

Rose Robins in the Hunter Region

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The distribution, relative abundance and seasonal movements of the Rose Robin *Petroica rosea* in the Hunter Region have been reviewed, using records over 1998-2015 from the BirdLife Australia Atlas project database supplemented by incidental records from annual bird reports for the region.

A distribution map was generated, which showed that Rose Robins were absent from much of the western parts of the region and from heavily cleared areas, but relatively common everywhere else. There were marked differences in the distribution pattern in the region depending upon the season. Timelines were produced showing when the species was recorded at locations above and below 400m elevation. These timelines suggest that the Hunter Region's Rose Robins make an altitudinal migration each year. They seem to remain within the region, but birds mostly have been recorded at low altitudes in the period between late April and mid-August and at high altitudes in the rest of the year.

The annual Reporting Rates from the BirdLife Australia Atlas project were calculated. These showed that although the status of the local population of Rose Robins has been maintained in the long term (i.e. over the 18-year period of the Atlas), it has varied markedly in some years apparently in response to climatic conditions. A large population increase occurred in 2003 following a three-year La Niña event and a large population decrease occurred in 2009 following several years of El Niño drought. The increase in 2003 was statistically significant at a 95% confidence level.

Local breeding records have been documented. All the records were from mid to high altitude locations within the region, confirming a breeding pattern noted elsewhere within the Rose Robin's range.

INTRODUCTION

The Rose Robin *Petroica rosea* in some respects is a special bird of the Hunter Region as the first documented specimen was collected locally by John Gould in about 1839 (Higgins & Peter 2002). It is an insectivore, mostly recorded as single birds and pairs within its range in south-eastern Australia. Its stronghold is the temperate woodlands on the eastern slopes of the Great Dividing Range (GDR) but its range extends to the western slopes of the GDR and north to about Rockhampton (Higgins & Peter 2002). In spring-summer, birds mostly are found in wet sclerophyll forests, moving to drier, more open habitats in autumn-winter (Higgins & Peter 2002).

Rose Robins are generally accepted to be a migratory species but there is a degree of uncertainty about the migration pattern. Griffioen & Clarke (2002) analysed large data sets for broad movement patterns and concluded that there was strong evidence for a "mid East Coast" movement by Rose Robins, with birds from NSW moving northwards along the eastern coast. However, they

also noted (in comments about migration patterns in general) that the broad pattern in evidence for a species did not necessarily apply to the entire population. Higgins & Peter (2002) analysed anecdotal evidence and concluded there was variability in the extent to which Rose Robin movement was an altitudinal migration or involved dispersal northwards, and in some areas birds were even considered to be sedentary (Higgins & Peter 2002). In the Hunter Region, Rose Robins are considered relatively common and to make an altitudinal migration (Stuart 2015). That assessment was based on incidental observations by members of Hunter Bird Observers Club over several decades. The recent availability of data for the Hunter Region from the BirdLife Australia (BLA) Atlas project has allowed the status of the Rose Robin in the Hunter Region to be more closely examined.

METHODS

Two main data sources were utilised: the BLA Atlas and the Hunter Region annual bird report series (Stuart 1994-2016). Atlas data for the Hunter Region were

exported from BLA's main database and supplied to us as an Excel file. These data, which mostly had been collected by well-defined survey methods (Newman *et al.* 2010), were used to generate distribution maps and for statistical analyses as described below. Incidental records for Rose Robin in the Hunter Region from the annual bird reports were reviewed.

A distribution map was generated through analysing the Atlas records within each of 60 bio-geographical sub-areas of the region (Williams & Stuart 2016). The analogous seasonal distribution maps were produced by using only those records obtained between October and March ("breeding distribution") and mid-April to August ("non-breeding distribution").

Reporting Rates (RR) for the region were calculated using a macro developed within the Excel software program (I. Martin unpublished). The regional RR is the ratio of the number of records for Rose Robin obtained from systematic surveys and the total number of systematic surveys conducted in all the 10-minute cells for which there has ever been a record of Rose Robin (Stuart 2016). Incidental records were not included into the calculation.

Timeline graphs were produced after determining the number of Atlas records of Rose Robin for each week of the year and calculating the mean weekly number of records. The analyses were done separately for grouped high and low altitude locations. Time periods were then classified according to whether their mean numbers of weekly records were within 1, 1.5, 2, 2.5 or >2.5 standard deviations from the overall weekly mean (Williams & Stuart 2016).

RESULTS

The general distribution in the region

Figure 1 shows the distribution pattern for Rose Robin based on Atlas data for every month of the year. In total, there were 917 records of Rose Robin in the database (for 1998-2015). 836 records were from systematic surveys and 81 records from incidental searches. Overall, the species has a wide distribution in the region with the stronghold over the whole year being the Barrington Tops. It is usually absent in the far west of the region, except from the Coolah Tops and their foothills. It is also absent from areas within the Hunter Valley floor, and elsewhere, which have been cleared of much of their natural vegetation. However, as will be discussed later, the distribution has a very marked seasonal aspect.

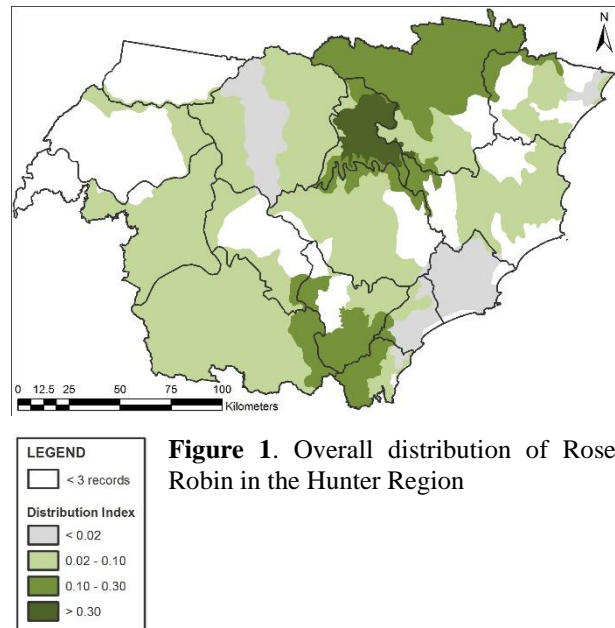


Figure 1. Overall distribution of Rose Robin in the Hunter Region

Reporting Rates

The RR from all the systematic surveys (area and 2ha) in the Hunter Region over the period 1998-2015 was 4.5%. The rate was 2.3 times greater from area surveys (RR 5.3%) than from 2ha surveys (RR 2.3%), as presented in **Table 1**. Each year the ratio of 2ha to area surveys within the Rose Robin's distribution in the Region was found to vary (low of 0.06, high of 0.36). This inconsistency of observer effort complicates attempts at trend analysis. However, because 88% of all the systematic surveys involved area surveys, these became the focus for a detailed analysis for trends.

Table 1. Reporting Rates (RRs) and Standard Deviation (SD) for annual RR from Rose Robin BirdLife Australia Atlas data (1998-2015)

	2ha	Area	Combined
No of records	100	736	836
RR (18-year)	2.3%	5.3%	4.5%
SD (annual RRs)	1.8%	1.8%	1.4%

Figure 2 shows the annual RRs from area surveys. The highest RR was 9.6%, occurring in 2003, while the 2009 RR of 2.0% was the lowest for any year. The standard deviation in the annual RR was 1.8% absolute. Thus, the RR in 2003 is > 2SDs above the long-term annual mean and is statistically significant at a 95% confidence level (Fowler & Cohen 1994).

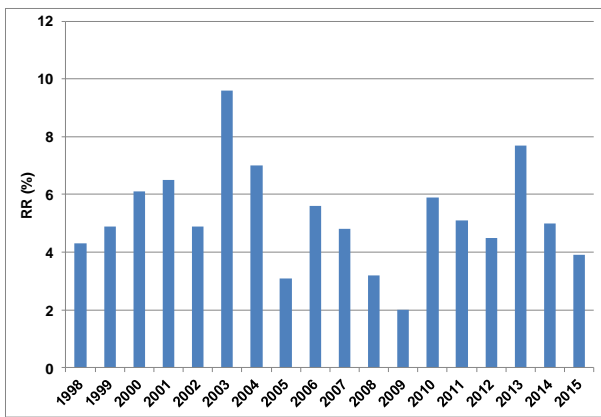


Figure 2. Annual area survey RRs for Rose Robin

Seasonal movements

The Rose Robin is a migratory species, breeding in spring-summer at high altitudes and dispersing in autumn-winter, although the extent to which the migration involves birds moving to lower-lying areas locally (altitudinal migration) or dispersing northwards (latitudinal migration) has been a matter of some debate (Higgins & Peter 2002, Griffioen & Clarke 2002). To investigate the migration for the Hunter Region, summer and winter distribution maps were generated (Figures 3 and 4). The summer map (Figure 3) confirms the Rose Robin’s preference for high altitude sites (Barrington Tops, Watagans, etc) in the breeding season, and then dispersal in autumn-winter (Figure 4).

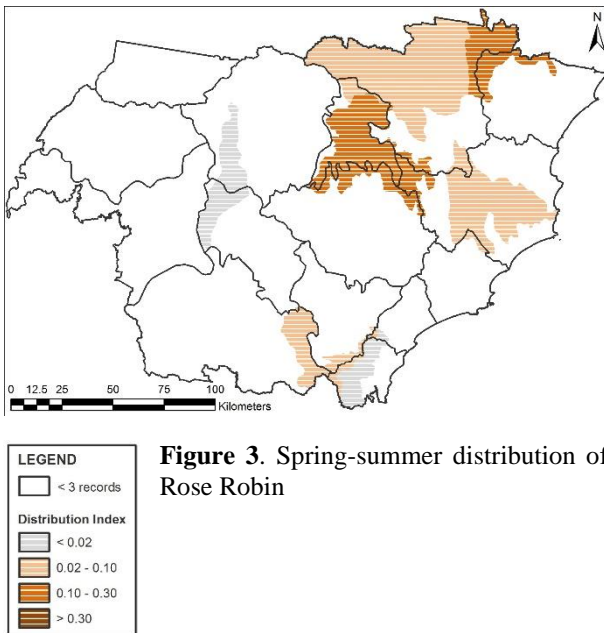


Figure 3. Spring-summer distribution of Rose Robin

To investigate the timing of the seasonal movement, timelines were generated for when birds had been recorded at altitudes above 400m (Figure 5) and below 400m (Figure 6).

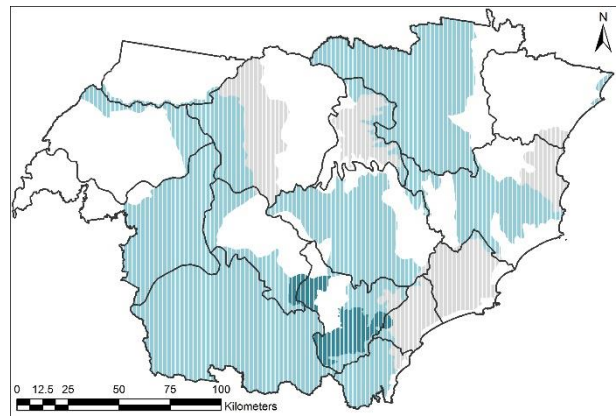


Figure 4. Autumn-winter distribution of Rose Robin

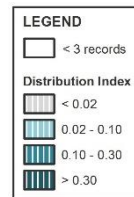


Figure 5. Rose Robin timeline for high altitude records above 400m

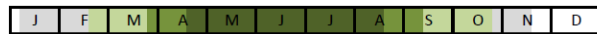


Figure 6. Rose Robin timeline for low altitude records below 400m

Most of the records published in the annual bird report series (Stuart 1994-2016) have matched the distribution patterns of Figures 1, 3 and 4 and the timelines of Figures 5 and 6. Single birds were recorded at Nobbys Beach in March 2013 and Ash Island in September 2010. Both were unusual locations with no other known records at them.

Breeding records

Rose Robins are well-documented as breeding in spring-summer at high altitude (Higgins & Peter 2002). Almost certainly that would also be the case for the Hunter Region. However, there have been surprisingly few breeding records. Birds had dependent young at Woko National Park in September 2012, Allyn River in February 2007 and Gloucester Tops in January 2005, and were reported to be nesting in the Gloucester Tops in December 2007 and October 2004 (Stuart 1994-2016). The only other known breeding record dates from 20 years earlier, when birds were observed to be feeding young at Brett Reserve near Barrington in November 1984 (HBOC unpublished records).

DISCUSSION

Reporting Rate trends

The long-term trend for Rose Robin RR suggests its status has been maintained (**Figure 2**). However, over the shorter term there have been some marked fluctuations. The 2003 RR was almost double the long-term average for area surveys, but then followed several years of declining RR, to a nadir of 2.0% in 2009. These fluctuations, which are statistically significant at a 95% confidence level for 2003 (Fowler & Cohen 1994), appear to reflect the prevailing climatic conditions of the time. During 2000-2002, south-eastern Australia experienced a La Niña event, with widespread above-average rainfall (Wikipedia 2016). Possibly those conditions were favourable for Rose Robins (i.e. leading to a population surge after the 2002 breeding season). Then, over 2004-2009, a severe and sustained El Niño-derived drought affected much of Australia, before a more normal rainfall pattern returned in 2010 (Wikipedia 2016). The RRs for Rose Robin were about average in 2004-2007. However, the continuing drought conditions seem eventually to have caused a contraction in numbers in 2008-2009. These were very poor years for the species, with relatively low RRs in both years. Also, birds were recorded in fewer 10-minute grid cells, in particular in 2008 when they were recorded in only nine cells (compared with an annual average of 20 cells across all years excluding 2008-2009).

Seasonal movements

Figure 5, the timeline for records of Rose Robins from above 400m, confirms their annual migration from high altitude locations. The majority of records for birds above 400m occur in spring and summer. By mid-February, some birds have departed and the bulk of them, barring some stragglers, have gone by mid-April. In late August, Rose Robins have begun to return to high altitudes.

Figure 6, the timeline for Rose Robins at sites below 400m, reveals that most of the records have been from the period between late April and mid-August. Records below 400m from mid-November to early January are rare. In other words, they are only occasionally present at lower altitude locations except around winter time.

It seems telling that the two timelines (**Figures 5** and **6**) are close to being mirror images of one another. Griffioen & Clarke (2002) concluded that birds from NSW moved northwards along the

eastern coast (“mid East Coast” movement pattern). If that was the case for the Hunter Region, and to fit the behaviour revealed in the timelines, high-altitude birds would need to migrate north in autumn and almost simultaneously be replaced by southern birds migrating into low-altitude locations in the region. The timing coincidence would then require to be reversed in spring. Whilst this might indeed be what is happening, it seems remarkable that the timings of the latitudinal movements would closely coincide in the autumn and spring migrations, producing mirror-image timelines.

Moreover, it should be noted that in spring-summer, Rose Robins in the Hunter Region prefer rainforest habitats whereas in the non-breeding period they occur in woodlands. It seems unlikely that migrating Rose Robins would reject suitable lower altitude woodlands nearby to their spring-summer territories and opt instead to make a longer distance latitudinal migration to find the same sort of habitat elsewhere.

Overall, it is simpler to explain Rose Robin movements in the region as being predominantly an altitudinal migration rather than a latitudinal one. However, the records from Nobbys Beach in 2013 and Ash Island in 2010 may have involved birds on latitudinal migration passage using the “mid East Coast” movement (Griffioen & Clarke 2002). In other words, there may be elements of both migration patterns occurring in the Region.

Breeding records

Although there have not been many breeding records, they all have originated from mid to high altitude locations within the region. This confirms the pattern noted elsewhere within the Rose Robin’s range (Higgins & Peter 2002).

CONCLUSIONS

The Rose Robin is a relatively common species within the Hunter Region, with a widespread distribution and an average reporting rate of 4.5% in the BirdLife Australia Atlas project. It has exhibited susceptibility to climate extremes, with the local population increasing significantly in times of above average rainfall and decreasing substantially during extended droughts. Because climate extremes are expected to become more pronounced in future, it will be important to continue to monitor the local status of the Rose Robin.

Birds are mainly found at high altitude locations in spring-summer, where they breed. They appear to mainly disperse in autumn-winter to lower altitude woodlands within the region.

ACKNOWLEDGEMENTS

We thank BirdLife Australia for providing records from the Atlas database and in particular, the strong support we have received from Andrew Silcocks, the BLA Atlas project manager. BLA has data exchange arrangements with other organisations including the New South Wales Bird Atlassers and the use of the latter's Hunter Region records from 1998-2001 is acknowledged.

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