

# MOVEMENT PATTERNS OF PIED CURRAWONGS *Strepera graculina* IN CENTRAL WESTERN NEW SOUTH WALES

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During 1988 and 1989 a total of 254 Pied Currawongs was trapped and colour-banded at Springwood, New South Wales. The data resulting from this study show a build up of Pied Currawong numbers at Springwood from January to a peak in April. Numbers then declined with only isolated breeding pairs present from September to December. The arrival of immature birds peaked two months before the peak in adult numbers. Immature birds were far more mobile than adult birds and accounted for a greater percentage of movements within the Blue Mountains region. More than half of the immature birds disappeared from the study site after being banded while the adult birds stayed at the banding site, on average, nearly twice as long as the immature birds (1.5 months compared with 0.9/0.8 months). During 1989, 56 per cent of all the Pied Currawongs banded in the previous year returned to the banding site. Of these, 27 per cent were immature birds. Recoveries document a general easterly movement to lower altitudes during most months of the year. Westerly movements only commenced in July with banded birds not reaching Blackheath until September. Movement of a small number of birds was recorded to the north of the study site during August and September. Only immature birds were recorded moving away from the Blue Mountains region with recoveries highlighting a north-easterly path through Blacktown, West Pennant Hills, Mooney Mooney, the central coast and on to Newcastle and Thornton. A small number also moved in a south/south-east direction.

## INTRODUCTION

Many workers have commented upon seasonal movements of Pied Currawongs in eastern Australia: Roberts (1942), Strong (1966), Readshaw (1968), Wimbush (1969), Buchanan (1983), Frith (1984). In his study of Pied Currawongs in the Albury region, Readshaw (1968) documented movements up to 320 km from the banding site and also noted, along with other authors, that this species is far more prevalent around settled areas during the non-breeding months. He also concluded that seasonal movements were in a north-south direction with birds shifting in a southerly direction in the spring and a northerly direction during autumn. Wimbush (1969) showed that movements around the Snowy Mountains were from high to low altitudes in autumn with the reverse occurring in spring. He pointed out that their congregation into flocks around the local towns may be attributed to the fact that most towns were at lower altitudes. He also noted that movements away from the area

were the widespread dispersal of immature and non-breeding adults. Similar altitudinal movements have been recorded around Canberra (Frith 1984) where few birds were sighted during summer in comparison to the substantial increase during the winter months.

Winter flocks of Pied Currawongs were observed in the lower Blue Mountains over a number of years prior to the commencement of this study and it was generally thought that this influx was due to movements of birds from higher altitudes. The aim of this two-year study (1988–89) was to test this assumption by colour-banding as many individual birds as possible to track their movements.

## METHODS

The banding site (33°41'36"S, 150°35'30"E) at Springwood, New South Wales, is situated in the Blue Mountains region at an altitude of 340 metres above sea level.

Pied Currawongs were captured utilizing a trap similar to that described by Strong (1966) but incorporated two ground-level funnels, a ground-level drop-door, and a wire section

that could be partitioned off from the main trap, for holding and extracting trapped birds. Bread and at times meat scraps were placed inside the trap with some smaller pieces positioned at the entrances to the funnels to entice the birds inside. Two mist nets (32 mm mesh) were also erected in the birds' flight paths. These two methods were used individually or in conjunction with each other at varying times so that the birds did not become 'trap shy'. When the mist nets were used without the trap being placed in the area, bread scraps were thrown around to coax the birds down from their perches in nearby trees. The use of mist nets by themselves was only employed on rare occasions at the beginning of the study as it was subsequently found that capture rates were far higher using the wire trap. Baiting of the trap took place at approximately 0700 h each day when most birds were present in the vicinity. The trap was left open during weekdays so that the birds would become familiar with it and then set on weekends. Even after taking all the above precautions only 6 per cent of birds banded were caught in the trap a second time. Recording of colour bands of all marked birds became the best means of 'retrapping' individual birds and was carried out daily. Trapping was carried out regularly every Saturday and at least two Sundays every month throughout 1988 and 1989 — even during those months when only a few Pied Currawongs were present at the banding site. The trap was set from 0700 h until 1500 h with most birds being caught between 0700 h and 0830 h.

A metal band was placed on the left tarsus of trapped birds (bands supplied by the Australian Bird and Bat Banding Scheme — ABBBS). A master colour was placed above the metal band (yellow = 1988, light green = 1989) and three colour bands were placed on the right tarsus (combinations supplied by ABBBS). The colour of the birds' gape, iris and bill were noted. Birds with a yellow gape were deemed immature, i.e. in their first year of life (Wimbush 1969).

Articles were published in the local press outlining the study, how the birds were marked and asking for assistance from residents in the district. Details were also broadcast over the local community radio station. The offices of the New South Wales National Parks and Wildlife Service at Blackheath and Glenbrook were notified so that any inquiries could be directed to me. Master colours and colour combinations were not published so that sightings could be readily checked against my records and verified.

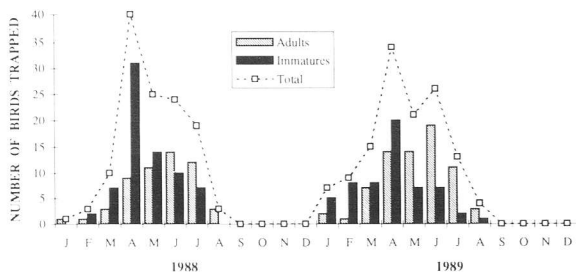


Figure 1. Number of adult and immature Pied Currawongs trapped per month for 1988–89.

## RESULTS

A total of 125 Pied Currawongs was banded during 1988 and 129 in 1989 (Fig. 1). The substantial rise in captures during April in both years coincided with the influx of birds into the district. Most birds left during the first half of August (1 August, 1988 and 12 August, 1989) with no birds being captured during the period September to December, although, several birds did stay and breed in the area during this time (pers. obs.). The number of immature birds trapped peaked during April in both years while the adult numbers were at their maximum in June (Fig. 1).

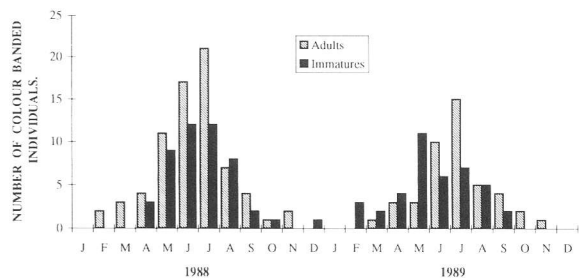


Figure 2. Re-sightings of colour-banded Pied Currawongs in the year of their banding.

The number of birds re-sighted at the banding site during the year in which they were banded is shown in Figure 2. Given that more juveniles were present than adults (Fig. 1), it is clear that adult birds were more likely to remain at the banding site than immature birds. During 1988 only 48 per cent of immature banded birds were sighted again after being released. A similar percentage (52%) was recorded for 1989. Comparable percentages for adults were 74 per cent in 1988 and 54 per cent in 1989. The average period of 'residency' at the banding site was calculated at 1.5 months for adult birds and 0.9 months for immature birds during 1988. In 1989 the periods were very similar — 1.5 and 0.8 respectively.

Sightings of birds outside a 3 km radius from the banding site during the year in which they were banded are shown in Figure 3. Of these, 56 per cent had moved to the south-east of the banding site, 8 per cent to the north and 36 per cent to the west. The movement of birds to the south-east occurred from March through to December while movements westwards to higher

altitudes commenced in July with banded birds first recorded at Blackheath (the farthest recoveries to the west) in September. A series of sightings highlight this altitudinal movement. 091-17757 was banded on 16 January, 1988 and was subsequently sighted south-east at Glenbrook on 4 September, 1988. It then reappeared at the banding site on 12 September, 1988. 091-17760 was banded on 5 February, 1988, sighted at Mt Riverview on 21 June, 1988 and then returned to the banding site on 24 June, 1988. 091-17828 was banded on 30 April, 1988 and was subsequently seen at Winmalee on 16 May, 1988 and at Valley Heights on 20 June, 1988. It then headed west and was sighted at Falconbridge on 8 July, 1988 and Hazelbrook on 18 August, 1988.

The total movements of 43 individually identified birds from 1988 to 1992 (Fig. 4) present a similar pattern to those within the year of banding: 49 per cent to the south-east, 15 per cent to

the north and 36 per cent to the west. There is a slight decrease in the percentage of birds that headed south-east with a corresponding increase in birds that headed north. Several birds actually took up residency at the northerly township of Bowen Mountain and were sighted regularly over several months. Most (70%) of these movements were of immature birds.

Movements away from the Blue Mountains region are shown in Figure 5. This shows a northward trend along the coastal plain. The only recorded sightings during 1988 came from Heckenberg where a band was retrieved from a dead bird and a report from Mooney Mooney that did not list a complete colour combination but in all probability the bird was banded at Springwood (B. Male — ABBBS, pers. comm.). During 1989 nine sightings were reported, the farthest at Thornton, 142 km to the NE. All birds sighted at Blacktown were banded early in 1988 and

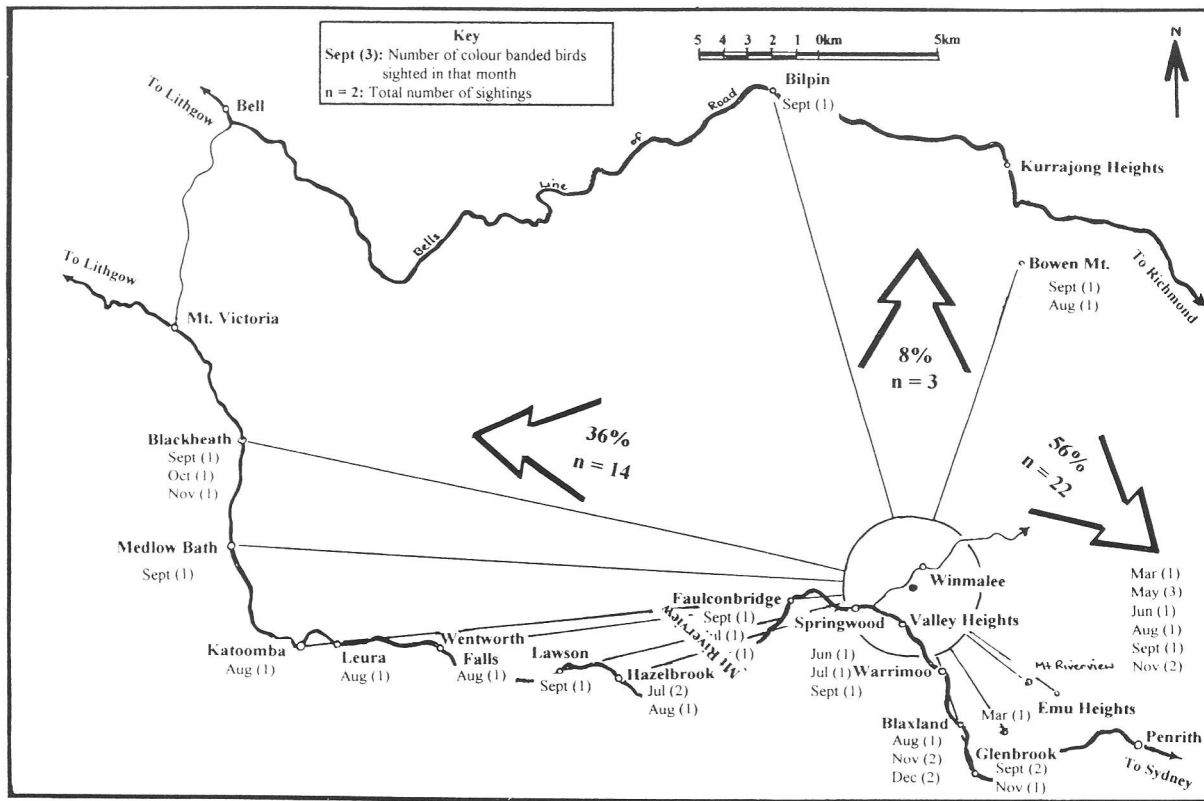


Figure 3. Movements of colour-banded Pied Currawongs in the Blue Mountains region (outside a 3 km radius from the banding site) during the year in which they were banded.

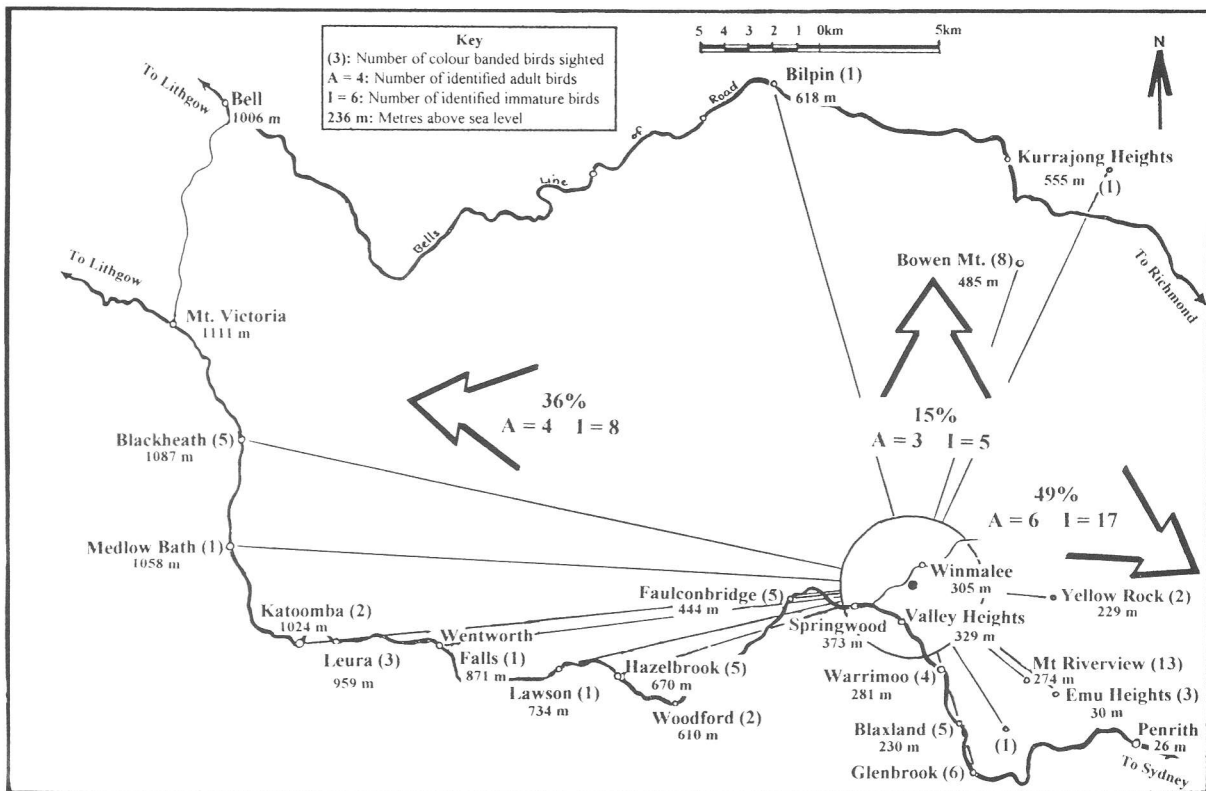


Figure 4. Number of colour-banded Pied Currawongs sighted across the Blue Mountains region from 1988 to 1992.

complete colour combinations were recorded. A band from a carcass found at West Pennant Hills identified a bird that was trapped in July the previous year. One bird (091-17810) was banded on 9 April, 1988 and after visiting Blacktown on 6 April, 1989 flew to Morisset and was sighted on 28 June, 1989. The report from Gwandalan did not include a precise colour combination but did record the master colour over the metal band on the bird's left tarsus. One bird seen at Newcastle and another at Thornton were banded in March and February, 1989 respectively. No sightings farther south than Warragamba have been reported. Of the banded birds sighted outside the Blue Mountains, all those individually identified by colour combinations were immature when banded.

Of the birds banded in 1988, 40 per cent were sighted and individually recognized within 3 km of the banding site in 1989 (Table 1). This figure does not include 21 sightings of birds that were missing bands but still retained the master colour

on their left tarsus. This takes the percentage return to a minimum of 56 per cent. This percentage is a minimum because it was sometimes very difficult to record the colour combinations of all the colour banded birds that flew around during feeding times. Adults had a much higher percentage return of 57 per cent compared to 27 per cent for immature birds. This trend is apparent in all months of banding except for July where adult and immature returns were similar.

## DISCUSSION

The arrival of Pied Currawongs at Springwood during autumn and winter coincides with their arrival in other centres in both New South Wales and Victoria: Beecroft (Roberts 1942), Mittagong (Walsh 1965), Austinmer (Strong 1966), Albury (Readshaw 1965), Island Bend and Waste Point (Wimbush 1969), Leura (Vellenga 1980), Canberra (Frith 1984), Timbertop (Nicholls and Woinarski 1988), Armidale (Bass 1989).

TABLE 1

Percentage of immature and adult Pied Currawongs which were banded in 1988 and re-sighted in 1989 within a 3 km radius of the banding site. Total number of birds banded in each month is shown in parentheses.

Month banded	Adults	Immatures
January	100 (1)	0 (0)
February	100 (1)	0 (2)
March	66 (3)	14 (7)
April	56 (9)	23 (31)
May	45 (11)	21 (14)
June	57 (14)	30 (10)
July	67 (12)	71 (7)
August	33 (3)	0 (0)
Mean	57 (54)	27 (71)

The major influx of birds and peak captures occurred during April in both 1988 and 1989. Vellenga (1980) noted an increase in numbers at Leura during April with a peak in May, June and July. Arrival of birds at Mittagong (Walsh 1965) commenced in April and increased to a peak in July with a similar pattern occurring at Beecroft (Roberts 1942) and Canberra (Frith 1984). The influx was slightly later at Armidale with a marked increase during May. It would appear that the increase in the number of Pied Currawongs at Thornleigh (Buchanan 1983) was slightly later than at the previously mentioned sites and may reflect an influx from other regions as indicated by this study (see Fig. 5).

The peak in the number of immature birds was in April in both 1988 and 1989 with the peak in adult numbers in June (Fig. 1). It would appear from these capture details that immature birds were the first to congregate at Springwood with most adults following one or two months later. Immature birds were less likely to remain at the banding site (Fig. 2) and in some instances travelled some distance away.

There was a sharp drop in both numbers of birds present at the site and the number captured during August with only several pairs of resident birds being sighted between September and December. A similar decline in numbers during August and September was noted at Beecroft (Roberts 1942), Mittagong (Walsh 1965), Canberra (Frith 1984), Timbertop (Nicholls and Woinarski 1988) and Armidale (Bass 1989). The

breeding season of Pied Currawongs commences during September in the southern part of their range (Recher 1976; Macdonald 1992; Marchant 1992) so the disappearance of birds from urban areas over such a wide area during spring can be attributed to breeding activities in adjacent bushland rather than localized factors such as food availability. Regular diurnal movements have been observed at Armidale (Bass 1990) but were not evident at the banding site.

Vellenga (1980) noted, but did not tabulate, some movements away from Leura. Records supplied by the ABBBS show that one bird (090-77395), which was banded by her at Leura on 6 October, 1966 was recovered at Lawson on 10 March, 1967 – a movement to a lower altitude. To date no colour-banded individuals have been observed at towns at a higher altitude and then re-sighted at Springwood but all available evidence points to at least some Pied Currawongs moving from higher altitudes to lower altitudes during autumn/winter and then returning during winter/spring.

Movements to lower altitudes during the autumn/winter period and to higher altitudes during spring have also been recorded at Canberra (Frith 1984) and the Snowy Mountains (Wimbush 1969) although Wimbush attributed the movement from higher altitudes to lower altitudes as a reflection of birds searching for food in settled areas that are usually situated in the valleys. This is not the case in the Blue Mountains region as towns are situated at regular intervals across a range of altitudes.

Total movements across the Blue Mountains over the two years of the study plus observations up to 1992 (Fig. 4) show that nearly half the movements were to a lower altitude with just over a third to a higher altitude. Movements northwards only accounted for 15 per cent of sightings. As there are very few towns to the north-west and none for some considerable distance to the south of the banding site, the probability of sightings in those directions was very much reduced. This may have biased the results slightly. Even so the major movements within the Blue Mountains are in an east-west direction. These movements involved both immature and adult birds with the immatures being the largest component (70%).

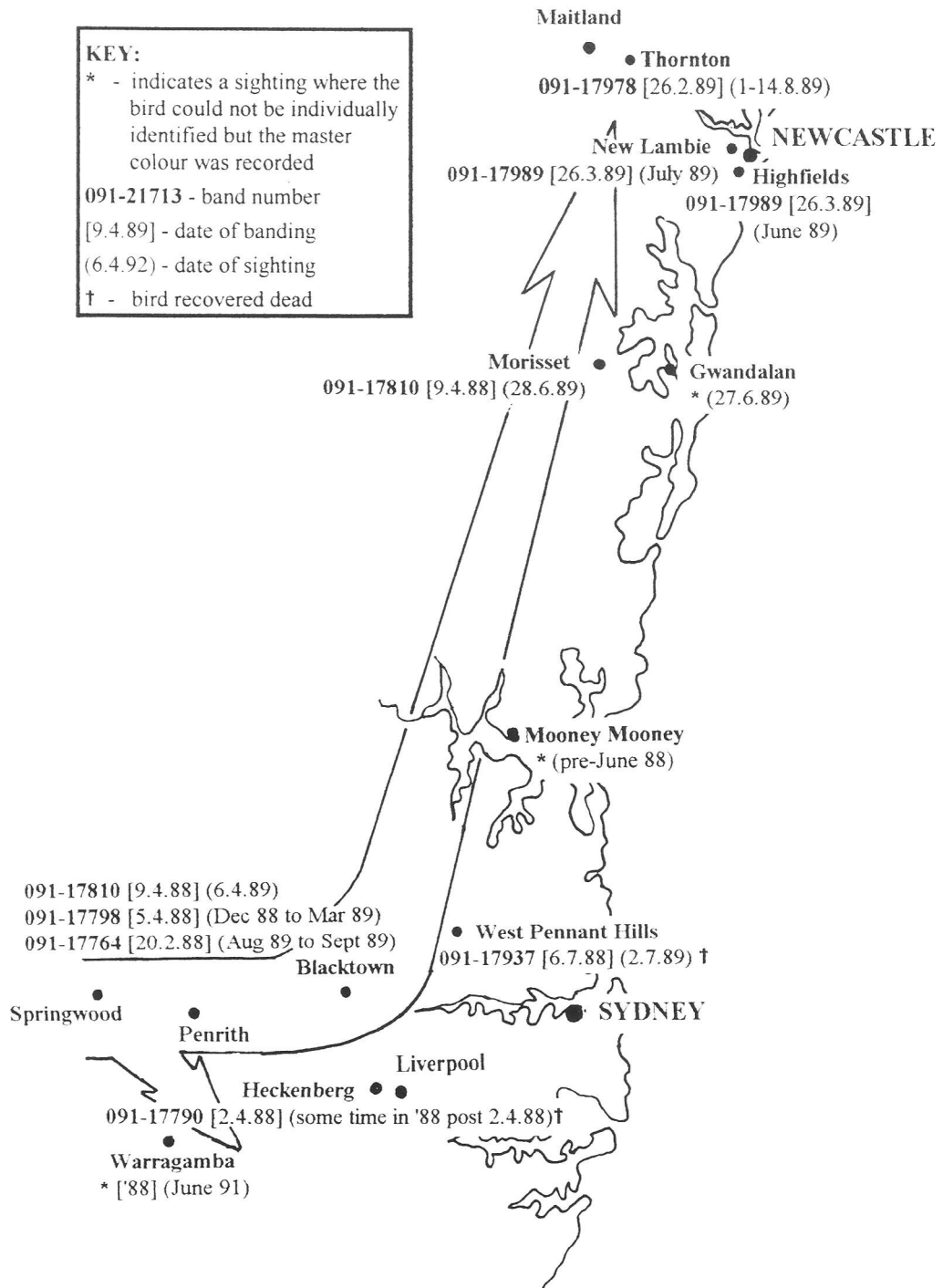


Figure 5. Recorded movements of colour-banded Pied Currawongs away from the banding site from 1988 to 1991.

A different pattern is evident when movements outside the region are examined (Fig. 5). An easterly and then a noticeably northward movement from Springwood occurred during the autumn/winter period. There was only one record of a bird that partially followed the route outlined in Figure 5 and then returned to the banding site. The bird in question (091-17798) was banded on 5 April, 1988 and was sighted at Blacktown on two occasions, 5 December, 1988 and 11 March, 1989. It then reappeared at Springwood on 25 April, 1989 and was not seen after 29 May, 1989. The sighting of a colour-banded bird with a yellow master colour at Warragamba during 1991 does not provide information on seasonal movements as this journey lasted at least two years. The same can be said for two other recorded movements. The first was a journey from Leura to Buxton a distance of 62 km to SSE (Vellenga 1980) that took place from April 1967 to July 1968. The second was from Wentworth Falls to Silverdale a distance of 31 km south-east (ABBBS banding records) that occurred from August 1981 to June 1983. However, these three movements do document a small south-easterly shift from the Blue Mountains.

Readshaw (1968) concluded from his study centred at Albury and other recorded movements that 'most Pied Currawongs regularly shift southwards in spring and northwards in autumn in New South Wales and northern Victoria'. The data presented in this paper show that this conjecture is not as clear cut in the central eastern part of New South Wales.

The number of Pied Currawongs banded in 1988 that returned to within a 3 km radius of the banding site in 1989 (Table 1) was high with a minimum percentage return of 56 per cent. In comparison, the four-year study by Vellenga (1980) at Leura and a six-year study by Wimbush (1969) in the Snowy Mountains recorded only 9 per cent and 15.6 per cent respectively. These lower percentages of returns/retraps could simply be attributed to the difficulty of retrapping banded birds because of their wariness. The number of adults re-sighted (57%) was higher than the number of immature birds (27%).

The high percentage return of birds at Springwood would indicate a fairly 'stable' population within the Blue Mountains region and this may necessitate many immature birds

travelling farther afield to establish breeding/feeding territories as indicated by the movement data. This is also supported by comparisons of the average period of residency of banded immature and adult birds. Immature birds stayed on average only half as long as adult birds. A small number of immature birds did remain in the area and at least 27 per cent returned in 1989. These birds probably became part of the Blue Mountains population.

This study highlights a trend in movements to lower altitudes over a longer range of time (March to December) than was recorded at Canberra and the Snowy Mountains. Movements to a higher altitude were more clear cut and started in July with the farthest point west reached in November. A small group of birds travelled north and was seen regularly at Bowen Mountain. As there are no towns directly south for some distance no reports of sightings could be expected and therefore some movement in that direction cannot be ruled out. Unfortunately, I was unable to document a precise and regular altitudinal movement pattern to the west as no bird banded at Springwood was subsequently sighted at higher altitudes and then re-sighted at Springwood. A definite altitudinal movement to the east was demonstrated by a small number of birds that were banded, sighted at some distance to the east of Springwood and subsequently returned to the banding site. This study suggests a regular movement of birds from high to low altitudes in the Blue Mountains during summer/autumn with a reversal occurring in winter/spring.

Movements of Pied Currawongs are still poorly known over much of their range but further banding at strategic places will certainly fill substantial gaps in our knowledge.

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# OBSERVATIONS ON THE DIET OF THE LEWIN'S HONEYEATER *Meliphaga lewinii* IN THE ILLAWARRA RAINFOREST, NEW SOUTH WALES

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Observations were made on the feeding behaviour of Lewin's Honeyeaters over a five year period. The species of plant which contributed fruit to the diet were recorded for each month of the year. Lewin's Honeyeaters in the Illawarra region of New South Wales were found to consume the fruit of 22 native and 2 introduced plant species, and some fruit of these species were available in all months of the year.

## INTRODUCTION

The Lewin's Honeyeater *Meliphaga lewinii* is a characteristic bird of Australian rainforests, ranging from Cooktown in the north of Queensland to the Dandenong Ranges in Victoria (Pizzey 1980). It also has the distinction of being the only honeyeater which has adapted to living in the rainforests of south-eastern Australia. Although basically a rainforest species, Lewin's Honeyeater can also be frequently seen in adjoining wet sclerophyll forests, heathland and man-made

habitats such as farmland, gardens and fruit orchards. It finds food in all these habitats but possibly its greatest variety of food sources is to be found in rainforests and their edges and it is there where it is most common.

Like most honeyeater species, the Lewin's Honeyeater includes a lot of insects and other invertebrates in its diet as well as the nectar of a variety of flowers (Barker and Vestjens 1990). However it differs from all other temperate Australian honeyeaters in that it eats a wide range of