LONG-TERM INDICES OF DENSITY OF TEN WOODLAND PASSERINES AT EYRE BIRD OBSERVATORY

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Between 1980 and 2008 surveys of the birds in the vicinity of Eyre Bird Observatory (32°15'S; 126°18'E), in Western Australia, have been made almost annually, using a point count method and a mapping method. The results have provided indices of the populations of seven resident, territorial species and three nomadic honeyeaters. Five of the resident species appear to have stable populations, varying over a narrow range, one species, the Blue-breasted Fairy-wren Malurus pulcherrimus appears to have declined, and one, the Weebill Smicronyx brevirostris, appears to have increased. The honeyeaters fluctuate in numbers greatly, presumably in association with the abundance of flowering mallee, both at Eyre and elsewhere. The results provide some baseline information about the range of fluctuation in numbers that can be expected for common species in mallee woodland at Eyre.

INTRODUCTION

In recent times, declines in the abundance and distribution of woodland passerines have been widely reported (e.g. Ford et al. 2001; Olsen et al. 2005). These declines have been observed throughout southern Australia, in woodlands both in the east and west of the continent. Several factors are thought to have contributed to these declines, especially clearing for agriculture, predation by exotic predators and the small size of surviving remnants.

The Nuytsland Nature Reserve (650,000 ha) on the southern coast of Western Australia contains part of one of the largest areas of undisturbed mallee woodland on the continent, stretching along the southern coast of Western Australia in a narrowing belt from Albany to the Western Australian border. The Eyre Bird Observatory (EBO) (32°15'S; 126°18'E), receiving an annual rainfall of 300 millimetres, is situated near the coast in the centre of the Reserve, and lies in mallee woodland that has not been grazed or burnt, since the Eyre Telegraph Station closed in 1927 – over 80 years. Since 1980, surveys have been conducted around the observatory as part of a week-long course entitled Field Techniques in Bird Studies. This course uses several different methods to calculate indices of the density of birds. Summaries of the data collected in the early years were included in Blakers et al. (1984). The surveys were not annual in the early years, because the course did not run in 1984, 1988, 1993 and 1995, but such records, as are available, make useful comparisons with recent years, because the methods are unchanged. The methods used have been developed from those described by Robbins (1978), and some of the preliminary results, as well as details of the development of the methods, have been described by Martindale (1980), Davies (1982) and Davies et al. (1985). The indices will not be accurate measures of abundance. In order to obtain accurate figures of abundance lengthy observations of colour-banded populations would be required. On the other hand, because the indices have been calculated by the same method over 29 years, they are likely to show up any long-term trends in abundance. Similar surveys have been extensively used to do so overseas (e.g. Freeman et al. 2007).

The mallee woodland around the EBO is dominated by Eucalyptus diversifolia, E. angulosa, E. gracilis and E. oleosa (Martindale 1980). A narrow fringe of Acacia woodland lies between the mallee and the sea, while to the north the mallee extends about 20 kilometres until it merges into the Nullarbor Plain. Over 240 species of birds have been recorded within a kilometre of the observatory, including nomadic honeyeaters, resident territorial species, trans-equatorial migrants, raptors, seabirds, pigeons and parrots (Watkins and Watkins 2003). A 50-metre grid has been laid out over 17.5 hectare of mallee around the observatory and fixed counting stations established for two kilometres along tracks to the east and west. The course on which the observations used to calculate the indices are made is held in early summer at the end of university semesters, and attracts between two and 12 participants.

METHODS

The data presented here were collected by university students who had various skills and experience in the observation of birds. In order to achieve some standardisation in their skill, the first day of the course was devoted to mistnetting and banding the local birds, so that the students had first hand experience of the birds they were to observe during the rest of the week. The justification for presenting the data lies in:

• its consistency over twenty-nine years of collection.
• the fact that the methods of collection remained unchanged.
• the birds on which data are presented are conspicuous or at least have distinctive calls, and are therefore easily recognisable.
• its ability to demonstrate long-term trends in numbers of birds seen.

It is not possible to repeat the observations and they are presented for their intrinsic value and in the hope that they provide interesting comparisons with other, systematically collected data.

Point Counts

The first method used at the EBO is the ‘Individual Point Count’ method. Ten points were set out in 1978, each 200 metres apart, along two kilometres of track. An observer moved along the track, stopped at each point, waited one minute and then recorded each bird seen or heard during the following five minutes. The distance of each bird observed from the point was also recorded. During the course students walked individually along the track early in the morning, setting out at ten-minute intervals, and doing a five-minute count at each peg, so that the number of observations available each year was ten times the number on the course. The leader(s) always did a count and when there were few students, the wardens also participated, enabling at least fifty counts to be incorporated in the calculation each year. Ramsay and Scott (1981) described a method of calculating densities from this method by determining the ‘Effective Area Surveyed’ that extended beyond the plot limits. The advantages of this technique are that it gives an opportunity to record all species that are in the area, its results closely approximate the absolute number of breeding groups, there is a minimum of error in estimating whether the birds recorded are within or outside the plot boundaries and observer bias is minimised because so many observers are involved. The main virtues of the mapping at the EBO are its long duration and consistent method that enable trends in numbers to be demonstrated over long time periods.

RESULTS

The results of the Mapping Method are presented for resident, territorial birds and these are illustrated in Figures 3 to 8. The results of the Point Counts are given for nomadic, non-territorial birds, and these are illustrated in Figures 9 to 12.
Figure 2. A sketch map of the surroundings of Eyre Bird Observatory showing pathways, banding sites and census grid.

Figure 3. Estimates of the density (♦) of the Grey Shrike-thrush at Eyre Bird Observatory from 1980 to 2008 based on mapping censuses.

Figure 4. Estimates of the density (♦) of White-browed Babbler at Eyre Bird Observatory from 1980 to 2008 based on mapping censuses.
Figure 5. Estimates of the density (●) of Blue-breasted Fairy-wren at Eyre Bird Observatory from 1980 to 2008 based on mapping censuses.

Figure 6. Estimates of the density (●) of White-browed Scrubwren at Eyre Bird Observatory from 1980 to 2008 based on mapping censuses.

Figure 7. Estimates of the density (●) of the Inland Thornbill at Eyre Bird Observatory from 1980 to 2008 based on mapping censuses.

Figure 8. Estimates of the density (●) of the Weebill at Eyre Bird Observatory from 1985 to 2008 based on mapping censuses.
Figure 9. Estimates of the density (●) of the Spotted (Yellow-rumped) Pardalote at Eyre Bird Observatory from 1985 to 2008 based on mapping censuses.

Figure 10. Estimates of the density (●) of New Holland Honeyeaters at Eyre Bird Observatory from 1991 to 2008 based on point count censuses.

Figure 11. Estimates of the density (●) of the Singing Honeyeater at Eyre Bird Observatory from 1980 to 2008 based on point count censuses.

Figure 12. Estimates of the density (●) of the Silvereye at Eyre Bird Observatory from 1980 to 2008 based on point count censuses.
DISCUSSION

The results for four of the resident, territorial birds show oscillations within a band of densities. Some years are good for the species and others are bad, but there are no indications of trends either up or down for the Grey Shrike-thrush *Colluricincla harmonica*, White-browed Babbler *Pomatostomus superciliosus*, White-browed Scrubwren *Sericornis frontalis* or Inland Thornbill *Acanthisitta apicalis*. The Weebill *Smicrornis brevirostris* was recorded rarely in the grid area until 1985. Prior to 1985 numbers were so low that it was unreasonable to calculate its density. Thereafter it was found in low numbers, below 0.5 birds per hectare, until 2002 and subsequent years, when its numbers have been high in some years and very low in others. It will be interesting to see if the apparent increasing trend continues. The Inland Thornbill shows a wider range of oscillations than the other three species, for all but three of the years, remains within the range of 0.2 to 0.7 birds per hectare. The Spotted Pardalote *Pardalotus punctatus*, a territorial species in the breeding season, may have been overlooked before 1985, because since then it has always been present, although its numbers fluctuate more than the other resident, territorial birds. Nevertheless, like the Inland Thornbill, its density is rarely outside the range of 0.2 to 0.6 birds per hectare and shows no trend of increase or decrease.

The Blue-breasted Fairy-wren *Malurus pulcherreus* appears to have declined steadily since 1988 and to have remained at its previous density since then. There may be several reasons for this. The species may have declined in real terms. Alternatively, the regrowth around the observatory may have made it less conspicuous and easy to overlook. It is recognised as one of the most secretive of the fairy-wrens. It has, along with the other territorial species, invaded the newly established rehabilitated sand dunes at the EBO, and may find these more attractive than the area within the grid. It is significant that, along with the decline in estimates of density, there has also been a decline, not systematically recorded, in the size of family groups. Groups of 12 birds were seen in the 1980s, but most recently the sizes of groups have been below six birds.

The three mainly nomadic species, New Holland Honeyeater *Phylidonyris novaehollandiae*, Silvereye *Zosterops lateralis* and Singing Honeyeater *Lichenostomus virescens*, show predictable peaks and troughs in abundance. The New Holland Honeyeater was not seen at the EBO between 1977 and 1991, but since then has sometimes been abundant, especially when the eucalypts are flowering well. Two birds banded at Twilight Cove (20 km west of the EBO) were re-trapped at Esperance, a distance of 420 kilometres, showing that this species does move along the south coast. They were particularly abundant at the EBO in 2000 and 2004. There are always Singing Honeyeaters at the EBO, particularly favouring the rehabilitated sand dunes, but at times they are very abundant, either as a result of good breeding conditions or as a result of the arrival of immigrants, 1996 and 2006 were such years. Usually their density is below five birds per hectare. Silvereyes, likewise, are always at the EBO, but sometimes appear plentiful and occasionally, extremely abundant, as in 2001.

The interest in these figures lies in the long-term, consistent methods employed to gather them and their consequent ability to demonstrate trends in numbers. Compared with measures from south-eastern Australia the densities appear low (Blakers et al. 1984), but they are from a very natural and long undisturbed area of mallee, illustrating levels of fluctuations in stable populations.

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REFERENCES


