

Current and Past Status of the Birds of Chiltern — a Box-Ironbark Forest in North-eastern Victoria

by B.J. TRAILL¹, EILEEN COLLINS², PAUL PEAKE³ and SCOTT JESSUP⁴

¹153 Perry Street, Fairfield, Victoria 3078

²P.O. Box 60, Chiltern, Victoria 3683

³4/10 Abinger Place, Richmond, Victoria 3121

⁴3 Wells Street, Beechworth, Victoria 3747

Summary

The current and past status of birds is described from a box-ironbark forest and its immediate surrounds at Chiltern in north-eastern Victoria. The area is exceptionally rich in birds with 220 taxa being recorded from the district in historical times. Current observations and previously published observations indicate that at least seven species have become extinct since European settlement of the area. Eleven other species have declined and, if current trends continue, these species will soon become extinct in the study area. Only one native species has definitely increased in abundance since European settlement of the area; two others show recent increases which follow possible earlier declines.

Introduction

There is currently a wave of local and regional extinctions of birds occurring throughout the box and ironbark forests and associated woodlands of south-eastern Australia (Robinson 1991, 1993). These forests occur in the foothills and adjacent plains inland of the Great Dividing Range in Victoria and New South Wales (Costermans 1983). Most of this habitat has been cleared for agriculture since European settlement. Despite this, most of the remnants are still intensively logged, mined or grazed. Several species dependent on this forest type are threatened nationally, or are threatened on a statewide basis in Victoria or New South Wales.

This paper lists the current and past status of the birds of a box-ironbark forest and its immediate surrounds at Chiltern in north-eastern Victoria. The Chiltern area is especially important for bird conservation and study as it supports an exceptionally high number of species, several of which are rare and declining, and has been relatively well studied by professional and amateur ornithologists for several decades. The current status of all bird species recorded at Chiltern is given. Species which have either increased or decreased in abundance are listed.

Such detailed notes on the fauna of specific areas are extremely valuable in determining historical changes in the status and distribution of species (e.g. Robinson 1993, Saunders & Ingram 1995). This is particularly so for areas and habitats such as box-ironbark forests which have received little study.

Study area

Chiltern lies in north-eastern Victoria (36°10'S, 146°37'E) (Figure 1). The study area includes the Chiltern Regional Park and all areas within 3 km of the boundaries of the two large blocks of forest which form the Park. The park covers 4200 ha, and the total area of our study area is approximately 13 000 ha.

The park has open box-ironbark forest typical of the low-elevation forests of the inland slopes of south-eastern Australia (Costermans 1983). Rainfall averages 675 mm a year, falling mostly in winter and spring. Altitude ranges from 200 to 350 m. The topography is mostly undulating with a few steeper hills. Most of the park lies in two large blocks which are separated by the Hume Freeway. These areas are connected by roadside corridors of trees to blocks of wetter foothill forest to the south and to the River Red Gum *Eucalyptus camaldulensis* forests of the Murray River floodplain to the north.

Much of the park was cleared for gold-mining in the late 1800s. Regrowth dating from this time has been intensively managed for firewood, fence posts and sawn timber. Mature trees and standing dead trees are consequently rare or absent in most of the forest. Details of the vegetation and its fire history before European settlement are poorly known.

The study area lies mostly on Ordovician sedimentary rocks with shallow gravel soils. On two ridges in the southern park block there are small areas of exposed granite with associated metamorphic rocks. Tertiary gravels and clays occur along the Black Dog Creek and other drainage lines.

The vegetation in the large park blocks is all dry sclerophyll, open forest (as defined in Specht 1981). This consists mostly of the ecological vegetation classes, 'Box-Ironbark Forest' and 'Heathy Dry Forest' (Muir et al. 1995). Private land around the park comprises mostly pasture of introduced grasses which is used for sheep and cattle grazing. Some areas in the north of the study area are cultivated for cereal production. In the farmland, areas of remnant native vegetation remain, especially along roadsides and watercourses. Black Dog Creek in the south and west of the study area is the only permanent stream. It has remnants of the ecological vegetation class 'Creekline Grassy Woodland' (Muir et al. 1995). In the Chiltern Valley, to the west of the town, there are several natural billabongs, a sewage treatment plant and two large artificial lakes (the 'no. 1 and no. 2 dams') on the floodplain of this creek. There are many small dams in the park and on private land. The town of Chiltern (population 2000 in 1995) lies in the centre of the study area.

Seven distinct bird habitats were recognised within the study area:

1. Farmland — pasture and cropping land as well as small remnants of native vegetation.
2. Town — gardens, parks and buildings in the town of Chiltern.
3. Wetlands — all dams, billabongs and other wetlands.
4. Red gum forest — River Red Gum and associated Yellow Box *Eucalyptus melliodora*, typically near wetlands or on flats with deeper soils.
5. Box forest — forest dominated by Grey Box *E. microcarpa* and White Box *E. albens*, typically with grassy understoreys, in gullies and flats with clay soils.
6. Ironbark forest — forest dominated by Mugga Ironbark *E. sideroxylon* and Red Stringybark *E. macrorhyncha*, typically with shrubby understoreys on low rises with shallow gravel soils.
7. Ridge forest — forest on steep slopes and ridges with Blakely's Red Gum *E. blakelyi*, White Box, Mugga Ironbark and Red Stringybark, trees typically stunted.

Methods

Information on the current status of species was gathered by the authors from both casual personal observations and systematic counts at particular sites. Intensive observations and systematic counts were made from 1987 to mid 1995 (hereafter referred to as the 'study period'). Collins has lived in the study area since 1969 and has made regular observations throughout the study area since that year. Peake visited the area regularly between 1977 and 1995, and Jessup visited regularly between 1992 and 1995; both these observers made observations throughout the study area. Traill carried out regular field work in the area between 1986 and 1991, which included regular transect counts at five sites in the park. At four of these sites a 500 m × 40 m transect was walked twice in each month between May 1987 and August 1988; two of these transects were in box forest, one in ironbark forest and one in ridge forest. At the fifth site, a 950 m by 50 m transect was censused in October and December 1989 and March, June, September and October 1990 (Traill 1995). In each of these months between 19 and 38 transect counts were completed on this single transect. This transect covered both ridge forest and box forest.

Additional information was obtained from the Atlas of Victorian Wildlife (database held by the Department of Natural Resources & Environment), from Robinson (1982) and from the unpublished observations of Bruce Quin, Rose Sanders and Philip Seely.

To avoid difficulties in comparing the status of different species, we made estimates of the total number of birds of each species in the entire study area. The estimates are made on a logarithmic scale of 1-10 individuals (Rare), 11-100 (Uncommon), 101-1000 (Common), >1000 (Abundant). Unless otherwise stated, the 'current' status given to species is for the period of 1987 to mid 1995. We emphasise that 'Common' and 'Abundant' refer to our estimates of total numbers of the species in the entire study area. Species in these categories often favoured particular habitats, and many were therefore sparse or completely absent in some habitats within the study area. Note that 'Rare' in this context does not imply that a species is threatened with extinction at Chiltern. Some species, for example Wedge-tailed Eagle, are likely to have always had less than 10 individuals present and they are in no way threatened at Chiltern. For nomadic or migratory species, which vary greatly in numbers from year to year, we have given the range of estimates for the highest populations from all years. For species which are total or partial migrants, estimates are given only for the season in which they were most common.

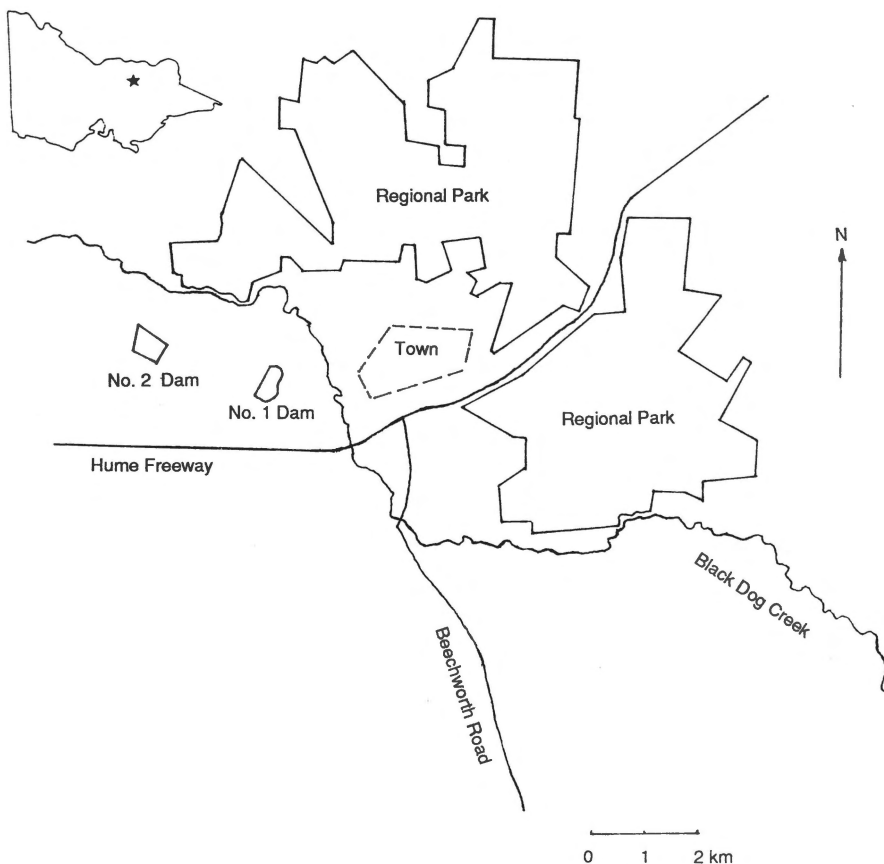


Figure 1. Study area at Chiltern

For rare species, and for conspicuous and easily counted species such as waterbirds and some raptors, the estimates of numbers are made from direct counts of individuals throughout the study area. For species in box, ironbark and ridge forests, the estimates are based on extrapolations from densities observed on the transect counts done by Traill. The average densities of each species in each forest type (ridge, ironbark and box) found in the park were calculated and then multiplied by the estimated area of each forest type in the study area (Victorian Department of Natural Resources & Environment, unpubl. data) to determine the total populations in these forest types in the study area. No detailed counts were available for birds in farmland, red gum forest or in the town. Density estimates for the number of individuals in these habitats were taken where possible from density estimates given for similar habitats in Blakers et al. (1984). These were then multiplied by the estimated area of each habitat type in the study area. Where data were not available in Blakers et al. (1984), we based estimates on our own observations of bird densities.

Information on the past status of species was derived from the annotated species lists of Campbell (1902) and McEvey (1965). Campbell's study area covered our study area, as well as the Rutherglen district to the north and west. Campbell recorded his personal observations that were made during three years' residence at the turn of the century. McEvey's study area covered the Rutherglen district and a small section in the north-west of our study area. McEvey's paper includes his personal observations made during his intermittent residence from 1930 to 1962, and also historical records from the time of intensive European settlement in the district in the 1850s. Neither Campbell nor McEvey attempted to make estimates of the actual numbers of the species they recorded. This meant that, for some of the species examined here, it was not possible to make accurate judgements on

Table 1

Changes in abundance of birds at Chiltern.

<i>Extinct</i>	<i>Declined</i>	<i>Increased</i>
Emu	Brown Quail	Wedge-tailed Eagle*
Grey Goshawk	Whistling Kite	Crested Pigeon
Brolga	Little Button-quail	Turquoise Parrot*
Australian Bustard	Bush Stone-curlew	
Yellow-tailed Black-Cockatoo	Southern Boobook	
Chestnut-rumped Thornbill	Southern Whiteface	
Crested Bellbird	Regent Honeyeater	
	Jacky Winter	
	Hooded Robin	
	Grey-crowned Babbler	
	Grey Butcherbird	

*These species may have increased following earlier unrecorded declines. See annotated species list for further details.

whether numbers have increased or decreased since those two studies. However, in the following cases we could make reasonable inferences that changes in abundance for some species had occurred:

- (i) Species which were recorded by McEvey or Campbell, but which were not recorded in our study;
- (ii) Species which were not recorded by McEvey or Campbell, but which are easily observed and which we recorded as common or abundant;
- (iii) Species which either McEvey or Campbell noted specifically as being rare or common, but which we recorded as having the opposite status.
- (iv) Species which clearly declined or increased during the period of our observations.

We assumed that species recorded by McEvey or Campbell were once present in our study area only if the location noted by the author was in our study area, or the author noted or implied that the species was common and widespread in a habitat definitely found in our study area.

Results

A total of 219 bird species has been recorded in the Chiltern district. One species, the Crimson Rosella *Platycercus elegans*, was represented by two distinct subspecies. Of these 220 taxa, seven have become extinct in the study area since European settlement. Of the remaining taxa, 96 are currently resident in the study area, 33 are summer migrants, 14 are winter migrants, 28 are nomadic and 42 are regarded as vagrants. Seven species have been introduced since European settlement. We recorded 119 species as definitely breeding during our study and judged another 21 species as likely to have bred during this time.

Definite changes in status were noted in 21 native species (Table 1). Seven of these have become extinct, eleven are still present but have documented declines in abundance, and three appear to have increased in abundance since the records of Campbell (1902) and McEvey (1965). The annotated species list details the current status of species in the study area. Where changes in status have occurred, these are noted in the species descriptions.

Annotated species list

The following definitions and abbreviations are used to describe current status in the annotated species list.

Res = Resident all year.

Mig = Migratory. May be either a 'summer' migrant (spring to autumn) or a 'winter' migrant (autumn to spring). Note that a migratory species may be present in low numbers in the 'off' season.

Nom = Nomadic. No clear seasonality. Present in the study in all or most years but at unpredictable times and in widely varying numbers.

Vag = Vagrant. Sporadic and unpredictable in its presence in the study area. Not observed in most years. Some consistently appear in 'summer' (spring to autumn) or 'winter' (autumn to spring).

Br = Breeding. Successful breeding or definite breeding attempt recorded in the study area.

Ex = Extinct. Formerly resident or regularly observed. Now extinct within the study area.

Rare = 1-10 individuals

Uncommon = 11-100

Common = 101-1000

Abundant = >1000

? = Insufficient information, most likely status is given.

The taxonomy used is that established by Christidis & Boles (1994).

Emu *Dromaius novaehollandiae* Ex.

Not reported by Campbell (1902), but McEvey (1965) noted historical records from the Rutherglen district from before the 1860s. Suitable habitat occurs in the Chiltern study area.

Stubble Quail *Coturnix pectoralis* Res?, Br, Common?

Regularly heard in spring and early summer in paddocks. Status at other times not clear.

Brown Quail *C. ypsilophora* Vag, Br, Rare.

Breeding in Chiltern Valley in May 1977. Observed in farmland in 1988 and possibly on golf course in 1990. Has declined in numbers. Recorded by Campbell (1902) to be 'in numbers' in all open grassland and croplands but McEvey (1965) had no confirmed records.

Plumed Whistling-Duck *Dendrocygna eytoni* Vag, Br, Rare.

Small groups recorded every few years at the Chiltern Valley wetlands. One pair with dependent young observed on no. 2 dam in Chiltern Valley in January 1982.

Blue-billed Duck *Oxyura australis* Vag, Rare.

Sporadic observations in wetlands in Chiltern Valley. Listed as threatened in Victoria (rare) by CNR (1995).

Musk Duck *Biziura lobata* Nom, Br, Rare.

Mostly on larger wetlands.

Freckled Duck *Stictonetta naevosa* Vag, Rare.

One observed on no 1. dam in 1982. Listed as threatened in Victoria (rare) by CNR (1995).

Black Swan *Cygnus atratus* Res, Br, Rare-Uncommon.

Mostly on larger wetlands.

Australian Shelduck *Tadorna tadornoides* Res, Br, Rare-Uncommon.

Small numbers on wetlands throughout the study area.

Australian Wood Duck *Chenonetta jubata* Res, Br, Common.

On most wetlands and adjacent paddocks in the study area. Breeding recorded in tree hollows in the park some distance from water.

Mallard *Anas platyrhynchos* Res, Br, Rare.

On Lake Anderson in the centre of the town. Occasionally elsewhere.

Pacific Black Buck *A. superciliosa* Res, Br, Common.

On all wetlands.

Australasian Shoveler *A. rhynchotis* Nom, Br, Rare.

Mostly on larger wetlands.

Grey Teal *A. gracilis* Res, Br, Uncommon-Common.

Wetlands throughout the study area.

Chestnut Teal *A. castanea* Vag, Rare.

Sporadic observations on wetlands in the Chiltern Valley.

Pink-eared Duck *Malacorhynchus membranaceus* Nom, Rare-Uncommon.

Mostly on larger wetlands.

Hardhead *Aythya australis* Nom, Br, Rare-Uncommon.

Mostly on larger wetlands.

Australasian Grebe *Tachybaptus novaehollandiae* Res, Br, Uncommon.

On all wetlands.

Hoary-headed Grebe *Poliiocephalus poliocephalus* Nom, Rare.

Mostly on larger wetlands.

Great Crested Grebe *Podiceps cristatus* Nom, Br, Rare.

Mostly on larger wetlands.

Darter *Anhinga melanogaster* Nom, Br, Rare.

Mostly on larger wetlands. One nest on no. 2 dam in 1990.

Little Pied Cormorant *Phalacrocorax melanoleucos* Res, Br, Uncommon-Common.

On all wetlands. Up to 45 pairs breeding on large wetlands in Chiltern Valley.

Pied Cormorant *P. varius* Vag, Rare-Uncommon.

Mostly on larger wetlands.

Little Black Cormorant *P. sulcirostris* Res, Br, Uncommon-Common.

On wetlands throughout the study area. Up to 20 pairs breeding at Chiltern no. 2 dam.

Great Cormorant *P. carbo* Nom, Br, Rare-Uncommon.

Mostly on larger wetlands.

Australian Pelican *Pelecanus conspicillatus* Nom, Rare-Uncommon.

Mostly on larger wetlands.

White-faced Heron *Egretta novaehollandiae* Res, Br, Uncommon.

On wetlands throughout the study area.

Little Egret *E. garzetta* Vag, Rare.

Observed on several occasions in 1980s on wetlands in the Chiltern Valley.

White-necked Heron *Ardea pacifica* Res, Br, Uncommon.

Wetlands, mostly larger ones along Black Dog Creek. Regular breeding colony of 4-5 nests on billabong in Chiltern Valley, occasionally breeds elsewhere.

Great Egret *A. alba* Nom, Rare.

Mostly on larger wetlands.

Intermediate Egret *A. intermedia* Vag, Rare.

Mostly on larger wetlands.

Cattle Egret *A. ibis* Vag, Rare.

Observed in May 1986 and April 1993 in Chiltern Valley.

Nankeen Night Heron *Nycticorax caledonicus* Nom, Rare-Uncommon.

Roosting adjacent to larger wetlands.

Glossy Ibis *Plegadis falcinellus* Vag, Rare.

Group of nine birds observed in 1980s.

Australian White Ibis *Threskiornis molucca* Res, Br, Common.

In paddocks and wetlands throughout the study area. A breeding colony of approximately 30 pairs on Chiltern Valley no. 2 dam. This colony established itself in 1979. Several pairs bred on a billabong elsewhere in the Chiltern Valley in 1988-1989. In the early 1980s there were c. 15 pairs nesting behind the Chiltern tip on the Rutherglen Road but this colony dispersed when trees were removed.

Straw-necked Ibis *T. spinicollis* Res, Common.

In paddocks throughout the study area.

Royal Spoonbill *Platalea regia* Vag, Rare.

Observed in 1993 in Chiltern Valley and in 1994 on a small farm dam.

Yellow-billed Spoonbill *P. flavipes* Nom, Rare.

Wetlands throughout the study area.

Black-shouldered Kite *Elanus axillaris* Nom, Br, Rare-Common.

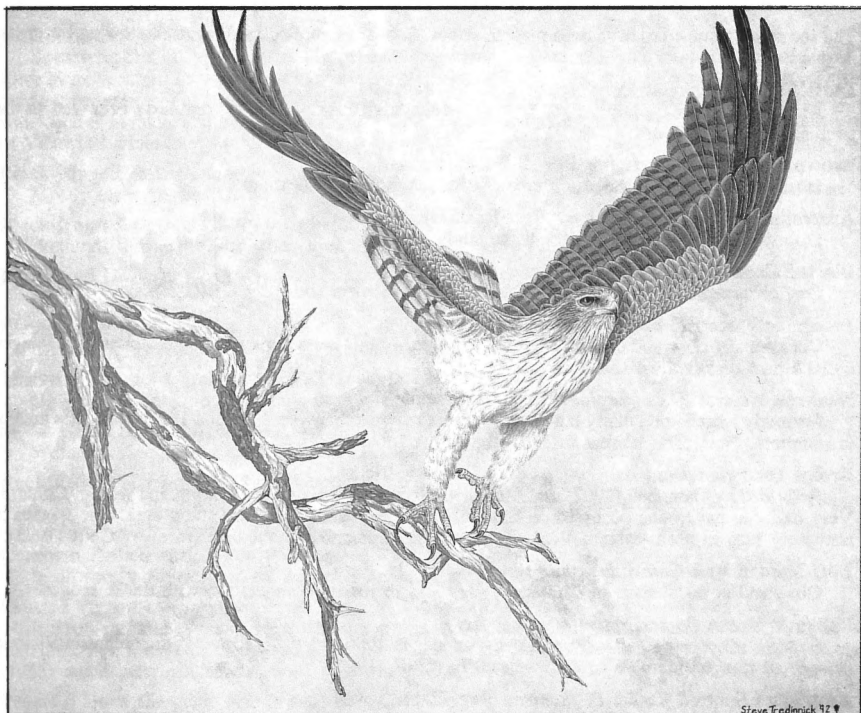
Influxes noted in years with high mouse populations. Notably absent in 1986 and first part of 1987.

Letter-winged Kite *E. scriptus* Vag, Rare.

One bird seen over town in January 1977. Listed as threatened in Victoria (rare) by CNR (1995).

Square-tailed Kite *Lophoictinia isura* Mig-Summer, Rare.

Observed from the early 1980s onwards, sporadic at first, now a regular migrant. Probably only one pair. Listed as threatened in Victoria (vulnerable) by CNR (1995).



Little Eagle

Plate 53

Painting: Steve Tredinnick

Black Kite *Milvus migrans* Vag-Summer, Rare.

Mostly over farmland.

Whistling Kite *Haliastur sphenurus* Res, Br, Rare.

A pair observed regularly in the Chiltern Valley. Occasionally observed elsewhere in the study. Has declined in numbers. Groups of 4-5 birds noted by Campbell (1902) and regarded as 'very common' by McEvey (1965).

White-bellied Sea-Eagle *Haliaeetus leucogaster* Vag, Rare.

A single bird recorded once in September 1987 over the no 1. dam. Regularly observed near Rutherglen. Listed as threatened in Victoria (rare) by CNR (1995).

Spotted Harrier *Circus assimilis* Nom? Br, Rare.

Mostly observed over farmland in the northern part of the study area.

Swamp Harrier *C. approximans* Mig-Summer, Br? Rare.

Mostly on larger wetlands.

Brown Goshawk *Accipiter fasciatus* Res, Br? Uncommon.

Regularly observed throughout the study area, most regularly in the park.

Grey Goshawk *A. novaehollandiae* Ex; formerly Br, Rare.

Resident and breeding in the northern part of the park in the 1970s. Not recorded since. Listed as threatened in Victoria (rare) by CNR (1995).

Collared Sparrowhawk *A. cirrhocephalus* Res?, Rare.

Several observations from the park. Possibly observed more regularly but could be confused with the Brown Goshawk.

Wedge-tailed Eagle *Aquila audax* Res, Br, Rare.

Probably two pairs regularly breeding within the study area. Two nests both used at least intermittently during the study period, one in the northern half and one in the southern half of the park. This species has increased in numbers in the last 30 years, possibly related to decreased persecution by farmers. It was not recorded by Campbell (1902) and was listed as 'occasional' by McEvey (1965).

The species is assumed to have been present originally but to have declined rapidly following European settlement.

Little Eagle *Hieraaetus morphnoides* Res, Br? Rare.

At least one pair, possibly two. Courting behaviour observed. Most regularly observed in the southern half of the park.

Brown Falcon *Falco berigora* Res, Br? Uncommon.

Observed throughout the study area. Most common over farmland.

Australian Hobby *F. longipennis* Res, Br? Rare.

Occasionally observed throughout the study area.

Black Falcon *F. subniger* Vag, Rare.

One observed in 1982. Listed as threatened in Victoria (rare) by CNR (1995).

Peregrine Falcon *F. peregrinus* Res, Rare.

Occasionally observed throughout the study area. A pair nests regularly in the Mount Pilot Ranges c. 10 km to the south of Chiltern.

Nankeen Kestrel *F. cenchroides* Nom, Br? Rare.

Formerly recorded regularly but very few birds recorded between 1986 and 1990. Fluctuates greatly in numbers. Noticeably absent in 1986 and first part of 1987.

Brolga *Grus rubicunda* Ex.

Recorded by Campbell (1902) and McEvey (1965) on the plains to the north and west of Chiltern. Very likely to have once occurred on the grasslands and wetlands in the study area. The species is now very rare in north-eastern Victoria. Listed as threatened in Victoria (rare) by CNR (1995).

Buff-banded Rail *Gallirallus philippensis* Nom? Br, Rare.

Observed at no. 1 dam in Chiltern Valley and in roadside vegetation with dense sedges.

Baillon's Crake *Porzana pusilla* Vag, Rare.

Single birds recorded in well-vegetated wetlands in 1986 and 1987. Listed as threatened in Victoria (suspected rare, vulnerable or endangered) by CNR (1995).

Australian Spotted Crake *P. fluminea* Vag, Rare.

Observed at no. 1 dam in 1991.

Spotless Crake *P. tabuensis* Vag, Rare.

Observed in February 1982 on no. 1 dam in Chiltern Valley.

Purple Swamphen *Porphyrio porphyrio* Res, Br, Uncommon.

Well-vegetated wetlands throughout the study area.

Dusky Moorhen *Gallinula tenebrosa* Res, Br, Uncommon.

Well-vegetated wetlands throughout the study area.

Black-tailed Native-hen *G. ventralis* Vag, Rare.

Sporadically observed on wetlands in the Chiltern Valley

Eurasian Coot *Fulica atra* Res, Br, Uncommon.

Mostly on larger wetlands.

Australian Bustard *Ardeotis australis* Ex.

Recorded by Campbell (1902). Not recorded in Rutherglen district since 1940s (McEvey 1965). The species is now extinct throughout north-eastern Victoria. Listed as endangered in Victoria (CNR 1995).

Little Button-quail *Turnix velox* Vag, Rare.

A single dead bird found in farmland in 1970s. Has declined in numbers. Recorded by Campbell (1902) to be 'in numbers' in all open grassland and croplands but not observed by McEvey (1965).

Painted Button-quail *T. varia* Res, Br, Common.

Found throughout the park. Most common in box and ironbark forests. Not recorded from small remnants of native vegetation.

Latham's Snipe *Gallinago hardwickii* Mig-Summer, Uncommon.

Mostly on larger wetlands.

Sharp-tailed Sandpiper *Calidris acuminata* Vag-Summer, Rare.

A group of three birds observed in Chiltern Valley in 1982.

Painted Snipe *Rostratula benghalensis* Vag, Rare.

A record from Chiltern Valley in 1981. Listed as threatened in Victoria (suspected rare, vulnerable or endangered) by CNR (1995).

Bush Stone-curlew *Burhinus grallarius* Res, Br, Rare.

Scattered pairs in copses of trees in partly cleared land. A decline in numbers noted since 1970s. Birds were resident in areas next to town until the late 1970s. Currently only two pairs known in remnant vegetation in northern part of the study area. The decline at Chiltern has been part of a Victoria-wide decline in range and numbers of this species (Johnson & Baker-Gabb 1993). Listed as threatened in Victoria (vulnerable) by CNR (1995).

Black-winged Stilt *Himantopus himantopus* Nom, Rare-Uncommon.

Mostly on larger wetlands.

Black-fronted Dotterel *Elseyornis melanops* Res, Br, Uncommon.

Wetlands throughout the study area.

Red-kneed Dotterel *Erythronyx cinctus* Nom, Rare.

Mostly on larger wetlands.

Banded Lapwing *Vanellus tricolor* Nom, Br, Rare-Uncommon.

On short grasslands, mostly in the northern half of the study area.

Masked Lapwing *V. miles* Res, Br, Uncommon-Common.

On grassland and wetlands throughout the study area.

Silver Gull *Larus novaehollandiae* Vag, Rare.

Wetlands. Seen in winter 1984 and January 1988.

Rock Dove *Columba livia* Res?, Uncommon.

Observed in the town. It is unclear whether the birds seen include totally feral birds or are all domesticated birds flying from lofts.

Common Bronzewing *Phaps chalcoptera* Res, Br, Common.

In all forest habitats and immediately adjacent farmland.

Crested Pigeon *Ocyphaps lophotes* Res, Br, Common-Abundant.

In farmland and edges of park. Has increased in numbers. Only occasionally recorded south of the Hume Freeway. This conspicuous species was not recorded by Campbell (1902) whereas McEvey (1965) noted increasing populations from the 1930s onwards.

Peaceful Dove *Geopelia striata* Res, Br?, Common.

In areas of red gum and box forests in and near the park. Possibly some local movements of birds in winter from the park to more open areas.

Yellow-tailed Black-Cockatoo *Calyptrorhynchus funereus* Ex.

Recorded by Campbell (1902) as a 'visitor'. Not recorded by McEvey (1965).

Gang-gang Cockatoo *Callocephalon fimbriatum* Mig-Winter, Rare.

Pairs or small groups recorded in most years throughout the study area.

Galah *Cacatua roseicapilla* Res, Br, Common.

Farmland and edges of park.

Sulphur-crested Cockatoo *C. galerita* Res?, Rare.

Pairs or small groups mostly recorded in the Chiltern Valley.

Cockatiel *Nymphicus hollandicus* Vag-Summer, Rare.

Small groups recorded every few years in farmland.

Musk Lorikeet *Glossopsitta concinna* Nom, Uncommon-Common.

Sporadic in occurrence, recorded every year but not in most months. Only common when there were large flowerings of one of the favoured eucalypts. As for all three lorikeets, mostly found feeding on flowering Mugga Ironbark, Grey Box and White Box. Found in orchards and in flowering eucalypts in all habits.

Little Lorikeet *G. pusilla* Nom, Common-Abundant.

Recorded at Chiltern in most months.

Purple-crowned Lorikeet *G. porphyrocephala* Vag, Rare-Uncommon.

The rarest of the three lorikeets at Chiltern.

Australian King-Parrot *Alisterus scapularis* Mig-Winter, Rare.

Pairs and small groups recorded in the park once or twice in most years.

Crimson Rosella *Platycercus elegans elegans* Mig-Winter, Common.

In trees in all habitats. Immature-plumaged birds appear to remain in the study area for longer in the spring.

Yellow Rosella *P. elegans flaveolus* Mig-Winter, Rare-Uncommon.

Small groups observed in and near the township and on the northern boundary of the park. Frequently observed outside the study area along Indigo Creek to the east and the Murray River to the north.

Eastern Rosella *Platycercus eximius* Res, Br, Common.

Found throughout the study area in farmland and park.

Swift Parrot *Lathamus discolor* Mig-Winter, Uncommon.

Small numbers on flowering eucalypts throughout the study area. Chiltern is likely to be an important site for this nationally threatened species. Listed as threatened in Australia (vulnerable) in the ESP Act (1992) and threatened in Victoria (endangered) by CNR (1995).

Red-rumped Parrot *Psephotus haematonotus* Res, Br, Common-Abundant.

In farmland, town, and red gum and box forests.

Budgerigar *Melopsittacus undulatus* Vag-Summer, Rare-Uncommon.

Small groups recorded every few years in the park or adjacent farmland.

Blue-winged Parrot *Neophema chrysostoma* Vag, Rare.

Small groups observed in northern part of forest in 1987 and 1988.

Elegant Parrot *N. elegans*

Recorded by Campbell (1902) as being present in 'open grass country'. Not recorded by McEvey (1965) and there were no observations from north-eastern Victoria or southern New South Wales during the bird atlas (Blakers et al. 1984). Blakers et al. (1984) suggested that 'it has never been more than an irregular visitor to the Murray-Darling and South-east Regions east of 140°'. Possibly Campbell confused this species with either the Turquoise Parrot or the Blue-winged Parrot. Given the lack of any corroborating records from in or anywhere near Chiltern, we have rejected this record as a possible misidentification. It is not included in our species tallies.

Turquoise Parrot *N. pulchella* Res, Br, Common.

Throughout study area in all habitats, but is patchily distributed and has local seasonal movements (see also Quin & Baker-Gabb 1993). As has occurred elsewhere in its range, this species has increased dramatically in numbers in the last 25 years. First recorded at Chiltern in 1969, when only a small number of birds was found. The species was not recorded by Campbell (1902) or McEvey (1965). Experienced, local naturalists in the area, from the 1920s onwards, did not observe the species which was either absent or very rare during this period. The species is still increasing in numbers at Chiltern and is expanding its range throughout eastern Australia following severe declines noted in the late 1800s and early 1900s. We assume that the species was originally present at Chiltern, but that it declined rapidly following European settlement, and was absent or very rare at the time of Campbell's observations. Listed as threatened in Victoria (rare) by CNR (1995).

Pallid Cuckoo *Cuculus pallidus* Mig-Summer, Br, Uncommon.

Mostly in farmland and forest edge.

Brush Cuckoo *Cacomantis variolosus* Vag-Summer, Rare.

One observed in November 1993 in the southern part of the park. Recorded by Campbell (1902) as 'found in one particular spot at Chiltern'. Prefers wetter forests (Emison et al. 1987) and unlikely to have ever been common.

Fan-tailed Cuckoo *C. flabelliformis* Mig-Summer, Br, Common.

Mostly in park and larger forest remnants.

Black-eared Cuckoo *Chrysococcyx osculans* Vag?-Summer, Rare.

Recorded sporadically in the park and on forest edges. Unclear whether it is a regular but rare migrant or only arrives in some years.

Horsfield's Bronze-Cuckoo *C. basalis* Mig-Summer, Br, Uncommon.

Throughout study area, mostly in farmland and forest remnants.

Shining Bronze-Cuckoo *C. lucidus* Mig-Summer, Br? Uncommon.

Throughout study area, mostly in the park.

Powerful Owl *Ninox strenua* Res, Br, Rare.

Two breeding pairs in the southern part of the park. One pair first discovered in late 1986 and has bred or attempted to breed in every subsequent year of this study. Another pair, which possibly bred, was discovered 2 km away from first pair in 1991 (see also Traill 1993a). Listed as threatened in Victoria (rare) by CNR (1995).

Barking Owl *N. connivens* Res, Br, Rare.

Found on the edges of the park and in large patches of remnant vegetation. Currently two pairs known within the study area, both from edges of the park boundary to the south of the highway. Another two pairs are resident in forest edge habitat along the Barambogie Ranges to the south-west of the study area. No changes in status have been noticed in 15 years of regular monitoring. Listed as threatened in Victoria (rare) by CNR (1995).

Southern Boobook *Ninox novaeseelandiae* Res, Br? Rare.

Only one resident pair known from the southern part of the park. Occasionally observed elsewhere. Has declined in numbers. Lack of suitable breeding hollows may partly explain its current rarity (Traill 1991). McEvey (1965) noted it as 'commonly heard or seen'.

Barn Owl *Tyto alba* Nom? Br? Rare-Uncommon.

Observed once or twice in most years on roadsides and in park, but status unclear.

Tawny Frogmouth *Podargus strigoides* Res, Br, Common.

Throughout the study area in all habitats with trees.

White-throated Nightjar *Eurostopodus mystacalis* Mig-Summer, Br? Uncommon.

Throughout the park.

Australian Owlet-nightjar *Aegotheles cristatus* Res, Br? Uncommon.

Patchily distributed in the park possibly because of a shortage of suitable hollows (Traill 1991). Regularly observed in mature forest at Coyles Trail in the southern part of the park.

White-throated Needletail *Hirundapus caudacutus* Mig-Summer, Uncommon-Common.

Large flocks regularly observed over the study area.

Azure Kingfisher *Alcedo azurea* Vag, Rare.

Recorded three times in study period, once at a dam in the park and twice in or near Black Dog Creek.

Laughing Kookaburra *Dacelo novaeguineae* Res, Br, Common.

Throughout the study area in all habitats with trees.

Red-backed Kingfisher *Todiramphus pyrrhopygia* Vag-Summer, Rare.

One observed in northern part of park in mid 1980s. A single bird observed regularly at no 1. dam in 1989-1990.

Sacred Kingfisher *T. sanctus* Mig-Summer, Br, Uncommon.

Patchily distributed in all forest habitats. Absent from large areas of forest, possibly because of lack of suitable hollows (Traill 1991).

Rainbow Bee-eater *Merops ornatus* Mig-Summer, Br, Common.

In all habitats. Large scattered breeding colonies known at Chiltern Valley no. 1 and no. 2 dams, smaller one at Cyanide Dam in the south of the park. Probably breeds at other sites throughout the study area.

Dollarbird *Eurystomus orientalis* Mig-Summer, Br, Rare.

Mostly in red gum forest at the Chiltern Valley wetlands, occasionally elsewhere.

White-throated Treecreeper *Cormobates leucophaeus* Res, Br, Common.

In park and larger forest remnants. Common in ridge forest, rare or absent elsewhere.

Brown Treecreeper *Climacteris picumnus* Res, Br, Common.

In red gum and box forests.

Superb Fairy-wren *Malurus cyaneus* Res, Br, Abundant.

All habitats with patches of dense vegetation.

Spotted Pardalote *Pardalotus punctatus* Res, Br, Common.

In park and larger forest remnants. Most common in ridge forest.

Striated Pardalote *P. striatus* Res, Br, Common.

In all habitats with trees.

White-browed Scrubwren *Sericornis frontalis* Res? Br? Rare.

Sporadic observations of individuals in the park in areas with dense understorey.

Chestnut-rumped Heathwren *Hylacola pyrrhopygia* Res, Br, Uncommon.

Occasional observations in the park in areas with dense understorey.

Speckled Warbler *Chthonicola sagittata* Res, Br, Common.

Throughout the park. Most common in ridge forest.

Weebill *Smicrornis brevirostris* Res, Br, Common.

In park and larger forest remnants. Most common in ridge forest.

Western Gerygone *Gerygone fusca* Mig-Summer, Br, Uncommon.

In park and larger forest remnants. Most common in ridge forest.

White-throated Gerygone *G. olivacea* Mig-Summer, Br, Uncommon.

In park and larger forest remnants. Most common in ridge forest.

Brown Thornbill *Acanthiza pusilla* Res, Br, Common.

In park and larger forest remnants. Most common in ridge forest.

Chestnut-rumped Thornbill *Acanthiza uropygialis* Ex?

Observed by Campbell (1902) who implied it was common but gave no further details on habitat or locality. Observed in the Barambogie Ranges to the south of the study area in 1979.

Buff-rumped Thornbill *A. reguloides* Res, Br, Abundant.

In park and larger forest remnants. Most common in ridge forest.

Yellow-rumped Thornbill *A. chrysorrhoa* Res, Br, Common.

In farmland and forest edges.

Yellow Thornbill *A. nana* Res, Br? Uncommon.

Observations from throughout the study area. Most common in town and in ridge forest.

Striated Thornbill *A. lineata* Res, Br, Abundant.

In park and larger forest remnants. Most common in ridge forest.

Southern Whiteface *Aphelocephala leucopsis* Res, Br, Rare-Uncommon.

Forest edges and farmland. Has declined in numbers. Campbell (1902) implied it was common and widespread in his study area. McEvey (1965) recorded it only 'occasionally' and as 'not as common' (as previously).

Red Wattlebird *Anthochaera carunculata* Nom, Br, Common-Abundant.

In all habitats. As with the lorikeets, largest numbers arrive in autumn to feed on flowering eucalypts.

Noisy Friarbird *Philemon corniculatus* Nom, Br, Common-Abundant.

In all habitats. As with the lorikeets, largest numbers arrive in autumn to feed on flowering eucalypts.

Little Friarbird *P. citreogularis* Nom, Br, Uncommon-Common.

Throughout the study area but most common in red gum forest.

Regent Honeyeater *Xanthomyza phrygia* Mig-Winter, Br, Rare-Uncommon.

In most years birds arrive in March-April, breed in early spring and depart by late spring. All habitats with trees, but concentrated at a small number of sites, all in the park and most near water. During the study period the number of known nests in the study area in different years ranged from 0 to 6. Has declined in numbers at Chiltern in parallel with the national decline in numbers of this species (Webster & Menkhurst 1992). Campbell (1902) recorded nests as being 'often seen'. Chiltern is currently one of the most important districts nationally for the species (Webster & Menkhurst 1992). Listed as threatened (endangered) in both Victoria and Australia (ESP Act 1992, CNR 1995).

Blue-faced Honeyeater *Entomyzon cyanotis* Res, Br, Rare-Uncommon.

Nearly all observations in or near the town. Occasionally in the park.

Noisy Miner *Manorina melanocephala* Res, Br, Abundant.

On roadsides and occasionally on edge of the park.

Yellow-faced Honeyeater *Lichenostomus chrysops* Mig-Winter, Common.

In park and larger forest remnants. Most common in ridge forest.

White-eared Honeyeater *L. leucotis* Res? Rare.

Less than ten records for the study area. Mostly in ridge forest. Possibly a resident but rare and at the edge of its geographical range.

Yellow-tufted Honeyeater *L. melanops* Res, Br, Abundant.

In park and larger forest remnants. Most common in ironbark forest. With Fuscous and White-plumed Honeyeaters appears to exclude a range of smaller species from large areas of red gum, box and ironbark forests (Traill 1995).

Fuscous Honeyeater *L. fuscus* Res, Br, Abundant.

In park and larger forest remnants. Most common in box and ironbark forests.

White-plumed Honeyeater *L. penicillatus* Res, Br, Abundant.

Throughout the study area. Most common in red gum forest and adjacent box forest.

Black-chinned Honeyeater *Melithreptus gularis* Res, Br, Common.

In park and larger forest remnants. Most common in box forest.

Brown-headed Honeyeater *M. brevirostris* Res, Br, Abundant.

In park and larger forest remnants. Most common in ridge forest.

White-naped Honeyeater *M. lunatus* Mig-Winter, Abundant.

In park and larger forest remnants. Most common in ridge forest.

Painted Honeyeater *Grantiella picta* Mig-Summer, Br, Rare-Uncommon.

In box and ironbark forest with large concentrations of mistletoe. Listed as threatened in Victoria (rare) by CNR (1995).



Yellow-tufted Honeyeater

Plate 54

Photo: Neville Male

Eastern Spinebill *Acanthorhynchus tenuirostris* Mig-Winter, Uncommon.

Observed throughout the study area. Mostly on forest edges.

Black Honeyeater *Certhionyx niger* Vag-Summer, Rare.

Recorded in summer of 1985 and October 1994.

Pied Honeyeater *C. variegatus* Vag, Rare.

One observed in February 1981 (Robinson 1982).

White-fronted Chat *Epthianura albifrons* Vag, Rare.

Occasionally observed in farmland.

Jacky Winter *Microeca fascians* Res, Br, Uncommon.

On edges of forest and forest remnants. Has declined in numbers. Regarded by McEvey (1965) as 'common' and 'rarer in recent years'.

Scarlet Robin *Petroica multicolor* Res, Br, Uncommon.

Most regularly observed in ridge forest. Possible tendency to move to farmland and the town following breeding.

Red-capped Robin *P. goodenovii* Res, Br, Uncommon.

Most regularly found in ridge forest. Some birds move to farmland and the town following breeding.

Flame Robin *P. phoenicea* Mig-Winter, Uncommon.

Mostly in farmland and boundaries of forest blocks.

Rose Robin *P. rosea* Mig-Winter, Rare.

Observed in most years in box forest and on forest edges.

Hooded Robin *Melanodryas cucullata* Res, Br, Rare.

In box forest and on forest edges. Has declined in numbers. Regarded by McEvey (1965) as 'common though not plentiful'.

Eastern Yellow Robin *Eopsaltria australis* Res, Br, Abundant.

Throughout the park and in larger forest remnants.

Grey-crowned Babbler *Pomatostomus temporalis* Res, Br, Rare.

Only two groups known to remain in the study area. One is in roadside vegetation to the north of the park, and one is in the northern part of the park. This species has declined at Chiltern as has occurred elsewhere in Victoria (Emison et al. 1987). Regarded as 'common' by Campbell (1902)

and widespread but decreasing in Rutherglen district (McEvey 1965). Listed as threatened (endangered) in Victoria (CNR 1995).

White-browed Babbler *Pomatostomus superciliosus* Res, Br, Common.
Red gum, box and ironbark forests.

Varied Sittella *Daphoenositta chrysoptera* Res, Br, Uncommon.
In park and larger forest remnants. Most common in ridge forest.

Crested Shrike-tit *Falcunculus frontatus* Res, Br, Common.
In red gum and box forests.

Crested Bellbird *Oreocitta gutturalis* Ex.

At the beginning of the study period (1987) this species was resident, breeding and uncommon. It was last observed in the study area in 1991. Formerly widespread and observed throughout the park. A steady reduction in the number of observations noted from the 1970s onwards. In the 1970s it was observed on most days by observers spending a full day in the park but by the mid 1980s it was only recorded every few months by observers working daily in the park.

Gilbert's Whistler *Pachycephala inornata* Res, Br, Rare.

Probably less than five birds present. Numbers of the species have always been low since regular record-keeping began in the 1970s. Observed sporadically in the northern part of the park in box and ironbark forest with dense patches of understorey shrubs.

Golden Whistler *P. pectoralis* Mig-Winter, Uncommon.
In all forest types but most regularly observed in ridge forest.

Rufous Whistler *P. rufiventris* Mig-Summer, Br, Abundant.
In park and larger forest remnants. Most common in ridge forest.

Grey Shrike-thrush *Colluricincla harmonica* Res, Br, Common.
In all forest types.

Leaden Flycatcher *Myiagra rubecula* Mig-Summer, Br, Rare.
Mostly observed in ridge forest in the southern part of the park, occasionally in box forest.

Satin Flycatcher *M. cyanoleuca* Mig-Summer, Br? Rare.
Mostly observed in ridge forest in the southern part of the park.

Restless Flycatcher *M. inquieta* Res, Br, Uncommon.
In red gum and box forests.

Magpie-lark *Grallina cyanoleuca* Res, Br, Common.
In all habitats except ironbark and ridge forests.

Rufous Fantail *Rhipidura rufifrons* Vag, Rare.
Occasionally observed in spring and autumn. Presumably migrants on passage.

Grey Fantail *R. fuliginosa* Res, Br, Abundant.
In park and larger forest remnants. Most common in ridge forest. Many, possibly most, birds migrate away from the area in winter.

Willie Wagtail *R. leucophrys* Res, Br, Common.
All habitats but most common in farmland, red gum and box forests.

Black-faced Cuckoo-shrike *Coracina novaehollandiae* Mig-Summer, Br, Common.
In all habitats with trees.

White-bellied Cuckoo-shrike *C. papuensis* Mig-Summer, Br, Uncommon.
In all habitats with trees. Some birds always present in winter.

Cicadabird *C. tenuirostris* Vag, Rare.
One male observed in the park in November 1987.

White-winged Triller *Lalage sueurii* Mig-Summer, Br, Rare-Uncommon.
Mostly on edges of park.

Olive-backed Oriole *Oriolus sagittatus* Mig-Summer, Br, Uncommon-Common.
In all types of forest in the park and in forest remnants of native vegetation.

White-breasted Woodswallow *Artamus leucorhynchus* Mig-Summer, Br, Rare.
At larger wetlands in the Chiltern Valley.

Masked Woodswallow *A. personatus* Mig-Summer, Br, Rare-Common.
In or over all habitats. Observed in most years, but numbers fluctuate greatly. Always in smaller numbers than White-browed Woodswallow. Rarely breeds.

White-browed Woodswallow *A. superciliosus* Mig-Summer, Br, Uncommon-Abundant.
In or over all habitats. Observed in most years but numbers fluctuate greatly. Most common in box forest.

Black-faced Woodswallow *Artamus cinereus* Vag, Rare.

A few observations from study area. No details recorded.

Dusky Woodswallow *A. cyanopterus* Mig-Summer, Br, Abundant.

In park and larger forest remnants. Most common in box and ironbark forests.

Grey Butcherbird *Cracticus torquatus* Vag, Rare.

Possibly a former breeding, resident species. One recorded in farmland in the north of the study area in July 1990. One recorded in the southern part of the park in July 1995. Has declined in numbers. Campbell (1902) recorded it in his study area but gave no notes. McEvey (1965) noted that it had been common in his study area at the turn of the century, but declined rapidly and he found no records.

Pied Butcherbird *C. nigrogularis* Res? Br, Rare.

In farmland and forest remnants on northern boundaries of the study area.

Australian Magpie *Gymnorhina tibicen* Res, Br, Abundant.

In farmland and red gum and box forests.

Pied Currawong *Strepera graculina* Mig-Winter, Common.

In all habitats, most common in the town and at the rubbish tip.

Grey Currawong *S. versicolor* Vag-Winter, Rare.

Small groups observed in the park in July 1988 and April 1995. Possibly formerly more common as Campbell (1902) implied it was a regular winter visitor.

Australian Raven *Corvus coronoides* Res, Br, Common.

Throughout the study area.

Little Raven *C. mellori* Res? Br? Uncommon-Common.

Farmland. Detailed observations of this species were not kept. Assumed to be a resident species.

White-winged Chough *Corcorax melanorhamphos* Res, Br, Common.

In all habitats except the town. Most common in forest remnants and box forest. Strangely, Campbell (1902) recorded this species only in *Callitris* pine country north of the Murray River.

Satin Bowerbird *Ptilonorhynchus violaceus* Vag-Winter, Rare.

Sporadic visitor to town gardens.

Singing Bushlark *Mirafra javanica* Nom? Rare?

Sporadically observed in farmland.

Skylark *Alauda arvensis* Res? Br? Uncommon.

Observed sporadically in farmland.

Richard's Pipit *Anthus novaeseelandiae* Res, Br? Common.

Farmland.

House Sparrow *Passer domesticus* Res, Br, Abundant.

Farmland and town.

Eurasian Tree Sparrow *P. montanus* Res, Br, Common-Abundant.

Farmland and town. First identified in Rutherglen district in the 1930s long after establishment of the House Sparrow (McEvey 1965).

Zebra Finch *Taeniopygia guttata* Vag, Rare.

In farmland. This species is found in large numbers to the north-west in the Rutherglen district.

Red-browed Finch *Neochmia temporalis* Res, Br, Common.

In the park and forest remnants. Most common in box forest.

Diamond Firetail *Stagonopleura guttata* Res, Br, Uncommon.

In park and forest remnants. Mostly in box forest.

European Goldfinch *Carduelis carduelis* Nom, Br? Rare-Uncommon.

Farmland and forest edges.

Mistletoebird *Dicaeum hirundinaceum* Nom, Br, Uncommon-Common.

All habitats with trees.

White-backed Swallow *Cheramoeca leucosternus* Mig-Summer, Br, Rare-Uncommon.

Mostly observed on or near wetlands in the Chiltern Valley. Not present in all years.

Welcome Swallow *Hirundo neoxena* Res, Br, Common.

In all habitats.

Tree Martin *H. nigricans* Mig-Summer, Br? Uncommon.

In all habitats.

Fairy Martin *Hirundo ariel* Mig-Summer, Br, Uncommon-Common.

Mostly over farmland and forest edge.

Clamorous Reed-Warbler *Acrocephalus stentoreus* Mig-Summer, Br, Uncommon.

Reed-beds on large wetlands.

Little Grassbird *Megalurus gramineus* Mig-Summer, Br, Rare.

Well-vegetated wetlands.

Rufous Songlark *Cinchoramphus mathewsi* Mig-Summer, Br, Common.

In red gum and box forests.

Brown Songlark *C. cruralis* Mig-Summer, Br?, Uncommon.

In farmland in north of study area.

Silvereye *Zosterops lateralis* Mig-Winter, Common.

In park, larger forest remnants and town. Most common in ridge forest.

Bassian Thrush *Zoothra lunulata* Vag? Rare.

Two observations in 1995, one of a mating pair and one of a single bird. Both observations were in gullies in the park.

Common Blackbird *Turdus merula* Res, Br, Common.

In town and farm gardens, and appeared to be resident in a few of the wetter gullies in the park.

Common Starling *Sturnus vulgaris* Res, Br, Abundant.

In farmland and town.

Discussion

The exceptionally high number of species at Chiltern reflects the geographical position of the area on the boundary between the drier inland habitats and the wetter foothill forests of the Great Dividing Range. Resident at Chiltern are species typical of wetter forests, such as Scarlet Robin and White-throated Treecreeper, as well as species typical of drier inland woodlands and scrubs such as Brown Treecreeper and Red-capped Robin. This trend is also reflected in the diversity of migrant species. In the winter, species which breed in foothill and mountain forests enter the area (e.g. Crimson Rosella, White-naped Honeyeater), and in summer a wide range of summer migrant species enters the area (e.g. Sacred Kingfisher, Masked Woodswallow, Budgerigar).

In addition to its high richness of species, the area supports a large number of threatened species. Regent Honeyeater and Swift Parrot are nationally threatened (ESP Act 1992, Garnett 1993). Nine species that we recorded regularly at Chiltern are listed as threatened in Victoria. A further seven species recorded here as vagrants are listed as threatened in Victoria (CNR 1995). The high number of threatened species is a reflection of the poor state of conservation of box and ironbark forests and woodlands. Over 80% of this habitat has been cleared and few of the remaining remnants of native vegetation are protected in conservation reserves (Traill 1993b, Muir et al. 1995).

Three native species have increased in abundance at Chiltern since the observations of Campbell (1902). The conspicuous and easily identified Crested Pigeon was not recorded by Campbell (1902), indicating that it was absent at that time. McEvey implied that it was present when he commenced observations in the 1930s, and that it had increased in numbers since then. The Crested Pigeon has expanded its range into other agricultural areas following clearing (Emison et al. 1987). In our judgement, the other two 'increasing' species, Wedge-tailed Eagle and Turquoise Parrot, are likely to have increased in numbers recently, following major declines which occurred shortly after European settlement. It is assumed that these declines occurred before the observations of Campbell, who did not record either species. Some other species which can utilise agricultural land, such as Galah and Australian Magpie, may have increased following European settlement, but we have no evidence that this has occurred. It is possible that such species were already common in the large areas of grassy woodland

and forest that would have been present at Chiltern before European settlement, and still present at the time of Campbell's observations.

There is a highly disturbing and continuing pattern of local extinctions at Chiltern. At least seven species have become extinct in the district in historical times. The Emu became extinct within a few decades of European settlement in the mid 1800s. Four of the species became extinct sometime between Campbell's observations at the turn of the century and McEvey's observations in the 1950s. Three of these — Brolga, Australian Bustard, and Chestnut-rumped Thornbill — were all reported by Campbell (1902) as being common in his study area, and the fourth species — the Yellow-tailed Black-Cockatoo — was listed by Campbell as a regular visitor. Two species — the Grey Goshawk and Crested Bellbird — appear to have become extinct in the last two decades. The Grey Goshawk, typically a bird of wetter forests, was probably only an irregular resident at Chiltern (Emison et al. 1987). The Crested Bellbird is a more disturbing example. It was a regularly observed, breeding resident at Chiltern, but it has declined rapidly and disappeared in the last 20 years.

Since Campbell's observations at least 11 species have undergone declines. Three species (Grey Butcherbird, Little Button-quail and Brown Quail) appear to have been rare for several decades. The remaining eight species (see Table 1) have declined since the observations of McEvey. If current trends continue, then most of these 11 species will be extinct at Chiltern within a decade. Most or all of these declines and extinctions are likely to have been caused by the fragmentation and degradation of the forests, woodlands and wetlands at Chiltern. This is the combined result of past and continuing clearing, mining, logging and grazing activities.

Our work indicates that 21 species have changed in status at Chiltern. Of these 18 have become extinct or declined in abundance. We stress that these estimates of change are very conservative. In determining which species had changed in status we included only species for which there was clear evidence of change from more than one observer. The real figures, particularly of declining species, are likely to be much higher.

The patterns of decline of bird species at Chiltern fit with the patterns of widespread local extinctions of many woodland and dry-forest birds in south-eastern Australia noted by Robinson (1991, 1993). Similar patterns have been documented in the woodlands and forests of the south-west of Western Australia and north-eastern New South Wales (Saunders 1993, Barrett et al. 1994, Saunders & Ingram 1995).

Campbell (1902) noted that 'a bird confined to the country nearer Chiltern is the *Oreoica cristata*, its beautiful bell-like notes being always heard among the ironbarks'. Two years ago the Crested Bellbirds stopped calling at Chiltern; they are now extinct throughout north-eastern Victoria. Urgent action is required to halt the current wave of extinctions of the Bellbird and of many other birds in areas such as Chiltern. For many decades into the future this is likely to be the most difficult challenge for bird conservation in Australia.

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