribute to rural tree dieback. However, there is increasing recognition of this parasitic plant as an integral component of woodland ecosystems and a 'keystone' resource for some fauna (Watson 2001). Forty-one species of bird, including the threatened Painted Honeyeater feed on mistletoe and the flowers are sought in summer when nectar availability in woodlands is lowest. Mistletoe clumps are also recorded as main nest sites for a number of birds and the Ringtail Possum (Watson 2001). Species of birds, ants, weevils and butterflies have co-evolved with mistletoe and are dependent on these plants for survival (Martin and Green 2002). Lack of mistletoe is not a current threat, though decline of live paddock trees will reduce the spatial availability of mistletoe for wildlife.

Tree hollows are a particularly important habitat resource for birds, bats and arboreal mammals and their loss is a major threat to those species (Bennett *et al.* 1994). This resource is not easily replaced, as hollows may take 70–100 years to develop to

minimum size (10 cm diameter) and more than 200 years to be large enough for a cockatoo, owl or possum (Martin and Green 2002). Nearly 400 species of Australian vertebrates use tree hollows as dens, roosts or nests and around 40 per cent of mammals and 20 per cent of birds are dependent on them. Scattered farm or paddock trees that have been left when the land was cleared are important habitat trees. Surveys in Victoria have shown that these trees support a widespread and relatively common insectivorous bat population (Reid and Landsberg 2000). Competition from introduced Common Mynahs (*Acridotheres tristis*) and Common Starlings (*Sturnus vulgaris*) is likely to reduce the availability of hollows for native wildlife in peri-urban areas and farmland. For example, there is evidence that Starlings have evicted Brown Treecreepers from nest hollows (ACT Government 1999e).

4.3.3 Predators, Human Impacts

Foxes, cats and dogs are known to prey on woodland fauna, which can form a substantial proportion of the diet of these introduced predators. The native prey of foxes, feral, stray and domestic cats includes mostly ground-dwelling small mammals and reptiles, birds commonly found on the ground or in lower understorey and occasionally bats and small arboreal mammals (Coman 1995; Newsome 1995; Dickman 1996). The impact of this predation on population sizes of woodland fauna has not been well quantified. It is evident, however, that some species have been highly vulnerable to predation by introduced predators. Mammals in the weight range between 35 g and 5.5 kg have shown disproportionate decline since European settlement, and this occurred prior to extensive agricultural clearing. Thirteen of the 27 species of native mammals that disappeared from western NSW were last collected in 1857 or earlier (Bauer and Goldney 2000). Dickman (1994) concluded that cats played an important role in the demise of these species. Feral cat and fox predation on native wildlife are listed as key threatening processes in NSW and nationally. The uncontrolled roaming of domestic cats, and in some cases dogs, in nature reserves close to urban areas is likely to contribute to increased predation on wildlife. Conservation of susceptible fauna in these areas will depend on responsible pet ownership or stronger controls.

Fragmentation and simplification of woodland vegetation structure can result in dominance of fauna species that are disturbance tolerant, widely distributed, abundant and often aggressive (Majer *et*

al. 2000). An abundance of such species can have a negative impact on other woodland fauna. In particular, domination of remnants by Noisy Miners (*Manorina melanocephala*) has been implicated in lowering the diversity of smaller passerines in fragmented rural woodlands (Dow 1977).

Threats from direct human impacts include trapping, hunting, disturbance to habitat in woodland areas used for recreation, and the impacts of traffic. Hunting is considered to have placed pressure on animal populations in the past and resulted in serious declines or extinction e.g. the Brush-tailed Rock Wallaby (*Petrogale penicillata*) in central western NSW (Bauer and Goldney 2000). Extensive trapping of some birds, especially parrots, has occurred in the past for the aviary trade. The Superb Parrot (*Polytelis swainsonii*) was formerly illegally trapped in large numbers but the current trapping situation is not known. Early in the 20th century, great numbers were also killed by the consumption of poisoned grain intended for the eradication of Galahs (Higgins 1999). Superb Parrots commonly feed on spilt grain on or near roads and many are struck by motor vehicles. Human disturbance to habitat is likely to be exacerbated in small woodland fragments close to population centres.

4.4

Woodland Fauna of the ACT Region

4.4.1 Woodland Fauna Information

A variety of data sources were used to compile composite information on woodland fauna of the ACT region. These sources included scientific papers and books; reports and/or records of observations by Environment ACT staff, consultants, other government agencies including the NSW Department of Environment and Conservation and community groups such as the Canberra Ornithologists Group (COG). The detail and accuracy of these data vary within the region, depending upon the locations and methods of surveys and the inclusion of opportunistic observations.

Overall, the ACT is the most extensively surveyed part of the region. Fauna surveys and specific studies have been conducted in many areas of lowland woodland and adjacent open forest and natural temperate grassland, including Mulligans Flat Nature Reserve, Ainslie–Majura and Black Mountain Nature Reserves and Kowen escarpment. COG has established a

number of sites in woodlands for ongoing bird monitoring. COG also regularly record sightings of birds within 2.5 minute grid cells (approximately 3.5 km by 4.5 km) as part of the Atlas of ACT Birds (Taylor and COG 1992) and prepare an annual bird report (e.g. COG 2002). Opportunistic sightings of species provide valuable information for areas where detailed surveys have not been conducted.

4.4.2 Birds

Lowland woodlands in the ACT support a diverse bird fauna. About fifty bird species occur as residents or summer migrants in grassy woodland, with many other species present on a less frequent basis (Taylor and COG 1992). In Mulligans Flat Nature Reserve alone, the number of bird species sighted each year is commonly around 100.

Some bird species in the ACT region are largely restricted to woodland habitat. The Southern Whiteface (*Aphelocephala leucopsis*) and White-fronted Chat (*Ephthianura albifrons*) feed on the ground in open woodland areas with short grasses and tend not to occur in forest habitats, which have a thick layer of leaf litter, or in areas devoid of trees or shrubs. Other species, such as the Double-barred Finch (*Taeniopygia bichenovii*), Western Warbler (*Gerygone fusca*) and Diamond Firetail (*Stagonopleura guttata*) prefer open grassy areas with a patchy shrub layer, which in the ACT region is often present in woodlands but not in grasslands or dense forest.

Several bird species are found only in relatively undisturbed woodland habitat (Freudenberger 2001). These species include Brown Treecreepers (*Climacteris picumnus*), Rufous Songlarks (*Cincloramphus mathewsi*), Jacky Winters (*Microeca fascians*), Diamond Firetails (*Stagonopleura guttata*), Hooded Robins (*Melanodryas cucullata*) and Speckled Warblers (*Chthonicola sagittata*). The latter two species also tend to occur only in large (more than 100 ha) well connected and complex woodland patches, though Hooded Robins occur in much smaller and less well connected remnants in the Boorowa River catchment (Freudenberger 2001). Other species inhabiting woodlands also frequent urban areas, particularly where suitable habitat is present such as mature trees, or where other resources have been provided. Examples of these birds are several cockatoo and parrot species, Scarlet Robin, Superb Fairy-wren (*Malurus cyaneus*), Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*) and Silvereye (*Zosterops lateralis*). Two threatened species, the

Regent Honeyeater (*Xanthomyza phrygia*) and Superb Parrot have occasionally been seen in urban areas.

Several woodland bird species, such as the Regent Honeyeater and Superb Parrot are semi-nomadic, ranging widely across woodlands in south-eastern Australia to follow the irregular and infrequent local eruptions of flowering eucalypts. Other species are migratory, and may cover large distances (e.g. the Swift Parrot, which migrates between Tasmania and the mainland), moderate distances (e.g. the White-winged Triller, which moves between the ACT and more northerly regions) or smaller distances within the region (e.g. the Flame Robin, which is an altitudinal migrant). Further details on habitat requirements of woodland birds and threats are given in section 4.6 and Appendix 2.

4.4.3 Mammals

Native mammals found in lowland woodlands of the ACT region include arboreal marsupials, grazing marsupials, smaller ground-dwelling mammals, and bats. Some of these species have adapted well to urban areas, particularly where mature trees have been retained. Arboreal marsupials include the Common Brushtail Possum (*Trichosurus vulpecula*), Common Ringtail Possum (*Pseudocheirus peregrinus*), Koala (*Phascolarctos cinereus*), Sugar Glider (*Petaurus breviceps*) and Squirrel Glider (*Petaurus norfolcensis*). Grazing marsupials include the ubiquitous Eastern Grey Kangaroo (*Macropus giganteus*), Wallaroo (*Macropus robustus robustus*), Red-necked Wallaby (*Macropus rufogriseus*), Swamp Wallaby (*Wallabia bicolor*) and Common Wombat (*Vombatus ursinus*). The Echidna (*Tachyglossus aculeatus*) is occasionally seen in woodlands of the ACT. Smaller ground-dwelling mammals recorded in ACT woodlands include the Yellow-footed Antechinus (*Antechinus flavipes*), Common Dunnart (*Sminthopsis murina*) and native Bush Rat (*Rattus fuscipes*). Unlike woodland in some other parts of Australia, the ACT lacks medium-sized ground-dwelling marsupials such as bettongs, pottoroos or bandicoots.

At least ten bat species occur in ACT woodlands. These are the Lesser Long-eared Bat (*Nyctophilus geoffroyi*), Gould's Long-eared Bat (*N. gouldi*), White-striped Freetail-bat (*Nyctinomus australis*), Chocolate Wattled Bat (*Chalinolobus morio*), Gould's Wattled Bat (*C. gouldii*), Common Bentwing-bat (*Miniopterus schreibersii*), Little Forest Bat (*Vespadelus vulturnus*), Southern Forest Bat (*V. regulus*), Large Forest Bat (*V. darlingtoni*) and Southern Freetail-bat (*Mormopterus planiceps*).

All native mammal species found in ACT woodlands also occur in other habitats such as forests, riparian zones, grasslands and the ecotones between them. The Eastern Grey Kangaroo and Common Brushtail Possum are abundant in woodlands of the ACT region. Wallaroos are found in small numbers in marginal dry hill country of the lower Nass and Gudgenby catchments. The Southern Freetail-bat and Squirrel Glider are considered to be uncommon, with the latter listed as a threatened species in New South Wales. The Common Bentwing-bat, although still reasonably abundant, is listed nationally under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) as being 'conservation dependent' because of the need to protect major roosting caves. The Koala is extremely rare in the ACT and is listed as threatened in NSW and south-eastern Queensland. The other mammal species occurring in ACT woodlands are considered to be common throughout most of their distributions (Strahan 1995), although population sizes of many have continued to decline since European settlement. There is some evidence that smaller ground-dwelling mammals are becoming less abundant in woodland reserves close to urban areas. None of the mammals occurring in ACT woodlands are listed as threatened in the ACT.

4.4.4 Reptiles

Lowland woodland in the ACT provides habitat for many lizard species and four snake species, and their abundances vary geographically. Frequently found lizards include the Eastern Blue-tongue Lizard (*Tiliqua scincoides*), Boulenger's Skink (*Morethia boulengeri*), Jacky Lizard (*Amphibolurus muricatus*), Delicate Skink (*Lampropholis delicata*), Three-toed Skink (*Hemiergis decresiensis*), Garden Skink (*Lampropholis guichenoti*), Stone Gecko (*Diplodactylus vittatus*), Copper-tailed Skink (*Ctenotus taeniolatus*), Striped Skink (*Ctenotus robustus*) and Olive Legless Lizard (*Delma inornata*).

Less commonly seen lizards include the Pink-tailed Worm Lizard (*Aprasia parapulchella*) (more usually associated with treeless native grassland), Burton's Snake Lizard (*Lialis burtonis*), Bearded Dragon (*Pogona barbata*), Common Dwarf Skink (*Menetia greyii*), Shingleback (*Trachydosaurus rugosus*), Marbled Gecko (*Christinus marmoratus*), Spotted Skink (*Ctenotis uber orientalis*) and Cunningham's Skink (*Egernia cunninghami*). The Nobbi Dragon (*Amphibolurus nobbi*) is uncommon in the ACT and is mostly found in areas close to the Murrumbidgee River. The Shingleback is primarily an inhabitant of the drier inland and the

northern ACT marks the easterly limit of its distribution. Specimens from the ACT and region are black or very dark brown in colour (Bennett 1997).

Rosenberg's Monitor (*Varanus rosenbergi*) is rarely seen in the ACT, with records from Mt Ainslie, Black Mountain, Aranda Bushland and as far south as Gigerline and the Orroral River. Also rarely seen is the Lace Monitor (*Varanus varius*), which has been recorded from Mt Ainslie, Black Mountain and the Gungahlin area. Lace Monitors appear to have declined in the ACT in recent years (Bennett 1997). Monitors (goannas) range long distances in search of food or mates, and only large areas of suitable woodland or dry sclerophyll forest will support a viable population. A key resource for monitors is termite mounds, which these species require for nesting.

Snakes found in ACT lowland woodlands include the Blind Snake (*Ramphotyphlops nigrescens*), Eastern Brown Snake (*Pseudonaja textilis*) and Red-bellied Black Snake (*Pseudechis porphyriacus*). The uncommon Black-headed Snake (*Suta spectabilis dwyeri*) has been recorded from wooded ridges and partially cleared hillsides in the Gungahlin area, including Mulligans Flat Nature Reserve (Osborne et al. 1992) and Gooroo (Bennett 1997).

The Eastern Snake-necked Turtle (*Chelodina longicollis*) is found throughout the ACT, including lowland woodland habitats, wherever there is a water source such as a creek, swamp or farm dam (Bennett 1997).

4.4.5 Amphibians

Frogs occur in wetter areas within woodland and may use logs, rocks and thick grass for shelter. Species recorded in ACT lowland woodland include Peron's Tree Frog (*Litoria peronii*), Whistling Tree Frog (*Litoria verreauxii*), Plains Froglet (*Crinia parinsignifera*), Common Eastern Froglet (*Crinia signifera*), Eastern Banjo Frog (*Limnodynastes dumerilii*), Brown-striped Frog (*Limnodynastes peronii*), Spotted Grass Frog (*Limnodynastes tasmaniensis*), Smooth Toadlet (*Uperoleia laevigata*) and the uncommon Brown Toadlet (*Pseudophryne bibronii*).

4.4.6 Invertebrates

Insects, other macro-invertebrates and microbiota account for more than 90 per cent of the biodiversity in woodlands and are vital for healthy ecosystem function. They are essential for pollination and reproduction of many woodland plants, are involved in nutrient recycling through the breakdown of dead plant and animal material and are the main food of many

woodland birds and reptiles. The uncontrolled abundance of some types of invertebrates contributes to rural tree dieback. The integrity of the whole woodland ecosystem depends on an abundance of invertebrates in the right balance. Invertebrates are more diverse and abundant in woodland with mature trees (loose bark) and a well-developed ground cover of leaf litter, logs, branches or tussock grasses. Less information, however, exists on the composition, biodiversity and ecological requirements of invertebrates in woodlands than for other fauna groups. Consequently, conservation of most invertebrate species falls under the umbrella of habitat protection for vertebrates and vegetation communities.

The Perunga Grasshopper (*Perunga ochracea*) and the Golden Sun Moth (*Synemon plana*) are listed as threatened in the ACT. Both species have been recorded in open grassy woodland, although they are more usually associated with treeless Natural Temperate Grassland. These species are found in a number of grassland reserves, which have been established for the protection of Natural Temperate Grassland and threatened grassland fauna. In woodland, these threatened grassland species are probably more closely associated with the more open grassy areas. Key's Matchstick Grasshopper (*Keyacris scurra*), an uncommon species in the ACT region, has been recorded in open grassy woodland at Mulligans Flat Nature Reserve.

4.4.7 Threatened, Declining and Uncommon Species

Woodlands in the ACT provide important habitat for eight animal species (all birds) declared as threatened in the ACT under the *Nature Conservation Act 1980* (Table 4.1). These are discussed more fully in section 4.6.1. Table 4.1 also lists woodland species occurring in the ACT region that are declared threatened in other jurisdictions, and includes birds, mammals and a reptile. In addition to the bird species listed as threatened in the ACT, there is a suite of woodland bird species that is in apparent decline based on Taylor and COG (1992), Reid (1999), Traill and Duncan (2000), and data from both COG and NSW Atlassers group. This suite includes the Diamond Firetail (*Emblema guttata*), Speckled Warbler (*Sericornis sagittatus*), Flame Robin (*Petroica phoenicea*), Crested Shrike-tit (*Falcunculus frontatus*), Scarlet Robin (*Petroica multicolor*), Jacky Winter (*Microeca fascinans*), Dusky Woodswallow (*Artamus cyanopterus*) and White-fronted Chat (*Ephthianura albifrons*).

Threatened and uncommon species that have been recorded in woodlands of the ACT region, but are more typically associated with native treeless grasslands, include the Perunga Grasshopper (*Perunga ochracea*), Golden Sun Moth (*Synemon plana*) (both listed as threatened in the ACT) and Pink-tailed Worm Lizard (*Aprasia parapulchella*) (listed as threatened nationally). Key's Matchstick Grasshopper (*Keyacris scurra*), a grassland species occasionally found in woodlands is also considered to be uncommon in the ACT. The Barking Owl (*Ninox connivens*) (listed as vulnerable in NSW) occurs sparsely in woodlands across Australia, though there are only a few records from the ACT, where it is considered to be a very rare visitor (Taylor and COG 1992).

Woodland species that are uncommon in the ACT region include the Lace Monitor Lizard, Shingleback Lizard, Black-headed Snake and Brown Toadlet.

4.5

Conservation of Lowland Woodland Fauna in the ACT

Consistent with the requirements for threatened species in the *Nature Conservation Act 1980*, one of the two goals adopted for the *Lowland Woodland Conservation Strategy* is to:

Conserve in perpetuity, viable, wild populations of all lowland woodland flora and fauna species in the ACT and support regional and national efforts towards conservation of these species.

The major threat to woodland fauna in the ACT region and the apparent reason for decline of some species is the loss and modification of woodland habitat (s. 4.3). The premise of this *Strategy* is that protection in nature reserves, and off-reserve conservation management of woodland habitat provides the foundation for long-term conservation of woodland fauna, including threatened species. For this reason, objectives and actions in the *Strategy* for conservation of fauna relate largely to woodland habitat. In general, the *Strategy* takes an ecosystem approach to the conservation of woodland fauna rather than treating each species separately. Exceptions are threatened species, for which there is a legislative requirement to prepare Action Plans and some threatened species have specific recovery requirements.

From the general threats to woodland fauna previously discussed, it is evident that all woodland fauna will be advantaged by the conservation of large, well-connected areas of woodland in sound ecological

Table 4.1: Woodland Species in the ACT Region that are Listed as Threatened in the ACT, NSW or Other Jurisdictions

	Statutory			Non-statutory APAB ¹ /IUCN ²
	ACT	NSW	Other	
BIRDS				
Hooded Robin	V	V		NT ¹
Brown Treecreeper	V	V		NT ¹
White-winged Triller	V			
Varied Sittella	V			
Painted Honeyeater	V	V	V(Vic), R(Qld)	NT ^{1,2}
Regent Honeyeater	E	E	E(C'wlth), E(Qld), E(SA), CE(Vic)	E ^{1,2}
Superb Parrot	V	V	V(C'wlth), E(Vic)	V ^{1,2}
Swift Parrot	V	E	E(C'wlth), E(Vic), E(Tas), V (SA)	E ^{1,2}
Diamond Firetail		V		
Speckled Warbler		V		
Flame Robin			R (SA)	LC ¹
Crested Shrike-tit			V (SA)	
MAMMALS				
Squirrel Glider		V		
Koala		V	E(SE Qld)	
REPTILES				
Rosenberg's Monitor		V		

CE: Critically Endangered; E: Endangered; V: Vulnerable; R: Rare; NT: Near Threatened; LC: Least Concern. Status at 31 December 2003.

Note that in Victoria, species are listed as 'Threatened' under the *Flora and Fauna Guarantee Act 1988* and specific conservation status (e.g. endangered) is applied in lists prepared by the Victorian Department of Sustainability and Environment.

1. *The Action Plan for Australian Birds 2000* (Garnett and Crowley 2000)
2. *2000 IUCN Red List of Threatened Species* (Hilton-Taylor 2000) (<http://www.redlist.org>)

Legislation:

Commonwealth: *Environment Protection and Biodiversity Conservation Act 1999*

ACT: *Nature Conservation Act 1980*

NSW: *Threatened Species Conservation Act 1995*

Vic: *Flora and Fauna Guarantee Act 1988, Threatened Fauna Act 1995*

SA: *National Parks and Wildlife Act 1972*

Qld: *Nature Conservation Act 1992, Nature Conservation (Wildlife) Regulation Act 1994*

Tas: *Threatened Species Protection Act 1995*

condition. This habitat is further enhanced where introduced predators can be controlled and deleterious human disturbance such as incompatible adjacent land uses can be managed. Actions undertaken to protect the range of woodland communities and to conserve threatened, declining or uncommon animal species and their habitats (see the following section) will also benefit the more abundant species.

For example, retention of a well-developed ground layer with fallen timber for threatened bird species will also

benefit other bird species, a diversity of invertebrates, reptiles (including Monitors) and small mammals (including Echidnas). Any key conservation requirements for non-threatened species that do not fall under the umbrella of general habitat protection for threatened species need to be explicitly identified. For example, termite mounds are required by Monitors for nesting and are a key food source for Echidnas and so should be conserved in woodlands. Water bodies (creeks, wetlands and dams) with good water quality and fringing and aquatic vegetation are habitat for amphibians.

Objectives and actions for the *Strategy* related to woodland fauna, including both declared threatened and declining species are shown in Table 6.1. The actions are not designed to prescribe every detailed task needing to be undertaken. Detailed actions will be developed by responsible agencies, often with community involvement and will be refined over time as more information is gained (as part of 'adaptive management'). With regard to threatened bird species, objectives and actions in this *Strategy* must be integrated with state and national conservation efforts. Information in the next section provides a guide to more detailed or specific actions related to the conservation of threatened species.

4.6

Conservation of Threatened and Declining Woodland Species in the ACT

4.6.1 Contribution of ACT Woodlands to Conservation of Threatened, Declining and Uncommon Species in the Region

Detailed regional distributions of threatened bird species are given in the individual species descriptions (Appendix 2). Regional distributions for threatened bird species (those with sufficient records) are shown in Figure 4.1 as Canberra Ornithologists Group (COG) Atlas 2.5 minute grid squares with threatened species records. The number of threatened bird species recorded in each COG grid cell in the ACT is shown with woodland areas in Figure 4.2.

Widespread clearing of woodlands in the ACT region (see s. 2) has resulted in a greater proportion of the region's remaining woodland habitat being located within the ACT. Currently, woodland in the ACT provides a major contribution to the conservation of regional populations of threatened birds and other species. However, the long-term viability of populations across the region is also dependant on appropriate conservation measures outside the ACT. The following provides further details on the distributions of individual threatened species within the region.

Brown Treecreepers, Varied Sittellas, and White-winged Trillers and to a lesser extent Hooded Robins, are distributed widely across woodlands of the region including broad distributions within the ACT in suitable habitat (Figures 4.1 and 4.2). For these four species, woodlands of the ACT form a substantial proportion of

their remaining habitat in the region and thus contribute significantly towards regional conservation objectives for the species. Conservation of viable populations of the sedentary Brown Treecreeper, Varied Sittella and Hooded Robin within the ACT is dependent on conservation of their habitat. Conservation of viable populations of the migratory White-winged Triller in the ACT is dependent on conservation of summer breeding habitat (within the ACT) and over-wintering habitat (outside the ACT).

The Superb Parrot, Regent Honeyeater and Swift Parrot, although present in the region, are found mostly outside of the ACT (Figure 4.1). The Painted Honeyeater occurs across large areas of eastern Australia, though rarely in the ACT region. Conservation of viable populations of these four species depends largely on conservation of their habitat outside the ACT. In the case of the Superb Parrot, the northern part of the ACT contains part of the regional breeding habitat (Figure 4.1). The continued presence of these species in the ACT, however, is dependent on conservation of habitat within the ACT.

Bird species shown in Table 4.1 are distributed widely across woodlands of the region including broad distributions within the ACT in suitable habitat. ACT woodlands form a substantial proportion of their remaining habitat in the region and thus contribute significantly towards regional conservation of these declining bird species

There is a paucity of records in the ACT for the Koala, Rosenberg's Monitor, Lace Monitor and Squirrel Glider.

4.6.2 Ecological Requirements and Threats

Large areas of woodland in relatively good condition support a greater number of threatened species than the more modified woodland areas or non-woodland areas (other vegetation types or urban). For example, grid cells that include some of the larger remaining woodland areas generally have a higher number of threatened bird species recorded in them (Figure 4.2). Grid cells that do not include woodland areas generally have a low number or no threatened bird species.

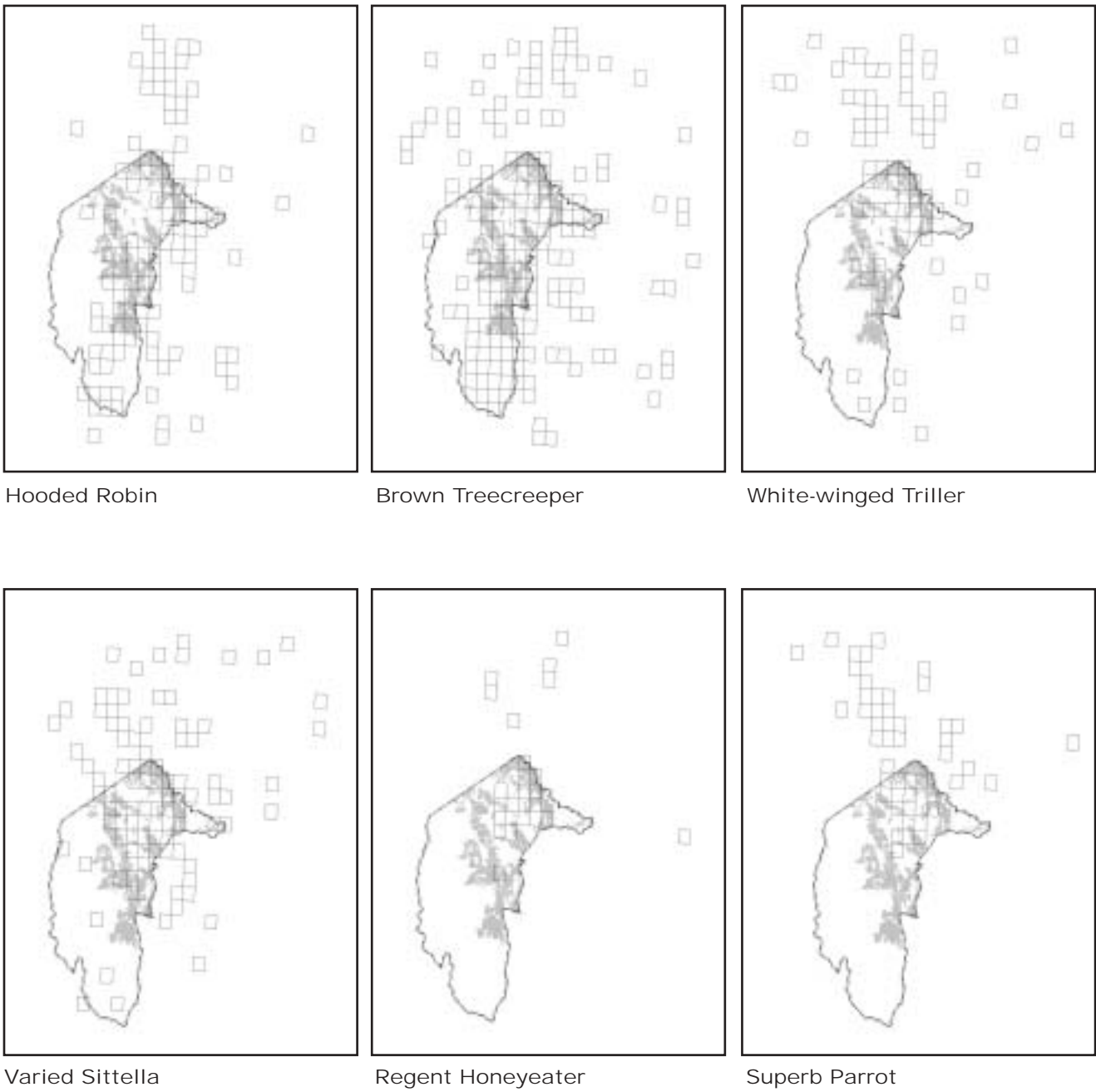


Figure 4.1: Regional Records of Threatened Bird Species

Squares are 2.5 minute grid squares with records of sightings. Woodlands are shown shaded. Swift Parrot and Painted Honeyeater are not shown due to insufficient data. Data supplied by the Canberra Ornithologists Group (COG).

Woodland animal species, including the eight threatened species, differ in their habitat requirements and may be broadly categorised as 'Landscape Species', 'Large Area Species' or 'Complex Habitat Species' to illustrate common themes in ecological requirements and threats. A species may fit into more than one category depending on its ecological requirements.

'Landscape Species' include the Regent Honeyeater, Superb Parrot, Painted Honeyeater, White-winged Triller and Swift Parrot. These species are semi-nomadic or migratory and individuals use the whole of the landscape, moving large distances to follow the irregular and infrequent local blossoming of flowering eucalypts. To ensure a continuous supply of food in all seasons, and particularly during low-rainfall years, these species require habitat on relatively fertile soils (to provide abundant flowering) that is widely distributed across the landscape (to take advantage of timing of local flowering eruptions).

The main habitat of the Regent Honeyeater, Superb Parrot and Swift Parrot are the box-ironbark communities of the dry open forests and woodlands, whereas the Painted Honeyeater is found in these and other dry forest and woodland communities, Acacia scrubs and riparian communities. Most of the box-ironbark and other woodland communities in the region have been cleared, particularly on the relatively fertile soils, and much of the remaining woodland is not contained within the regional reserve system. Increasing fragmentation across the landscape not only reduces available habitat, it can also result in the necessity to move greater distances between resources.

Although few large areas of good quality habitat remain, small woodland patches and scattered paddock trees are still important resources for the Superb Parrot (for food and nesting hollows; A. Manning, pers. comm.), Regent Honeyeater (ACT Government 1999g) and Swift Parrot (Higgins 1999). Conservation of the 'Landscape Species' relies mainly on off-reserve habitat conservation, including retention of small remnants and isolated trees (particularly mature, large-crowned trees on fertile soils). Ongoing regeneration within these small woodland patches and replacement of paddock trees is required to prevent continued long-term decline of habitat for these species.

'Large Area Species' are those that require large woodland patches (generally greater than 100 ha, especially in poorer quality habitats) to survive and

reproduce, and hence persist in these patches in the long-term. Bird species in this category tend to be sedentary, sensitive to habitat disturbance and do not readily disperse between woodland fragments greater than about 1 km apart. Birds in this category include two threatened species, the Hooded Robin and Brown Treecreeper, and other woodland birds such as the Speckled Warbler (Freudenberger 1999). Conservation of 'Large Area Species' relies on conserving intact woodland patches of greater than 100 ha which are subject to little disturbance. Additional woodland patches or stepping stone connections should be less than 1km apart. Other 'Large Area' species are the large terrestrial predators such as Monitor lizards, which require large home ranges (many hundreds of hectares).

'Complex Habitat Species' require structural diversity of vegetation to meet their habitat requirements (Freudenberger 1999; Reid 1999). These species are grass-seed eaters, insectivores or nectivores of the shrub or ground layer, or require nesting sites within the mid-storey. A well-developed cover of tussock grasses, leaf-litter and fallen timber in the ground layer provides an abundance of invertebrate food and seeds of native grasses. Shrubs, fallen branches and logs provide essential sites for 'perch and pounce' feeders and a patchy shrub layer and dead branches provide nesting sites. Large mature trees provide protective cover and a source of invertebrate food for bark and canopy gleaners.

Bird species in the 'Complex Habitat' category include the four threatened insectivores, the Hooded Robin, Varied Sittella, White-winged Triller and Brown Treecreeper, and other woodland birds such as the White-fronted Chat, Jacky Winter, Flame Robin and Diamond Firetail. Other declining or uncommon species requiring 'complex habitat' include the Squirrel Glider (hollows for shelter, eucalypts and wattles for seeds and gum), Black-headed Snake (cover and prey) and Monitor lizards (cover and prey or carrion). Complex habitat can be retained by not removing fallen timber, large trees or rocks; allowing shrub and tree regeneration to occur; and maintaining a tussock structure by not overgrazing.

In addition to the above habitat considerations, Rosenberg's Monitor and Lace Monitor require habitat with termite mounds, in which they lay their eggs. The Brown Toadlet requires wet areas with ground cover to maximize breeding success and nearby areas of complex habitat (logs and rocky areas) for shelter.

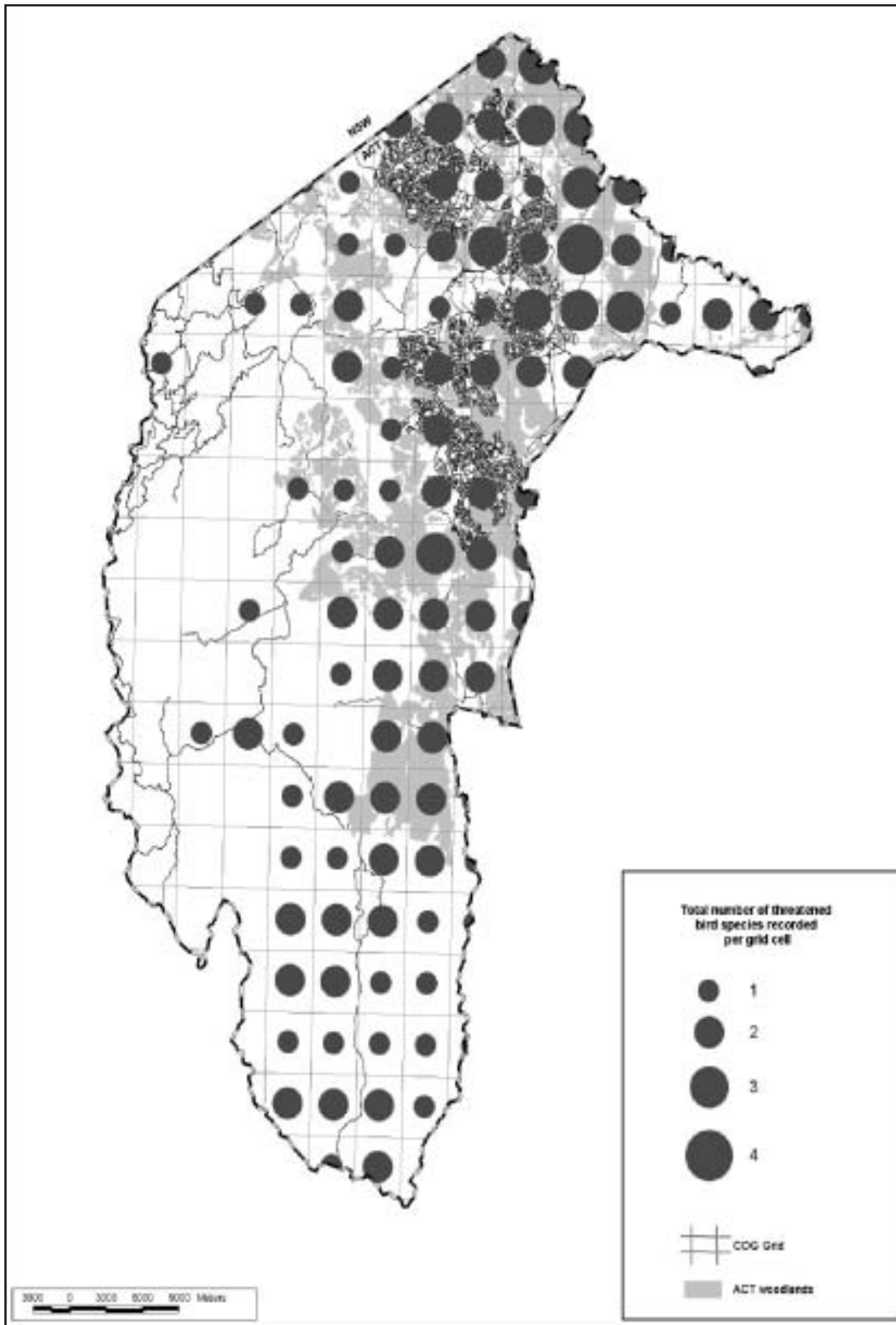


Figure 4.2: Records of Threatened Bird Species in the ACT

Shaded circles represent the number of threatened bird species recorded in each 2.5 minute grid square in the ACT (1986–2001). Note: locations of records can be anywhere within the grid square and may not correspond to the location of the circle in the square. Data supplied by the Canberra Ornithologists Group (COG).

Table 4.2: Potential Threats to Woodland Birds and Their Application to ACT Declared Threatened Species

Threats	HR	BT	WT	VS	PH	RH	SuP	SwP
Removal of fallen timber and litter (fire fuel hazard reduction and firewood collection with consequent loss of habitat and nesting sites)	✓	✓	✓					
Predation by feral and/or uncontrolled domestic animals (foxes, dogs and cats may be a problem for species that nest or feed close to the ground)	✓	✓	✓					
Invasion of key habitats by introduced pasture and weeds (reduces the amount of foraging habitat by preventing access to the litter layer, may reduce food sources and habitat complexity)	✓	✓	✓					
Inappropriate fire regimes (result in degradation of habitat)	✓	✓	✓		✓	✓	✓	
Uncontrolled grazing by livestock (reduces food (seeding plants or insects) and cover)	✓	✓	✓	✓		✓	✓	
Clearing of both living and dead trees (agricultural expansion, urban development and firewood collection)	✓	✓	✓	✓	✓	✓	✓	✓
Rural tree dieback	✓	✓	✓	✓	✓	✓	✓	✓
Use of chemicals (fertiliser use contributes to loss of native understorey and weed invasion. Pesticide use may result in loss of invertebrate food sources)	✓	✓	✓	✓	✓		✓	✓

HR = Hooded Robin, BT = Brown Treecreeper, WT = White-winged Triller, VS = Varied Sittella, PH = Painted Honeyeater, RH = Regent Honeyeater, SuP = Superb Parrot, SwP = Swift Parrot

Note: A threat applies to each species to varying degrees. A tick means that the threat is of particular importance to that species, absence of a tick means that the threat still applies but is of lesser importance.

4.6.3 Hooded Robin (*Melanodryas cucullata*)

(for species description see Appendix 2.1)

HABITAT REQUIREMENTS

Critical habitat features required by the Hooded Robin include:

- large trees for protective cover;
- areas of grass that support insects and other invertebrates on which the species feeds;
- perching sites within these grassy areas; and
- trees or shrubs (either standing or fallen) to provide sites for nesting (Graham 1990).

Hooded Robin territories usually have some patches of eucalypt regrowth. The species requires more vegetation cover in the breeding season, as nests are typically built in saplings and small trees. The results of research on the species near Armidale suggested that nesting habitat, including small patches of

eucalypt regrowth, may be in shorter supply than foraging areas (Fitri 1993). The distribution of the Hooded Robin in the ACT is restricted to habitats that contain a mixture of woodland and native grassland away from urban areas (Graham 1990) (Figure 4.1). The Hooded Robin is both a 'complex habitat' and 'large area' species, which tends to prefer woodland associations that contain Yellow Box, although it appears to be the structure of particular woodlands that is important rather than a specific eucalypt association. Suburban gardens are unsuitable as habitat. This species has continued to decline generally in south-eastern Australia over the last decade.

THREATS

In common with other threatened bird species the principal threat to the Hooded Robin is loss of its woodland habitat. The modification of the structure of grassy woodland habitat has contributed to the decline of Hooded Robin. The loss of perching sites essential

for feeding behaviour may alone be sufficient to make otherwise suitable habitat unsuitable (Graham 1990). Thus the removal of timber for firewood is likely to result in local reduction of Hooded Robin numbers.

It is possible that habitat degradation such as removal of understorey species and tree cover has exposed the Hooded Robin to higher rates of predation. The species requires more vegetation cover in the breeding season as nests are typically built in saplings and small trees. Nesting habitat, including small patches of eucalypt regrowth, may be in shorter supply than foraging areas (Fitri 1993; ACT Government 1999b). (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.4 Brown Treecreeper (*Climacteris picumnus*)

(for species description see Appendix 2.2)

HABITAT REQUIREMENTS

Critical habitat features required by the Brown Treecreeper include:

- relatively undisturbed grassy woodland with native understorey;
- large living and dead trees which are essential for roosting and nesting sites and for foraging; and
- fallen timber which provides essential foraging habitat.

The Brown Treecreeper probably exists in isolated family groups in the ACT region. It is both a 'complex habitat' and 'large area' species, and would benefit from improvements in connectivity between woodland areas (ACT Government 1999e).

THREATS

In common with other threatened bird species the principal threat to the Brown Treecreeper is a severe decline in the quality and quantity of its woodland habitat. In particular, the removal of timber for firewood is likely to result in local reduction of Brown Treecreeper numbers. The fragmented nature of woodlands may present barriers to movement and recolonisation unless measures are taken to connect areas of viable habitat with existing populations. (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.5 White-winged Triller (*Lalage sueurii*)

(for species description see Appendix 2.3)

HABITAT REQUIREMENTS

Critical habitat features for the White-winged Triller include:

- large living and dead trees which are essential for perching, roosting and nesting sites, and for foraging; and
- foraging areas of grass and fallen timber that support insects and other invertebrates on which the species feeds.

The White-winged Triller is widespread in the ACT region, and within the ACT most records are from Hall, Mulligans Flat, Gooroo, the Pinnacle, Campbell Park and the Gigerline–Tharwa area. The species tends to occur in grassy woodland including Yellow Box – Red Gum, Apple Box, Candlebark, or less commonly, Snowgum woodlands, where it forages close to the ground, in shrubs or amongst fallen timber. This 'landscape' and 'complex habitat' species would benefit from the retention of large mature trees and dead standing and fallen timber.

THREATS

In common with other threatened bird species the principal threat to the White-winged Triller is a severe decline in the quality and quantity of its woodland habitat. In particular, the removal of fallen timber for firewood and overgrazing have led to a loss of complexity of the ground layer and hence lower availability and quality of foraging habitat. (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.6 Varied Sittella (*Daphoenositta chrysoptera*)

(for species description see Appendix 2.4)

HABITAT REQUIREMENTS

Critical habitat features for the Varied Sittella include:

- large living and dead trees, particularly rough-barked eucalypts, which are essential for foraging, roosting and nesting sites; and
- relatively well-treed habitats (rather than sparsely treed habitats).

Varied Sittellas are rarely found in open areas or urban areas, suggesting that there is a minimum tree density for foraging efficiency. Woodland patches that are sparsely treed, small or lack many large trees may not

provide sufficient resources to support family groups of the Varied Sittella. This 'complex habitat' species would benefit from both improvements in tree density where trees are sparse, and connectivity between woodland areas.

THREATS

In common with other threatened bird species, the principal threat to the Varied Sittella is a severe decline in the quality and quantity of its woodland habitat. In particular, tree clearing, rural dieback and overgrazing result in smaller fragments, lower tree densities and fewer large trees, all of which constitute habitat degradation for the Varied Sittella. In addition, the fragmented nature of woodlands of the ACT may present barriers to movement and recolonisation unless measures are taken to connect areas of viable habitat with existing populations. (See also sections 4.3, 4.4.3 and Table 4.2).

4.6.7 Painted Honeyeater (*Grantiella picta*)

(for species description see Appendix 2.5)

HABITAT REQUIREMENTS

Critical habitat features for the Painted Honeyeater include:

- abundance of mistletoe; and
- flowering eucalypts on fertile soils.

The Painted Honeyeater is sparsely scattered over a wide range, mostly on privately owned lands, but including remnant woodland and roadside reserves which have varying levels of protection. Because of its general scarcity, specialised diet and nomadic habits, this 'landscape' species cannot be effectively protected in established reserves. Its breeding distribution is dictated by the presence of mistletoe (Garnett and Crowley 2000).

In the ACT region, the species has been recorded from a range of woodlands that contain mistletoe (*Amyema* spp.), including River Oak (*Casuarina cunninghamiana*) woodland associated with river systems (in which mistletoe is particularly abundant) and Yellow Box – Red Gum woodlands at locations such as Mulligans Flat and Campbell Park.

THREATS

For the Painted Honeyeater, a mobile species that uses resources in different and widely distributed locations, the major causes of its decline are thought

to be reduction in total area of habitat, selective loss of important habitats and isolation of fragmented remnant habitats (Bennett 1993). In central NSW, widespread clearing of habitat such as Boree is thought to have reduced the numbers of the species (Cooper and McAllan 1995). (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.8 Regent Honeyeater (*Xanthomyza phrygia*)

(for species description see Appendix 2.6)

HABITAT REQUIREMENTS

Critical habitat features for the Regent Honeyeater include:

- large, heavily flowering eucalypts on fertile soils.

Yellow Box has been identified as one of the key habitat species for the Regent Honeyeater (DCNR 1994) but the species also feeds on nectar from mistletoes on other woodland trees (Taylor and COG 1992). This 'landscape' species prefers large, fully mature trees on more fertile sites which flower well and produce large quantities of nectar, as well as attracting insects (Webster and Menkhorst 1992; ACT Government 1999g; Garnett and Crowley 2000). There are occasional nesting records from the Canberra urban area (Taylor and COG 1992) and other urban locations in the region (Menkhorst 1998) (Figure 4.1). The 1995 breeding episode at North Watson (Bounds *et al.* 1996) and breeding attempts at another northern ACT site emphasise the abundance of mature flowering eucalypts as being of significant habitat value to the species, irrespective of the structure and nature of the understorey.

THREATS

The principal cause of the dramatic reduction in the range of the Regent Honeyeater nationally, and extremely small population (estimated to be 1000–1500 individuals (Franklin *et al.* 1987; Webster and Menkhorst 1992; RAOU 1994), is loss of its box woodland habitat. Yellow Box habitat for the species is found on fertile soils on gently sloping foothills and plains and has suffered extensive clearing for agriculture and urban development. Tree decline in agricultural and pastoral land has depleted the habitat quality of remnant stands. The large, fully mature trees in the woodlands favoured by the honeyeater are now rare and were often cut for firewood, and stands are fragmented.

Continued and extensive clearing of the Box–Ironbark woodlands west of the Great Dividing Range has drastically reduced the available and favoured habitat of the species (Longmore 1991; Garnett 1993; Garnett and Crowley 2000;). In coastal areas of NSW, urban development coupled with agriculture has also severely reduced the species preferred habitat, which includes Swamp Mahogany *E. botryoides* and Spotted Gum *E. maculata* forest (Hindwood 1939, 1944). Overall, clearance has destroyed about 75 per cent of the Regent Honeyeater's habitat (Garnett and Crowley 2000).

Grassy woodland habitat that the Regent Honeyeater uses was once widespread in the ACT region, but is now reduced in area and fragmented following clearing for agricultural and urban development. Loss of woodland from lower elevation areas with more fertile soils has particularly affected this species. (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.9 Superb Parrot (*Polytelis swainsonii*)

(for species description see Appendix 2.7)

HABITAT REQUIREMENTS

Critical habitat features for the Superb Parrot include:

- clusters of large living and dead trees for nesting sites.

The Hall area in the northern part of the ACT forms the southern edge of one of the two main centres for breeding distribution of the Superb Parrot (Figure 4.1). This area extends north to Cowra and west to Cootamundra. Martin (1996) and Davey (1997) identified a number of areas to the north-west of the ACT that are potentially important breeding habitat areas for the Superb Parrot. Off-reserve habitat retention is very important for this 'landscape' species as its breeding habitat is mainly located in rural lands where woodlands are highly fragmented. The Superb Parrot forages mainly on the ground for seeds of grasses and herbs but also feeds in the canopy and outer branches of shrubs. The species has been recorded in the breeding season in the ACT utilising seeds of planted *Acacia* spp. and lerps on remnant Yellow Box trees (Taws 2002).

THREATS

The Superb Parrot has been seriously disadvantaged by extensive clearing and disturbance of its prime habitat, the box woodlands in the ACT, NSW and Victoria. In the past, activities associated with illegal trade in wildlife, such as poaching and trapping, are

likely to have contributed to the decline of Superb Parrot in the ACT region but the species is now abundant in captivity. Road kills of birds feeding on spilt grain remain a problem. However, the overall effects on the species are insignificant in comparison with habitat loss and its consequential effects. (See also sections 4.3, 4.4.2 and Table 4.2).

4.6.10 Swift Parrot (*Lathamus discolor*)

(for species description see Appendix 2.8)

HABITAT REQUIREMENTS

Critical local habitat features required by the Swift Parrot include:

- winter flowering eucalypts; and
- eucalypts carrying lerps.

The species migrates north to mainland Australia over winter, from its breeding areas in Tasmania, following abundances of flowering eucalypts and lerps as they occur. It is likely that groups of this 'Landscape' species pass through the ACT before moving west into areas of key flowering eucalypts, for example, Grey Box (*E. microcarpa*), White Box (*E. albens*) and Mugga Ironbark (*E. sideroxylon*) (ACT Government 1999c). The rather sparse collection of records of the Swift Parrot in the ACT region is representative of the sporadic nature of the distribution of the species on the mainland during winter.

THREATS

Nationally, the range of the Swift Parrot has been reduced by half (Garnett and Crowley 2000). The principal causes are loss of breeding and feeding habitat (Blue Gum *Eucalyptus globulus*, Messmate *E. obliqua* or Swamp Gum *E. ovata* forest) in Tasmania, cleared for agriculture and urban development, and clearfelled in forestry operations; and clearance of box–ironbark and box–gum woodlands in its wintering range in mainland Australia, including the ACT. (See also sections 4.3, 4.4.2 and Table 4.2).

4.7

Conservation Actions

The following are specific actions for the conservation of woodland fauna, in particular threatened species, and are framed within the objectives and actions outlined in Table 6.1. These actions also fulfil the requirement under the *Nature Conservation Act 1980* to prepare Action Plans for threatened species. For the reasons presented in section 4.5, the actions relate mostly to conservation of woodland habitat.

Environment ACT will seek to implement these actions where it has the responsibility to do so. It will also encourage other agencies, individuals and community groups to do likewise.

INFORMATION

Identify key habitats and potential habitats for threatened, declining and uncommon woodland species, and areas of high biodiversity, based on database records held by Environment ACT and other organisations such as Canberra Ornithologists Group.

PROTECTION AND MANAGEMENT

- **Protection of habitat:** Give priority for habitat protection and conservation management to woodland patches, particularly those that are threatened species habitat, are large, or have complex habitat structure.
(Hooded Robin, Brown Treecreeper).
- Evaluate the most appropriate form of habitat protection:

 - (a) Reservation, including addition to an existing reserve, and inclusion of conservation requirements for threatened species in reserve management plans.
 - (b) Inclusion of conservation requirements in Memorandums of Understanding (MOUs) (especially with Commonwealth Government landholders).
 - (c) Inclusion of conservation requirements in Land Management Agreements (for rural leases).
 - (d) Directions by the Conservator of Flora and Fauna under s. 47 of the *Nature Conservation Act 1980* for the protection of 'native animals, native plants and native timber' on Public land within the urban fabric which is not reserved. Management agreements or MOUs may be developed between the Conservator and an agency if management objectives or land use activities have potential to place conservation values at risk.
- **Maintenance and enhancement of connectivity:** Give priority for habitat protection and restoration (re-creation of connections) to connections between woodland patches, particularly between large patches or between threatened species habitat and other woodland patches. Connections include corridors (which should be >25 m wide) and 'stepping stones' (woodland patches within 1 km of other patches).
(Hooded Robin, Brown Treecreeper)
- **Maintenance of woodland remnants and isolated paddock trees:** Take measures to protect woodland remnants (small isolated patches and tree clusters, road verges) and paddock trees, particularly large mature trees on fertile soils or trees known to be used by threatened species. Measures such as encouraging efforts by landholders and conservation groups should also be taken to ensure replacement of paddock trees, particularly winter flowering eucalypts and species with potential to develop nest hollows.
(Painted Honeyeater, Regent Honeyeater, Superb Parrot, Swift Parrot)
- **Limitation on removal of live and dead timber:** Maintain or enhance habitat complexity and protect large, mature eucalypts (a key resource) by limiting the removal of standing living and dead timber, particularly where other land uses, such as rural activities, road and service easements, and public land that is managed for recreation or other intensive uses. This management action should be given priority in habitat for threatened species that require structural complexity or large mature eucalypts.
(Hooded Robin, Brown Treecreeper, Painted Honeyeater, Regent Honeyeater, Superb Parrot, Swift Parrot, Varied Sittella, White-winged Triller)
- **Prevention of intensive grazing:** Take measures to prevent intensive grazing so that habitat complexity is maintained or enhanced. This management action should be given priority in habitat for threatened species requiring structural complexity. On rural leases in the ACT, appropriate levels of stock grazing in Yellow Box–Red Gum woodland will be encouraged through LMAs.
(Hooded Robin, Brown Treecreeper, White-winged Triller, Superb Parrot)
- **Maintenance of patches of shrubs or eucalypt regrowth:** Take measures to maintain or enhance habitat complexity by maintaining patches of shrubs and/or eucalypt regrowth. Priority should be given to habitats for threatened species requiring

these features for nesting and shelter purposes.
(Hooded Robin)

- **Regeneration of habitat:** Include identified habitat requirements into programs of woodland regeneration and restoration (e.g. regenerating or planting trees with potential to develop nest hollows and food trees such as winter-flowering eucalypts, planting shrub patches). Undertaking regeneration or restoration activities that enhance connectivity between woodland areas.

(Hooded Robin, Brown Treecreeper, Painted Honeyeater, Regent Honeyeater, Superb Parrot, Swift Parrot, Varied Sittella, White-winged Triller)

- **Minimisation of adverse effects of fire:** Ensure planned burns are carefully managed, particularly those in or near identified areas of faunal significance. The timing and intensity of planned burns should take into account adverse effects on fauna, particularly threatened and declining species, such as disruption of breeding. Identified threatened species habitat should receive the same protective measures against unplanned fire as for other identified areas of fauna significance.
(Hooded Robin, Brown Treecreeper, Painted Honeyeater, Regent Honeyeater, Superb Parrot, Swift Parrot, Varied Sittella, White-winged Triller)
- **Minimise nest hollow competition:** Discourage use of nesting sites by introduced species such as the Common Starling (*Sternus vulgaris*), Common Myna (*Acridotheres tristis*), European Honey Bee (*Apis mellifera*) through research and, where practical, pest control techniques. The scope for placement of nest boxes should be evaluated.
(Brown Treecreeper, Superb Parrot)

MONITORING AND RESEARCH

- **Monitor fauna**, particularly threatened, declining and uncommon species, to determine their long-term trend and status in the ACT and region through compilation of observations and in some cases systematic surveys. The Canberra Ornithologists Group (COG) has played a key role in undertaking systematic monitoring and reporting of bird species, and the COG database forms the basis for current understanding of the status of threatened bird species in the ACT.
- Encourage and support the continuation of the Canberra Ornithologists Group's monitoring programs, particularly with regard to threatened and declining species.
- Encourage and support research into the ecology and conservation requirements of threatened

species and facilitate the incorporation of research results into lowland woodland management.

Research priorities for threatened species include:

- specific habitat requirements (key resources such as Mistletoe or nesting hollows, including distribution of key habitats);
- effects of habitat modification, fragmentation and land use practices (such as grazing and effects of fire);
- movement patterns (particularly in relation to flowering patterns and nectar productivity of key eucalypts and other key resources such as nesting sites);
- Breeding and recruitment (breeding success, survival, dispersal in fragmented environments, nest predators and rates of predation competition with introduced pests for nest hollows);
- evaluating threats to important sites;
- assessment of potential for augmenting local populations through reintroductions, which could accelerate the extension of the species' range and increase the probability of long-term viability of local populations; and
- interactions with the other species (such as Mistletoebird with Painted Honeyeater).

NATIONAL AND REGIONAL COOPERATION

- Maintain links with, and participate in national recovery efforts for threatened woodland species to ensure that ACT conservation actions are coordinated with national programs.
- Liaise with the NSW Department of Environment and Conservation with the aim of achieving a coordinated, regional approach to the conservation of threatened bird species, especially in relation to cross-border planning issues.

EDUCATION

- Endeavour to raise community awareness through community liaison and public education, with the aim of fostering protection of threatened woodland species and their habitats.