

Impacts on Speckled Warbler abundance in the Paterson area of NSW

Mike Newman

7 Glenurie Close, Woodville, NSW 2321

When the woodland at Green Wattle Creek near Paterson was lightly grazed Speckled Warblers *Chthonicola sagittata* were abundant, being present at densities which are probably exceptional for the Paterson area. Consequently this remnant woodland, with of the order of 80 hectares of suitable habitat, was an important refuge for the species. However, when cattle grazing ceased, the understorey and ground cover vegetation increased. This habitat change triggered a tenfold decrease in the abundance of Speckled Warblers. At this lower population density, the fringes of the woodland become important, particularly where they abut grazed areas. At Black Rock, another location in the Paterson area, there was evidence of a drought-related decline in Speckled Warbler abundance.

INTRODUCTION

The Speckled Warbler is listed as vulnerable under the *Threatened Species Conservation Act 1995* (NSW). The Action Plan for Australian Birds 2000 (Garnett & Crowley 2000) indicates the need to protect woodland habitat where Speckled Warblers are known to be resident and to undertake long-term monitoring of remnant sub-populations. This paper addresses those recommendations.

Speckled Warblers are resident at Green Wattle Creek 32°40'S 151°39'E, an area of remnant woodland approximately 100 hectares in size, situated on the edge of the Butterwick flood plain. This woodland was monitored monthly between April 1996 and December 2009 (Newman 2009). Variations in Speckled Warbler numbers at Green Wattle Creek are compared with its occurrence at other locations near Paterson in the Hunter Valley.

METHODS

The approach used involved a combination of four 20-minute fixed site surveys embedded in a four-hour fixed route area search (Figure 1). Surveys at Green Wattle Creek were conducted monthly and numbers of birds present were recorded. This survey approach was established during the Birds Australia (BA) Birds on Farms project. Although the fixed sites are nominally termed '2ha' in this paper and for BA Atlas reporting, their actual size is approximately 1.25ha as a smaller site size was used for the Birds on Farms project

compared with the New Atlas of Australian Birds which used 2ha sites (Barrett *et al.* 2003). Further details of the study area, including habitat description are provided in a previous paper (Newman 2009). Similar long-term studies involving quarterly surveys were conducted on two farms in the Paterson – Allyn River Valley area of the Hunter Region (Newman 2007, Newman & Lindsey 2008). The results of other survey campaigns using a fixed route approach at Black Rock near Martins Creek 32°34'S 151°39'E and on the Yaraandoo property 32°38'S 151°40'E, both in the hinterland near Paterson, are also discussed.

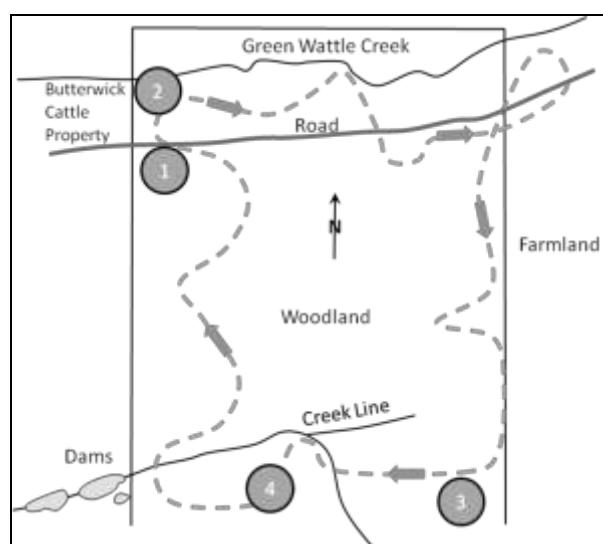


Figure 1. Survey route and 2ha survey sites at Green Wattle Creek woodland

RESULTS

Annual variations in the mean reporting rate (the frequency with which Speckled Warblers were present during a survey) and the mean number of Speckled Warblers observed during four-hour area surveys at Green Wattle Creek are shown in Figure 2. When systematic surveys commenced in 1996 Speckled Warblers were seen on every one of the 45 surveys conducted during the first four years and the reporting rate was 100%. However, during this initial period the number of birds fell, indicating the species had become less numerous. Subsequently the reporting rate fell until stabilising between 2001 and 2009, suggesting that the Speckled Warblers remain resident in the woodland, but at a much lower density.

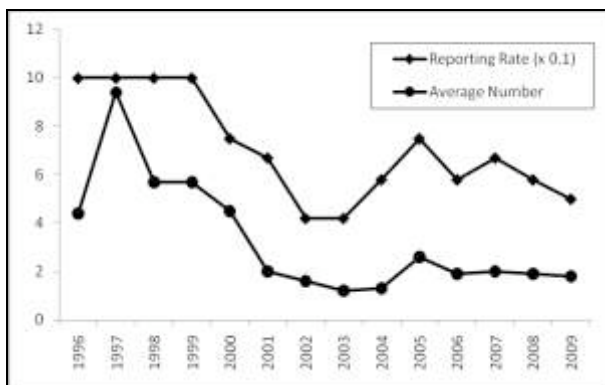


Figure 2. Variation in annual reporting rates and annual average numbers of Speckled Warblers at Green Wattle Creek

The rates of observation of Speckled Warblers are compared in Figure 3. The results suggest that, during the period between 1996 and 1999 when Speckled Warblers were plentiful, area searches were a more effective method of detecting Speckled Warblers than the fixed site surveys. Subsequently this advantage was less apparent.

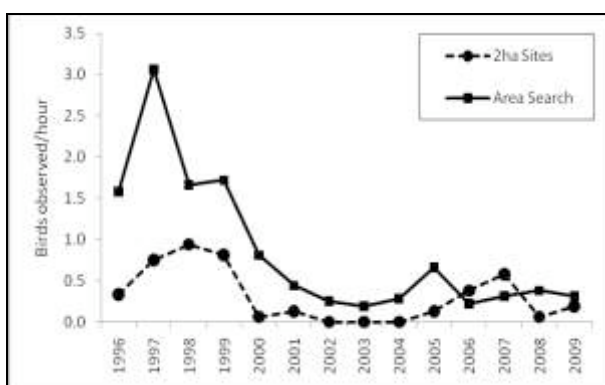


Figure 3. Annual variations in the rate of observation of Speckled Warblers at Green Wattle Creek

Peak sizes for the Speckled Warbler population at Green Wattle Creek were estimated using the 2ha site and fixed route survey data for 1998 (Figure 3). At the 2ha sites the mean rate of Speckled Warbler observation was 0.94 birds/hour in an area of 3.75ha (i.e. three sites each of 1.25ha surveyed in one hour). This equates to a mean Speckled Warbler density of 0.25 birds/ha and a total population of 20 birds, assuming that there is 80 hectares of suitable habitat at Green Wattle Creek. During the fixed route survey it was estimated that 2.5km of transect 50m wide was sampled in 2.7 hours (4.6 ha/hr). At an observation rate of 1.66 birds/hour this equates to a Speckled Warbler density of 0.35 birds/ha and a total population size of 28. These two estimates are of the same order of magnitude and the agreement is good given that the sizes of the areas surveyed are only known approximately.

Speckled Warblers were seen at all four of the 2ha sites with reporting rates for the 165 surveys ranging from 5% at site 2 to 9% at site 1. Most of the records at the 2ha sites (61%) were between 1997 and 1999. However during this period Speckled Warblers were seldom recorded during consecutive surveys suggesting they were foraging over a more extended range than the 2ha site. They were usually recorded as single birds (59%) and pairs (36%), with two instances of groups of four birds. There were no birds recorded at the 2ha sites between 2002 and 2004, but from 2005 Speckled Warblers were again occasionally recorded at sites 1 and 2. In contrast between 2001 and 2009 there was only one record from site 4 and none from site 3.

On the cattle property immediately adjacent to Green Wattle Creek the mean reporting rate for Speckled Warblers during 44 surveys of approximately 3 hours duration fell from 32% to 14% between the two halves of the 11-year study. At another cattle property, Warakeila 32°15'S 151°31'E, Speckled Warblers were only recorded twice, once before the surveys commenced in 1996 and during one of the 48 surveys similar to those conducted at Green Wattle Creek (Newman & Lindsey 2008). At Black Rock near Martins Creek, 81 surveys each of 2 hours or greater duration were made between 2000 and mid 2010. The reporting rate of Speckled Warblers during these surveys declined post 2006 as shown in Figure 4. However it should be noted that the survey effort was greater between 2000 and 2006 when 62 surveys were made with a Speckled Warbler reporting rate of 42% compared with 19 surveys between 2007 and mid 2010 at a 16% reporting rate.

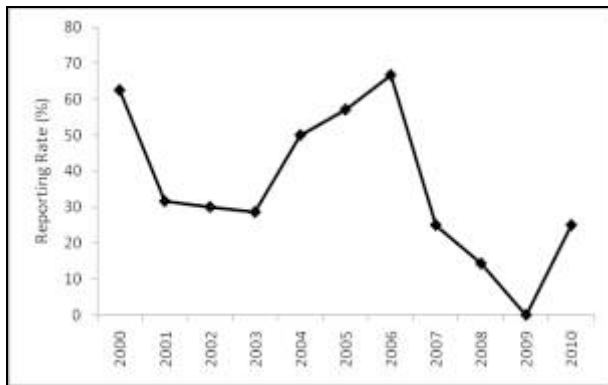


Figure 4. Variation in Speckled Warbler reporting rates at Black Rock, Martins Creek

In contrast, on the Yaraandoo property Speckled Warblers were recorded during six out of seven fixed route surveys each of around 2.5 hours duration conducted between August 2009 and January 2010. All but one of the Speckled Warbler records at Yaraandoo were made in two small commercial olive plantations. However these birds were absent during subsequent monthly surveys over autumn.

DISCUSSION

As shown in Figures 2 and 3, both the reporting rate and the abundance of Speckled Warblers at Green Wattle Creek decreased between 1999 and 2003, and the species remained relatively scarce until the end of 2009. Examination of Figure 3 shows that the peak mean annual observation rate in 1997 of approximately 3 birds/hour was an order of magnitude higher than the lowest rate, which occurred in 2003. It is suggested that increases in the density and height of understorey vegetation rendered the woodland less suitable habitat for Speckled Warblers, resulting in the population decline. It is proposed that the most important cause of the change in habitat and its decreased suitability for Speckled Warblers was the cessation of light grazing in the woodland about the time that these surveys commenced in 1996. The prolonged period of below-average rainfall between 2002 and 2006 may have exacerbated the situation. In contrast, at Black Rock, the post-2006 decline (Figure 4) is attributed to drought as there was no change in grazing intensity and understorey vegetation condition at that location.

The Atlas Bushcare analysis in the second Atlas Supplementary Report (Barrett *et al.* 2002) highlights the beneficial impact of ceasing to graze woodland habitat supporting Speckled Warblers,

with maximum benefit occurring between two and ten years after stock are removed. However, after ten years the Speckled Warbler population declined and the initial benefit of removing cattle was lost. The results in this paper suggest that the decline is in fact more rapid and is essentially complete in six years based on the changes in abundance shown in Figure 3. The fact that the area had only been lightly grazed may have allowed accelerated rates of understorey recovery and growth. The Barrett *et al.* (2002) report also indicates that Speckled Warblers favour sites with fallen logs which are adjacent to grazed areas. Sites 1 and 2 at Green Wattle Creek (Figure 1) fit this description and these were the sites where Speckled Warblers continued to be recorded towards the end of the study in the period 2007 – 2009.

The changes in both the bird populations and habitat were more precisely characterised at the four 2ha sites than in the area searched along the survey route between these sites. The 2ha sites were selected to sample four different sub-habitats (Newman 2009). Between 1996 and 1999, Speckled Warblers were observed intermittently at all of these sites suggesting that the entire area, other than the very dense creek-side vegetation was suitable habitat for Speckled Warblers at that time.

The experiences at sites 3 and 4 are particularly insightful because they are typical of the two habitat types which represent the bulk of the woodland away from the creek. In 1998 Speckled Warblers were observed during four of the twelve surveys at site 3 compared with three observations at each of the other sites. However, after 1999 there was only one record in ten years involving 120 surveys. This is attributed to the growth of the shrub layer, which by 2009 had become sufficiently dense to attract species like the Regent Bowerbird *Sericulus chrysocephalus*. However, for much of that ten-year period Speckled Warblers were intermittently recorded on the fixed route survey at the edge of the woodland within 100m of site 3, and hence Speckled Warblers would have been expected to occur if site 3 was suitable. Interestingly, following increased rainfall and the removal of cattle, grass cover increased in the paddock near site 3 and the Speckled Warblers disappeared. This complements the experience at site 4 where native grasses provide almost total ground cover and there is little shrub layer. It is suggested that the ground cover increased post grazing, making this site unsuitable; in addition it

is the site most distant from grazed habitat surrounding the wood, which is known to be beneficial (Barrett *et al.* 2002).

The maximum reporting rate for the Speckled Warbler recorded in the New Atlas of Australian Birds (Barrett *et al.* 2003) was found in the 1° grid 32°S 150°E at similar latitude to Green Wattle Creek, but further west in much drier country. On this basis the Green Wattle Creek woodland is probably sub-optimal and its suitability requires measures like light grazing which limit the amount of understorey and ground cover vegetation. In this respect controlled burning might also be beneficial provided that it is conducted infrequently and in a manner which generates a mosaic of habitat with refuges for the core Speckled Warbler population. The need for the reduction of combustible fuel associated with the fire risk to adjacent residences make future burning at Green Wattle Creek a probability, which will provide an opportunity to monitor the impact of this management option on the Speckled Warbler population.

The high density of Speckled Warblers at Green Wattle Creek when it was lightly grazed attracted Black-eared Cuckoos *Chalcitis osculans*. In 1993 a number of pairs were fostering juvenile Black-eared Cuckoos for which the Speckled Warbler is a preferred host species. This is the only year that the Black-eared Cuckoo, which is locally rare, has been recorded breeding in the east of the Hunter Region (Newman 2009), which suggests that Speckled Warbler densities of this magnitude are exceptional in the Paterson area.

The studies at the cattle property adjacent to Green Wattle Creek (Newman 2007), at Warakeila (Newman & Lindsey 2008) and at Black Rock, Martins Creek all suggest that Speckled Warblers have declined during the last decade. The combination of the adjacent grazed property and the woodland at Green Wattle Creek appears to provide an important synergy which allows survival through periods of environmental stress like drought. At areas like Black Rock, where land use was virtually unchanged, other factors like drought appear to be of primary importance. Warakeila and immediately surrounding areas appear to lack sufficient remnant habitat to support an on-going Speckled Warbler population and the species seems to have become at least temporarily extinct at that site (Newman & Lindsey 2008).

The Speckled Warblers at Yaraandoo may provide a fascinating insight into the habitat requirements of the species in that maintenance of the two olive

groves provides a combination of relatively bare ground under the olive trees surrounded by grazed pasture. Although the population size is very small, it warrants further investigation to determine whether their occurrence is seasonal. Recent results provide further support for this hypothesis.

CONCLUSIONS

When the woodland at Green Wattle Creek was lightly grazed Speckled Warblers were abundant, being present at densities which are high for the Paterson area. Consequently, this remnant woodland which held of the order of 80 hectares of suitable habitat was an important refuge for Speckled Warblers. However, when cattle grazing ceased, the understorey and ground cover vegetation increased. This habitat change triggered a tenfold decrease in the abundance of Speckled Warblers. At this lower population density the fringes of the woodland become important particularly where they abut grazed areas.

Throughout most of the Paterson area there appears to have been a decline in Speckled Warblers including areas where there is no obvious change in land use. At places like Black Rock drought appears to be a significant factor determining Speckled Warbler numbers.

It is apparent from this study that processes which reduce understorey and ground cover in the wetter coastal woodlands of NSW can be beneficial in providing the habitat balance which is essential to Speckled Warblers. Light grazing, perhaps intermittent, is an obvious option as is controlled burning to create vegetation mosaics with patches of relatively bare ground. Understanding the attributes of olive groves to Speckled Warblers may provide insights into how their habitat can be maintained and even created.

ACKNOWLEDGEMENTS

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