

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, ground dwelling and arboreal marsupials, 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.

4.3

Threats to Fauna

Widespread clearing, habitat modification and fragmentation of woodlands since European settlement have had a severe impact on the habitat of woodland animals. Other threats include increased predation by introduced predators and human disturbance.

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). 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). 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. 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*) 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. 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.

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 which have little understorey other than exotic pasture. Thirty-seven 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. Many reptiles, small mammals, ground-dwelling birds and invertebrates found in woodlands are strongly associated with a well-developed ground cover (Martin and Green 2002).

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 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 coevolved 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 percent of mammals and 20 percent 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.

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 and feral 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) concludes that cats played an important role in the demise of these species.

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 (Vertebrate Atlas of the ACT, Lintermans 1990), consultants, other government agencies including the NSW National Parks and Wildlife Service, and community groups such as the Canberra Ornithologists Group (COG). The detail and accuracy of this data varies within the region depending upon the locations and methods of surveys and 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). Opportunistic sightings of species provide valuable information for areas where detailed surveys have not been conducted.

4.4.2 Threatened Species and Species of Conservation Concern

Woodlands in the ACT provide important habitat for six animal species declared as threatened in the ACT under the Nature Conservation Act 1980. All of these are birds (Table 4.1). In addition, 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) have

been recorded in grassy woodlands in the ACT, though these species are more typically associated with native treeless grasslands.

Several other species that occur in woodlands are of conservation concern because they are in apparent decline or are rare. A suite of woodland bird species are in apparent decline (Taylor and COG 1992). This suite includes the Scarlet Robin (*Petroica multicolor*), Flame Robin (*Petroica phoenicea*), White-winged Triller (*Lalage tricolor*), Jacky Winter (*Microeca fascinans*), Dusky Woodswallow (*Artamus cyanopterus*), White-fronted Chat (*Ephthianura albifrons*) and Crested Shrike-tit (*Falcunculus frontatus*). Key's Matchstick Grasshopper (*Keyacris scurra*) is also considered to be an uncommon species in the ACT.

4.4.3 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 feed on the ground in open woodland areas with short grasses and tend not to occur in the forest habitats which have a thick layer of leaf litter, nor 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, Diamond Firetails, 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 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, covering large distances in the case of the

Swift Parrot (Tasmania to the mainland) or smaller distances within the region (such as 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.

Birds are valuable indicators of habitat modification and ecosystem health. Because birds occupy a diversity of niches at the apex of the food chain, their species composition and abundance reflects the underlying state of the ecosystem. Moreover, birds are highly visible and the strong community interest and skill in observing birds means more information is generally available on their species composition and abundance than for other types of animals.

Table 4.1: Conservation Status in other Jurisdictions of ACT Threatened and Declining Bird Species

	Statutory			Non-statutory APAB ¹ /IUCN ²
	ACT	NSW	Other	
Hooded Robin	V			NT ¹
Swift Parrot	V	E	E(C'wlth), E(Vic), E(Tas), V (SA)	E ^{1,2}
Superb Parrot	V	V	V(C'wlth), E(Vic)	V ^{1,2}
Brown Treecreeper	V			NT ¹
Painted Honeyeater	V	V	V(Vic), R(Qld)	NT ^{1,2}
Regent Honeyeater	E, SPSS	E	E(C'wlth), E(Qld), E(SA), CE(Vic)	E ^{1,2}
Flame Robin	√ ^N		R (SA)	LC ¹
Scarlet Robin	√ ^N			
Jacky Winter	√ ^N			
White-winged Triller	√ ^N			
Dusky Woodswallow	√ ^N			
White-fronted Chat	√ ^N			
Crested Shrike-tit	√ ^N		V (SA)	

CE: Critically Endangered; E: Endangered; V: Vulnerable; R: Rare; SPSS: Special Protection Status Species (ACT); NT: Near Threatened; LC: Least Concern. Status at 9 April 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>)
- N Nominated

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*

4.4.4 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*). Smaller ground-dwelling mammals recorded in ACT woodlands include the Yellow-footed Antechinus (*Antechinus flavipes*), Common Dunnart (*Sminthopsis murina*), Bush Rat (*Rattus fuscipes*) and Echidna (*Tachyglossus aculeatus*). 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 Bent-wing 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 nationally and 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. 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. None of the mammals occurring in ACT woodlands are listed as threatened in the ACT.

4.4.5 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 Bearded Dragon (*Pogona barbata*), 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*), Burton's Snake Lizard (*Lialis burtonis*), 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 textiis*) 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).

4.4.6 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*).

4.4.7 Invertebrates

Insects and other macro-invertebrates account for more than 90% 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 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 lowland 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 lowland woodland.

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.

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 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 rare animal species (many of which are sensitive to habitat modification) and their habitats will also contribute to the conservation of 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 outlined 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 Species and Declining Birds in the Region

Detailed regional distributions of threatened bird species are given in the individual species descriptions (see 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.

Brown Treecreepers, 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 two 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 these two sedentary species in the ACT is dependent on conservation of their habitat within 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 (see Figure 4.2). The continued presence of these species in the ACT, however, is dependent on conservation of habitat within the ACT.

Species in the suite of declining birds, with the exception of the White-fronted Chat, 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 species. The White-fronted Chat is broadly distributed in the region, though there are few records of this species from the ACT.

4.6.2 Particular Habitat Requirements of Species

Large areas of woodland in relatively good condition support a greater number threatened bird species than the more modified woodland areas or non-woodland areas (other vegetation types or urban land). 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 (see Figure 4.2). Grid cells that do not include woodland areas generally have a low number or no threatened bird species.

Woodland bird species, including the six threatened species, differ in their habitat requirements and may be broadly be 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 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 eruptions 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.

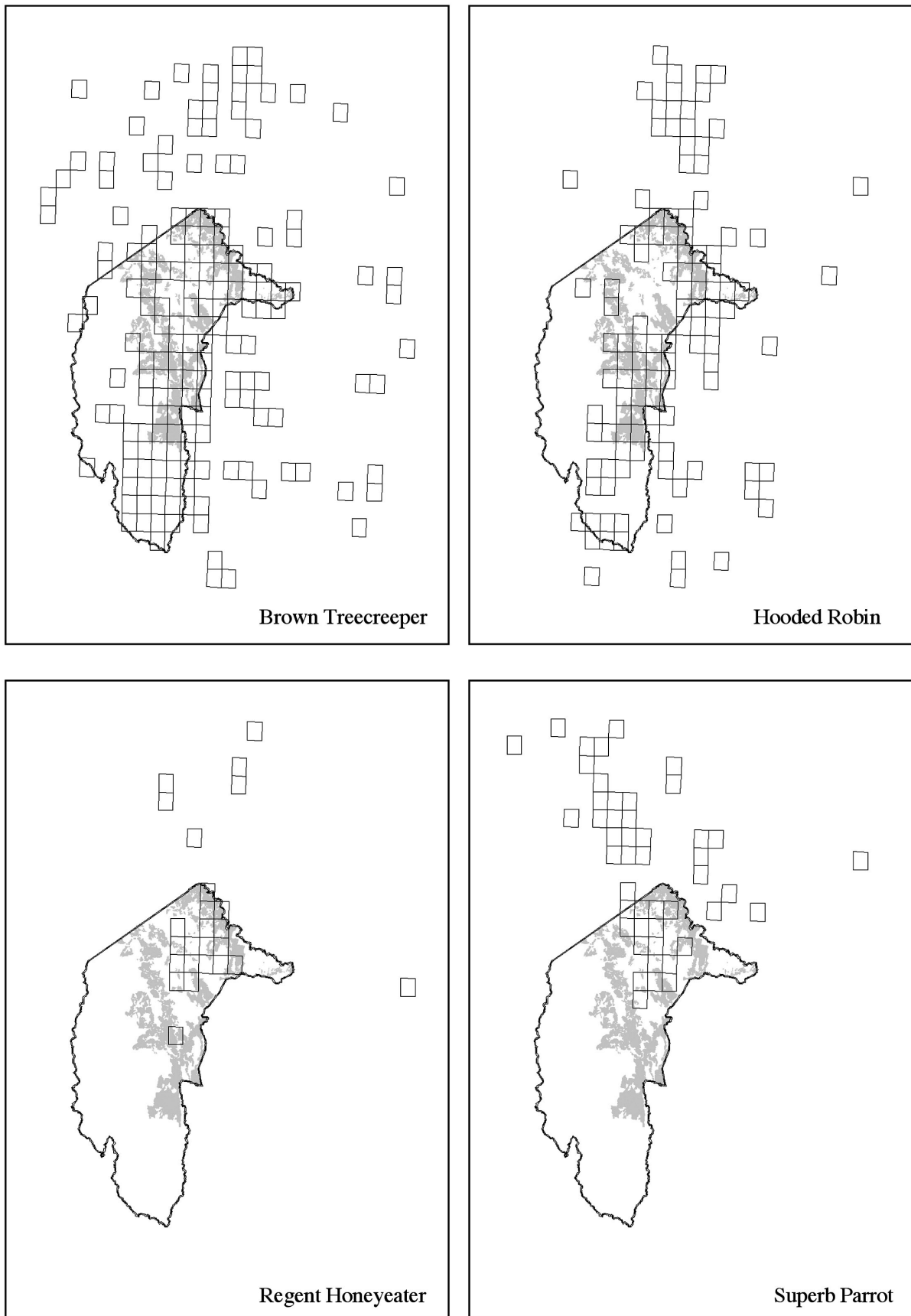


Figure 4.1: Regional Records of Threatened Bird Species

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).

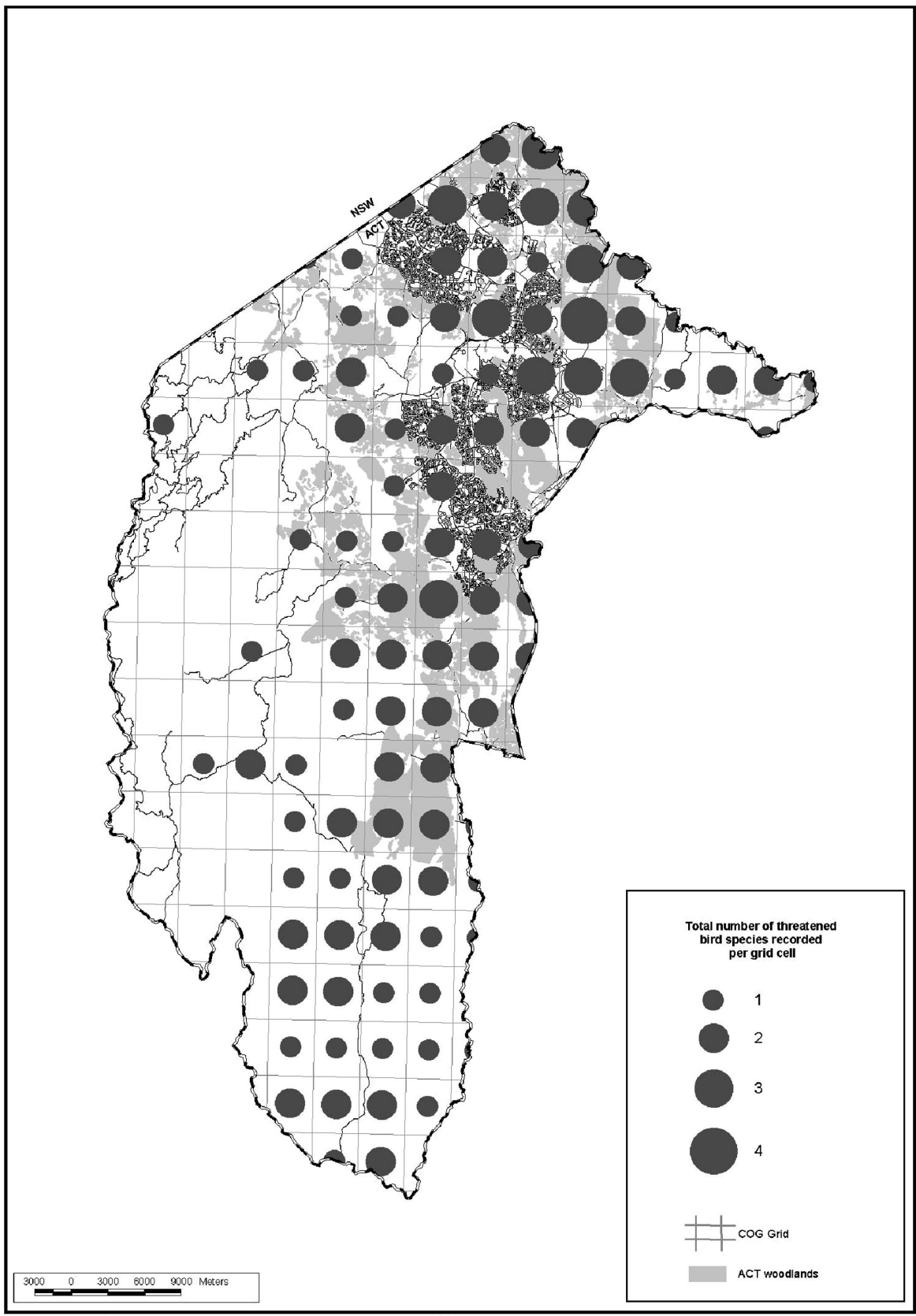


Figure 4.2: Records of Threatened Bird Species in the ACT

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).

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. On-going 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.

'Complex Habitat Species' require structural diversity of vegetation to meet their habitat requirements (Freudenberger 1999, Reid 1999). These species are grass-seed eaters, insectivores 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 two threatened insectivores, the

Hooded Robin and Brown Treecreeper, and many other woodland species such as the White-fronted Chat, Jacky Winter, White-winged Triller, Flame Robin and Diamond Firetail. 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.

The following particular habitat requirements for the threatened species are framed within the context of the conservation of lowland woodland including Yellow Box-Red Gum grassy woodland which is the primary requirement for the perpetuation of these species in the ACT region.

Hooded Robin (*Melanodryas cucullata*):

Critical habitat features required by *M. cucullata* 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 (either standing or fallen) to provide sites for nesting (Graham 1990).

M. cucullata territories usually have some patches of eucalypt regrowth (Fitri 1993). The distribution of *M. cucullata* in the ACT is restricted to habitats that contain a mixture of woodland and native grassland away from urban areas (Graham 1990) (see Figure 4.1). The loss of perching sites essential for feeding behaviour may alone be sufficient to make otherwise suitable habitat unsuitable for *M. cucullata* (Graham 1990). Thus the removal of timber for firewood is likely to result in local reduction of *M. cucullata* numbers.

It is possible that habitat degradation such as removal of understorey species and tree cover has exposed *M. cucullata* 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)

Swift Parrot (*Lathamus discolor*):

Critical local habitat features required by *L. discolor* 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 *L. discolor* 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).

Superb Parrot (*Polytelis swainsonii*):

Clusters of large living and dead trees for nesting sites are a critical habitat requirement for *P. swainsonii* (ACT Government 1999d). 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 *P. swainsonii* (Figure 4.1). This area extends north to Cowra and west to Cootamundra. Off-reserve habitat retention is very important for this species as its breeding habitat is mainly located in rural lands where woodlands are highly fragmented. *P. swainsonii* 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).

Brown Treecreeper (*Climacteris picumnus*):

Critical habitat features required by *C. picumnus* 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.

C. picumnus probably exists in isolated family groups in the ACT region. The young are unable to disperse very long distances, particularly over large tracts of unsuitable habitat (Cooper in ACT Government 1999e). The species would benefit from improvements in connectivity between woodland areas (ACT Government 1999e).

Painted Honeyeater (*Grantiella picta*):

G. picta 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, the 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, its principal habitat is River Oak (*Casuarina cunninghamiana*) woodland which contains

mistletoe (*Amyema* spp.) (ACT Government 1999f). A considerable extent of this River Oak woodland was severely burnt in the fires of January 2003 and its regeneration is uncertain. Possibly due to drought conditions, Painted Honeyeaters were recorded from the Canberra urban area in 2002-3.

Regent Honeyeater (*Xanthomyza phrygia*)

Yellow Box has been identified as one of the key habitat species for *X. phrygia* (DCE 1994) but the species also feeds on nectar from mistletoes on other woodland trees (Taylor and COG 1992). *X. phrygia* 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) (see Figure 4.1).

4.6.3 Conservation Actions: Threatened Bird Species

The following are specific actions for the conservation of threatened bird species framed within the objectives and actions outlined in Table 6.1:

INFORMATION

- Based on database records held by COG and the Environment ACT, identify key habitats and potential habitats for threatened bird species.

PROTECTION AND MANAGEMENT

- Evaluate the most appropriate form of habitat protection:
 - (a) reservation or addition to existing reservation and inclusion in requirements for managing reserves;
 - (b) inclusion of requirements in Memorandums of Understanding (MOUs) (especially with Commonwealth Government landholders);
 - (c) inclusion of requirements in Land Management Agreements (for rural leases); and
 - (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.

- Ensure that identified habitat requirements are incorporated into the above mechanisms, including management actions within those mechanisms (e.g. prevention of intensive grazing in *Melanodryas cucullata* habitat, avoidance of planned burning in the vicinity of nesting trees and foraging habitats for *Polytelis swainsonii*, maintenance of the integrity of nest colonies (clusters of nest trees or individual trees)).
- Include identified habitat requirements into programs of woodland regeneration and restoration (e.g. regenerating or planting trees with potential to develop nest hollows, including understorey in restoration activities, undertaking regeneration or restoration activities which enhance connectivity between woodland areas).

MONITORING AND RESEARCH

Monitoring of threatened bird species to determine their long-term status in the ACT and region is an important part of the conservation effort. The Canberra Ornithologists Group (COG) has played a key role in undertaking systematic monitoring and reporting, and the COG database forms the basis for current understanding of the status of threatened bird species in the ACT.

- Environment ACT will encourage and support the continuation of the Canberra Ornithologist Group's monitoring programs, particularly with regard to threatened species.

There are still many aspects of the ecology of threatened bird species that warrant further research. These include movement patterns of migratory species, ecological requirements (e.g. relationships with eucalypt flowering), habitat requirements and utilisation, threatening processes, breeding success and post-breeding dispersal.

- Environment ACT will encourage and support research into the ecology and conservation requirements of threatened bird species and facilitate the incorporation of research results into lowland woodland management.

NATIONAL AND REGIONAL COOPERATION

As noted previously, the conservation of threatened bird species usually needs consideration on an inter-state or national scale. At one level this may involve participation in national recovery efforts, at another, involvement in cross-border (ACT–NSW) planning issues involving lowland woodland or other important habitat for threatened species.

- Environment ACT will maintain links with, and participate in national recovery efforts for threatened bird species to ensure that ACT conservation actions are coordinated with national programs.
- Environment ACT will liaise with the NSW National Parks and Wildlife Service with the aim of achieving a coordinated, regional approach to the conservation of threatened bird species, especially in relation to cross-border planning issues.