Winners and losers – Changes in the bird population on removing cattle from woodland near Paterson NSW

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The start of monthly bird monitoring in woodland at Green Wattle Creek in the Hunter Valley of New South Wales in April 1996 coincided with the cessation of cattle grazing. This paper describes the subsequent changes in the bird population at a 2-ha survey site over an 18-year period.

In the absence of grazing the understorey vegetation increased, changing the foraging opportunities for many bird species. This resulted in a temporary increase in the number of types of birds recorded, but after a mid-study peak the number of species recorded decreased to its initial level. However, there were substantial differences between the bird assemblages at the start and end of the study. These differences were explained in terms of differences in the foraging behaviour of individual species (e.g. birds which foraged on the ground were disadvantaged by dense understorey vegetation).

The "winners" were species that benefitted from increased shrub layer vegetation. These included Lewin's Honeyeater *Meliphaga lewinii*, Brown Thornbill *Acanthiza pusilla*, White-browed Scrubwren *Sericornis frontalis* and Eastern Whipbird *Psophodes olivaceus*. However, as the shrub layer vegetation became denser some of these species decreased from their mid-study peak levels, presumably because they were no longer able to forage effectively.

The "losers" were predominantly species which like open habitat, particularly those which forage on the ground, such as the Speckled Warbler *Pyrrholaemus sagittatus*, Double-barred Finch *Taeniopygia bichenovii* and two species of Fairy-wren *Malurus* spp. Foliage-feeding honeyeaters were indirectly affected with the Fuscous Honeyeater *Ptilotula fuscus* and the White-naped Honeyeater *Melithreptus lunatus* decreasing. In their absence the Yellow-faced Honeyeater *Caligavis chrysops* increased, becoming the most frequently recorded species.

INTRODUCTION

It is widely acknowledged that grazing impacts adversely on bird populations, and considerable emphasis has been placed on the need for woodland restoration (Lindenmayer 2011). However, within woodland historical grazing may have opened up unique opportunities for some bird species as shown in this paper, which tracks the loss of a number of species in an area of woodland after grazing ceased.

Green Wattle Creek is a 90-ha area of woodland near Paterson in the Hunter Region of New South Wales (NSW). It is now known as the Butterwick Crown Lands Reserve and is managed by Crown Lands, a division of the NSW Department of Trade and Investment. Green Wattle Creek, formerly a travelling stock route, was grazed under lease when this study commenced in 1996. However, during that year the cattle were removed providing an opportunity to monitor changes in the bird population in response to the change in land management.

The results presented in this paper are from a single survey site at Green Wattle Creek. A previous paper provided general background to these studies at Green Wattle Creek, including an overview of the bird populations and a description of the habitat (Newman 2009). This paper provides an in depth evaluation of the results for one of the four 2-ha survey sites and updates the records until the end of 2013 when the study finished.

METHODS AND ANALYSIS

Monthly surveys were conducted at Green Wattle Creek between April 1996 and December 2013 using BirdLife Australia's (BLA) standard 2-ha survey, which involves recording all species present in a 2-ha area during a period of 20 minutes. All birds seen and heard were

recorded. Surveys were conducted in the morning at four 2-ha survey sites and the observations were submitted to BLA's Birdata archive. The results reported in this paper were recorded at survey Site 3 (BLA site identification 273038; 32.660°S, 151.653°E). Numbers of each species were recorded, but were not used in this analysis, which was based on presence-absence. Reporting rates (RR) expressed as a percent value were used to compare the frequency at which each species was recorded (e.g. a species with a RR of 50% was recorded in half of the surveys).

Using a survey method which samples a small area (2 ha) for a short time (20 min) has the advantage of detecting differences in the RRs of frequently observed species (e.g. with RRs > 20%), but has limited statistical power for less common species with low RRs.

All the surveys were conducted by the same person (MN). While this provided consistency, the data set was potentially subject to systematic errors associated with the decreasing detectability of some species as the density of the understorey vegetation increased. This placed increased reliance on vocal detection.

Trend analysis and statistical tests were performed using a method which was developed for the analysis of Birdata survey results (Cunningham & Olsen 2009).

RESULTS

Seventy-seven species were recorded in 208 surveys conducted between April 1996 and December 2013 at monthly intervals. The results, as summarised in **Table 1**, have been divided into six intervals, each of three years' duration. The number of species recorded peaked in 2002–2004, when the mean number of species/survey was also highest. There was a similar increase in the number of frequently recorded species with RRs exceeding 20% (**Figure 1**).

The results were divided into six three-year periods for evaluation of temporal changes in RR. The results for 33 species which had RR>10% in at least one three-year period are shown in the **Appendix**, which contains the scientific names of all species not discussed in the text.

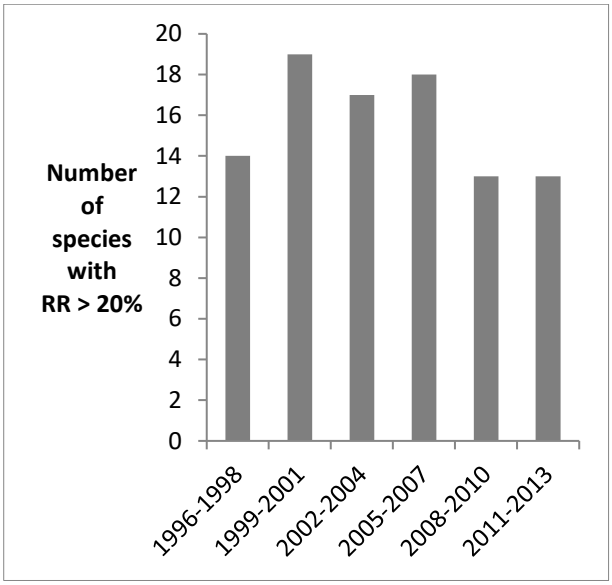

Figure 1. Temporal variation in the number of species which were regularly recorded (RR > 20%) at Green Wattle Creek Survey Site 3 over the period 1996 to 2013.

Although there was relatively little change in the status of species like the Grey Fantail *Rhipidura fuliginosa* and the Yellow-faced Honeyeater *Caligavis chrysops*, there were dramatic changes in the occurrence of other species. For instance, three species, Speckled Warbler *Pyrrholaemus sagittatus*, Double-barred Finch *Taeniopygia bichenovii* and Jacky Winter *Microeca fascinans*, which were present on a number of occasions in the first six years, were not recorded during the last six years of the study (**Figure 2**). The RR of the Superb Fairy-wren *Malurus cyaneus*, the second most frequently recorded species in 1996-1998, decreased by 75% (**Figure 3**). Although the Variegated Fairy-wren *Malurus lamberti* RR increased initially, it subsequently followed the decrease of the Superb Fairy-wren RR (**Figure 3**).

Table 1. Summary of statistics for surveys at Green Wattle Creek Site 3 between April 1996 and December 2013.

	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010	2011-2013
Number of species	35	47	53	50	37	43
Number of surveys	33	34	36	34	35	36
Mean species/survey	7.8	10.2	11.4	8.1	9.3	8.1
Standard Deviation	3.3	4.3	3.9	4.3	3.0	3.2

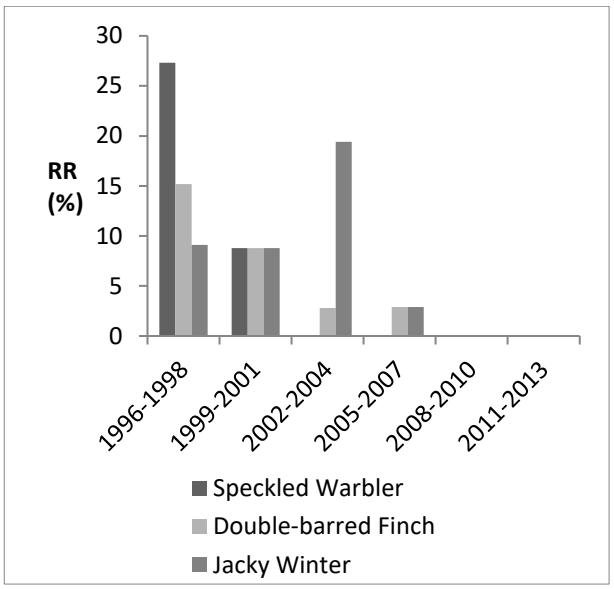

Figure 2. Reporting rates of Speckled Warbler, Double-barred Finch and Jacky Winter, which were not recorded at Green Wattle Creek Survey Site 3 after 2005-2007.

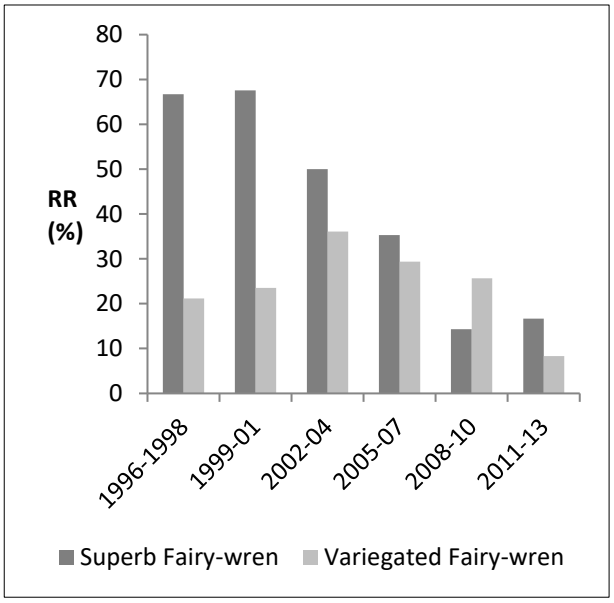

Figure 3. Reporting rates of the Superb and Variegated Fairy-wrens; examples of species which decreased at Green Wattle Creek Survey Site 3 between 1996 and 2013.

The Fuscous Honeyeater *Ptilotula fuscus* and White-naped Honeyeater *Melithreptus lunatus*, also decreased, and were not recorded in the last six years of the study. In contrast, there was a sustained increase in the occurrence of the Yellow-faced Honeyeater (**Figure 4**). Three other species which increased were Lewin's Honeyeater *Meliphaga lewinii*, White-browed Scrubwren *Sericornis frontalis* and Brown Thornbill *Acanthiza pusilla*, although the latter two species were recorded less frequently in the last three years (**Figure 5**).

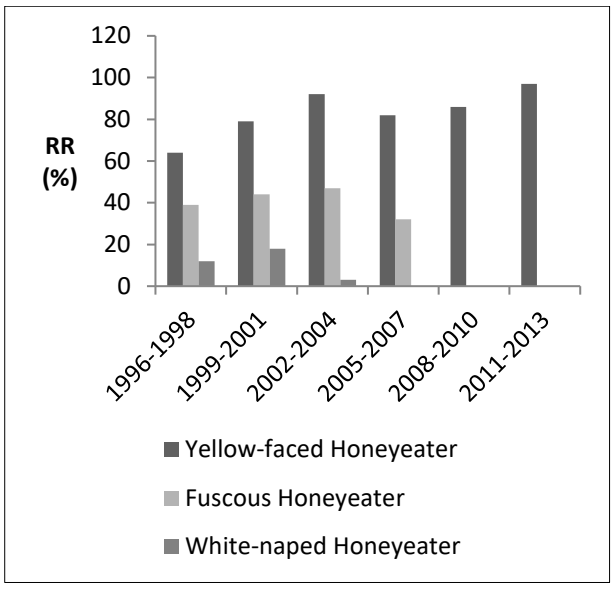

Figure 4. Changes in the status of three honeyeater species, with one increasing and two unrecorded during the last six years of the study at Green Wattle Creek Site 3.

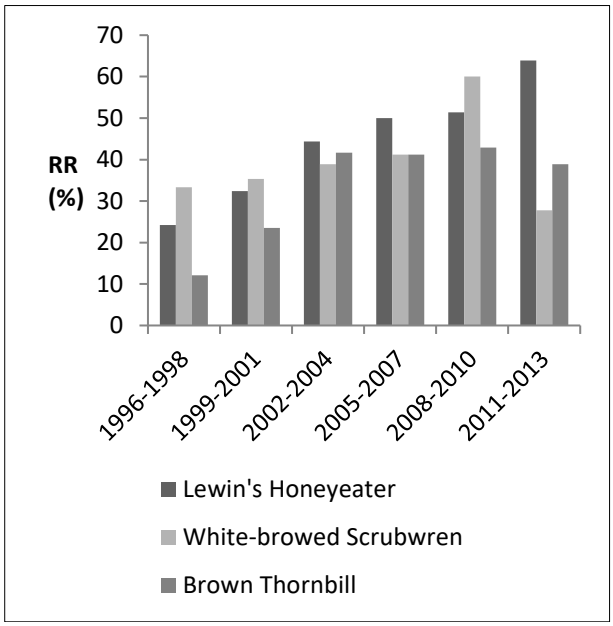

Figure 5. Temporal variations in the reporting rates of Lewin's Honeyeater, White-browed Scrubwren and Brown Thornbill, which increased at Green Wattle Creek Survey Site 3 between 1996 and 2013.

Statistical Modelling

Examples of increasing (Lewin's Honeyeater) and decreasing trends (Superb Fairy-wren) are shown in **Figures 6a** and **6b** respectively. In both cases there was a statistically significant change in the status of the species as indicated by the linear trend line. However, shorter term fluctuations are also apparent as indicated by the smooth trend line. In contrast, the Eastern Whipbird *Psophodes olivaceus* increased initially before decreasing

from a mid-study peak value (**Figure 6c**). Although there was an overall increase in the RR, the linear trend was not statistically significant (p=0.28). Similar, but less well-defined mid-study peaks, were observed for a number of other species including the Rufous Whistler *Pachycephala rufiventris.*

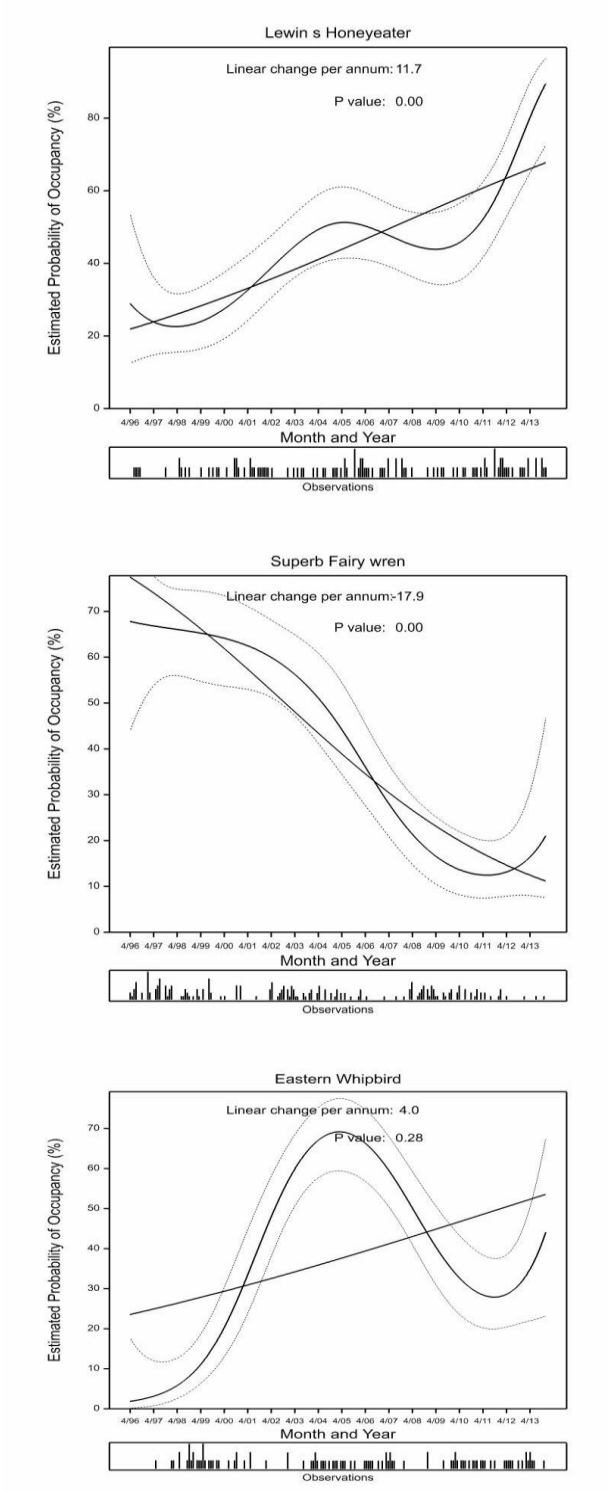

Figure 6. Smooth trends showing (a) the increase of Lewin's Honeyeater, (b) the decrease of the Superb Fairy-wren and (c) the mid-study peak occurrence of the Eastern Whipbird. Solid smooth lines show the estimated temporal trends in the probability of occurrence. The dotted lines show the 95% confidence limits of the smooth trend estimate. The linear trend lines, after back transforming the probability function, are also shown. The linear trends for (a) and (b) were highly significant statistically (p<0.001). The lower rug plot shows when records occurred.

The linear trend lines for 12 species indicated statistically significant population changes (p=0.05 or less), four increasing and eight decreasing (**Table 2**). Fuscous Honeyeater (p=0.06) was close to statistical significance. The trend rate is a measure of annual rate of change of the population of each species.

Table 2. Species for which there were statistically significant linear trends in status at Green Wattle Creek Survey Site 3 (1996-2013).

Species	**Trend Rate[1]**	***P*** **[2]**
Australian Raven	15.4	0.01
Brown Thornbill	8.9	0.01
Double-barred Finch	-24.1	0.01
Eastern Rosella	-11.0	0.01
Fuscous Honeyeater	-9.4	0.06
Grey Fantail	-7.9	0.03
Lewin's Honeyeater	11.7	0
Speckled Warbler	-45.0	0.02
Striated Pardalote	-14.2	0.01
Superb Fairy-wren	-17.9	0
White-naped Honeyeater	-15.0	0.03
Yellow-faced Honeyeater	12.4	0.01
Yellow Thornbill	-7.3	0.05

[1] Positive and negative values indicate increasing and decreasing species respectively.
[2] All species were statistically significant (p not greater than 0.05) except the Fuscous Honeyeater.

Changes in habitat

The following description of the habitat at Survey Site 3 was completed for the New Atlas of Australian Birds project (Barrett *et al.* 2003) in 1999 during the early stages of regeneration following the removal of cattle. There were many trees of varying age and size (2 to 8 m height). Two or three species dominated. The shrub layer comprised a mix of many small, mainly native shrubs and a few taller shrubs dominated by two or three species. There were a small number (<6) of fallen trees/large branches.

Ten years later the understorey was described as follows (Newman 2009): 'There is an extensive dense understorey growth of Blackthorn *Bursaria*

spinosa to a height of 3m with amounts of Kurrajong *Brachychiton populneus*, wattle *Acacia* spp. and the introduced species Lantana *Lantana camara* and Wild Olive *Olea europaea africana*. There are minor patches of the small native shrub Prickly Beard-heath *Leucopogon juniperinus*.'

The survey site and surrounding area had not been burnt for at least five years prior to the study. In spring 2010 fuel reduction burns were conducted in patches of the reserve (Newman 2014a), including areas adjacent to, but not at, Survey Site 3.

The extent of the densification of understorey vegetation required the undergrowth to be cut back to allow access during the period 2011-2013.

More comprehensive details of the habitat at and surrounding Survey Site 3 are provided in previous publications (Newman 2009, 2010 and 2014a).

DISCUSSION

The extent of the change in the bird population at Green Wattle Creek Survey Site 3 is dramatically demonstrated by a comparison of the ten most frequently recorded species in the first and last three years of this study (**Table 3**). Only three species, Grey Fantail, Yellow-faced Honeyeater and Lewin's Honeyeater sustained their top-ten ranking. Fuscous Honeyeater and Speckled Warbler, ranked 5 and 9 respectively, were not recorded during the last six years of the study.

Birds are mobile species which complicates discussion of trends at a single survey site. For instance, the observed trends may be influenced by changes in conditions at the survey site or by external factors. The following sections seek possible explanations for the observed changes in the status of species by evaluating the impact of changes in habitat that occurred after cattle grazing ceased.

Changes in habitat

Following the removal of cattle in 1996 the understorey vegetation progressively increased. This had implications for birds using the area, including both changes in food availability/type and foraging opportunities. For instance, the niche for species which feed in areas of open ground largely disappeared and there was less opportunity for birds to forage at sub-canopy levels. However, the dense shrub layer vegetation increased cover for small species seeking shelter from predators, as well as benefitting species that forage and nest in dense cover.

Decreasing species

There were statistically significant decreases in eight species and a ninth species decreased at near-significant level (p=0.06) based on linear trend analysis (**Table 2**). Feeding on or close to the ground is an important component of the foraging activities of Double-barred Finch, Jacky Winter and Speckled Warbler, three of the five species which were unrecorded in the last six years of the

Table 3. Comparison of the ten most frequently recorded species at Green Wattle Creek Survey Site 3 for the periods 1996-1998 and 2011-2013.

Rank	1996-1998	RR (%)	Rank	2011-2013	RR (%)
1	Grey Fantail	81.8	1	Yellow-faced Honeyeater	97.2
2	Superb Fairy-wren	66.7	2	Grey Fantail	75.0
3	Yellow-faced Honeyeater	63.6	3	Lewin's Honeyeater	63.9
4	Eastern Yellow Robin	45.5	4	Spotted Pardalote	47.2
5	Fuscous Honeyeater	39.4	5	Eastern Yellow Robin	41.7
6	Spotted Pardalote	36.4	6	Brown Thornbill	38.9
7	White-browed Scrubwren	33.3	7	Golden Whistler	38.9
8	Striated Thornbill	27.3	8	White-throated Treecreeper	33.3
9	Speckled Warbler	27.3	9	Eastern Whipbird	30.6
10	Lewin's Honeyeater	24.2	10	Silvereye	30.6

study. The development of dense shrub layer vegetation eliminated this opportunity, rendering Site 3 unsuitable. In the case of the Speckled Warbler this decrease occurred throughout the woodland at Green Wattle Creek (Newman 2010). In spring 2011 weed removal and controlled burns temporarily restored patches of habitat to a condition similar to that when grazed. The Speckled Warblers returned (Newman 2014a) suggesting that the decrease at Survey Site 3 was caused by lack of grazing. While a similar explanation can be proposed for the decrease of the Double-barred Finch, there may have been other contributing causes as there was a contemporaneous decrease throughout much of the Paterson area (Newman 2014b). Jacky Winter have more foraging options than the previous two species. They hunt by spotting prey while perched and taking food from a variety of substrates as well as hawking aerially (Keast 1985). Development of tall dense shrub vegetation is counterproductive to some of these foraging techniques.

It was around six years before Superb Fairy-wrens decreased (**Figures 3** and **6b**). In contrast, the Variegated Fairy-wren RRs increased initially, before decreasing (**Figure 3**). Both species were present throughout the study. It is suggested that in the initial stages increased shrub layer vegetation provided improved shelter, and that this was particularly advantageous to the Variegated Fairy-wren. However, as the vegetation became denser, foraging became more difficult. However, some of the apparent decrease may have been a consequence of decreased detectability as discussed in the methods section.

It is less obvious why the Fuscous and White-naped Honeyeaters should abandon the survey site towards the end of the study (**Table 3**) as both forage in the canopy and changes in the shrub layer vegetation would have less impact. Chan (1990) indicates that Fuscous Honeyeaters favour eucalypt woodland away from stream beds and with a poorly developed shrub layer. This supports the proposition that a dense shrub layer would render the habitat unsuitable. The same logic presumably applies to the sympatric White-naped Honeyeater. Chan (1990) indicates that both species are highly aggressive and generally avoid each other. The decrease of the Fuscous Honeyeater coincided with a statistically significant increase in the Yellow-faced Honeyeater (**Figure 4**), which may have benefitted from the decreased competition with Fuscous Honeyeaters.

The other species which decreased to a statistically significant extent were the Eastern Rosella *Platycercus eximius*, Grey Fantail, Striated Pardalote *Pardalotus striatus* and Yellow Thornbill *Acanthiza nana*. Most of the Eastern Rosella records occurred in the first half of the study. The lack of records after dense shrub layer vegetation developed reflects their preference for similar habitat to Noisy Miners *Manorina melanocephala* with both species generally avoiding areas with dense understorey vegetation (Higgins *et al.* 2001; Newman 2013). Despite experiencing a statistically significant decrease in RR the Grey Fantail remained the second most frequently recorded species (**Table 3**). In a previous analysis (Newman 2012) fluctuations in Grey Fantails were attributed to a combination of the impacts of removal of cattle and rainfall. Grey Fantails use most strata when foraging, but concentrate on the periphery of trees and shrubs, as well as hawking in the open air adjacent to them (Cameron 1985). Dense understorey vegetation would progressively limit the opportunities for Grey Fantails to forage other than in the canopy. It is not obvious why changes in the understorey vegetation should have affected the Striated Pardalote and Yellow Thornbill adversely as both are predominantly canopy-feeding species.

Increasing species

Lewin's Honeyeater increased from the 10th to the 3rd most frequently recorded species (**Table 3**). The increase, which was highly significant statistically, was sustained throughout the study (**Figure 6a**). Lewin's Honeyeater, an arboreal species, feeds at all levels, in shrubs and trees and occasionally on the ground (Higgins *et al.* 2001) and would have benefitted from the establishment of understorey vegetation. It is a vocal species which is easily detected, even when foraging in dense cover.

Brown Thornbill, which glean from the foliage (Bell 1985), was another species which benefitted from the increase in shrub layer vegetation. Despite a slightly lower RR in the final three years (**Figure 5**) the overall increase was highly significant statistically. A similar increase was observed for the White-browed Scrubwren, a species which forages mainly in undergrowth (McDonald 2007), but in this instance the drop in the RR in the final three years was more pronounced, and the overall increase was not statistically significant. A possible explanation is that this species has an optimal shrub layer

structure for foraging and the vegetation density eventually exceeded this limit.

The increased occurrence of the Australian Raven *Corvus coronoides* was unexpected and no explanation is offered.

Species which peaked mid-study

In the previous section it was suggested that the shrub layer vegetation can become so dense that it inhibits optimal foraging. The smooth trend for the Eastern Whipbird, a species which habitually lives in dense ground level vegetation (**Figures 3** and **6c**) supports this hypothesis. The timing of the peak occurrence of the whipbird, approximately six years before the peak for White-browed Scrubwren, may be a consequence of its larger size restricting its ability to forage as the vegetation became increasingly dense.

For species such as the Rufous Whistler, which forage predominantly in or close to the canopy, it is less obvious how there would be a stage in understorey vegetation which provided optimal foraging opportunities. However, Rufous Whistlers do spend some time foraging in the upper levels of shrub layer vegetation and on trunks (Keast 1985), and this may be a contributing factor.

Cattle as bird habitat managers

This opportunistic study demonstrates how the exclusion of cattle can transform an area of woodland and its bird population. In such situations cattle are usually cast as the villains, but it is worth reflecting that at the start of this study they contributed to maintaining habitat which supported an assemblage of birds that were locally unusual, perhaps unique in the Paterson area of the Hunter Valley. In addition to the Speckled Warbler and Double-barred Finch other species like the Brown Treecreeper *Climacteris picumnus*, Buff-rumped Thornbill *Acanthiza reguloides* and Painted Button-Quail *Turnix varius*, which all favour open woodland, decreased elsewhere in the Green Wattle Creek Reserve (Newman 2009). The core range of many of these species lies well to the west of Green Wattle Creek. Some of these species have become scarce and one, the Brown Treecreeper, is no longer found in the area surrounding Green Wattle Creek (Stuart 2017).

It is possible to speculate that removing cattle from the woodland at Green Wattle Creek might allow it to revert to a state broadly similar to that which existed before European settlement. Attempts to find locations in the Paterson area with similar bird assemblages to those existing at the start of this study suggests that Green Wattle Creek may have been the last bastion of extensively grazed woodland there. This suggests that local changes in land use and management, such as acreage subdivisions, have resulted in a change in avian biodiversity including changes in the status of threatened species (e.g. Speckled Warbler).

Unfortunately, when an area which has been grazed, reverts to its natural state, weeds, such as Lantana, will often dominate the shrub layer vegetation, as occurred at Green Wattle Creek. Consequently, the vegetation may revert to a condition involving floristic and structural attributes that are different from those that existed previously. Therefore the area may no longer be capable of supporting the bird assemblages present before grazing commenced.

At Green Wattle Creek a program of burning and weed removal has been implemented to restore the vegetation to a state which may provide habitat for species which require more open shrub layer vegetation (Newman 2014a).

Limitations of a single survey site analysis

Survey Site 3 sampled approximately 2% of the Green Wattle Creek Reserve in which there was considerable variation in habitat (Newman 2009). As anticipated, the results of monthly surveys provided reliable trends for species that were regularly recorded (see 95% confidence bounds in **Figure 6**) and it was possible to determine whether statistically significant changes in status had occurred over the 18-year duration of the study. However, there are two caveats to the conclusions drawn from this study; they concern the extent to which Survey Site 3 was representative of the whole reserve and the lack of statistical power for the less common species with low RRs (e.g. Speckled Warbler and Double-barred Finch). To address these problems surveys were conducted at four 2-ha sites selected to sample differences in habitat, which provides the future opportunity to address both these issues. For instance, the occurrence of species with high RRs, such as the Yellow-faced Honeyeater, can be compared between survey sites and for species with low RRs the statistical power can be increased by pooling the results across the survey sites. However, the complexity of the analysis is much greater, as exemplified by results published for the Grey Fantail (Newman 2012).

CONCLUSIONS

When cattle were removed from woodland at Green Wattle Creek there was a rapid increase in the number of bird species, including those which were recorded regularly (2-ha survey RRs exceeding 20%). This increase was attributed to the development of understorey vegetation. For many species these increases were not sustained, and after 15 years the avian diversity had decreased to its initial level. However, there were substantial differences between the bird assemblages at the start and end of the 18-year study.

The "winners" were species that benefitted from increased shrub layer vegetation, such as the Brown Thornbill, White-browed Scrubwren and Eastern Whipbird. However, as the shrub layer vegetation became denser some of these species decreased from their mid-study peak levels, consistent with the proposition that they were no longer able to move through the shrub layer and forage effectively.

The "losers" were predominantly species which prefer open habitat, particularly those which forage on or near the ground, such as the Speckled Warbler, Double-barred Finch and two species of fairy-wren. Foliage-feeding honeyeaters were indirectly affected, with Fuscous and White-naped Honeyeaters both decreasing. These aggressive species avoid areas of woodland with dense understorey vegetation. In their absence the Yellow-faced Honeyeater increased, becoming the most frequently recorded species.

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APPENDIX

Species recorded at Green Wattle Creek Survey Site 3 between April 1996 and December 2013 which had a Reporting Rate exceeding 10% in at least one three-year period.

Species		**1996-98 RR (%)**	**1999-01 RR (%)**	**2002-04 RR (%)**	**2005-07 RR (%)**	**2008-10 RR (%)**	**2011-13 RR (%)**
Australian Raven	*Corvus coronoides*	3.0	2.9	13.9	11.8	28.6	19.4
Bar-shouldered Dove	*Geopelia humeralis*	0.0	2.9	2.8	11.8	2.9	11.1
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	12.1	8.8	13.9	20.6	8.6	11.1
Brown Gerygone	*Gerygone mouki*	12.1	0.0	8.3	2.9	0.0	2.8
Brown Thornbill	*Acanthiza pusilla*	12.1	23.5	41.7	41.2	42.9	38.9
Double-barred Finch	*Taeniopygia bichenovii*	15.2	8.8	2.8	2.9	0.0	0.0
Eastern Rosella	*Platycercus eximius*	18.2	32.4	13.9	11.8	0.0	11.1
Eastern Spinebill	*Acanthorhynchus tenuirostris*	18.2	38.2	36.1	41.2	45.7	27.8
Eastern Whipbird	*Psophodes olivaceus*	6.1	26.5	63.9	61.8	42.9	30.6
Eastern Yellow Robin	*Eopsaltria australis*	45.5	50.0	47.2	32.4	28.6	41.7
Fuscous Honeyeater	*Ptilotula fusca*	39.4	44.1	47.2	32.4	0.0	0.0
Golden Whistler	*Pachycephala pectoralis*	24.2	41.2	44.4	20.6	34.3	38.9
Grey Fantail	*Rhipidura fuliginosa*	81.8	88.2	75.0	76.5	57.1	75.0
Grey Shrike-thrush	*Colluricincla harmonica*	18.2	14.7	19.4	14.7	17.1	8.3
Jacky Winter	*Microeca fascinans*	9.1	8.8	19.4	2.9	0.0	0.0
Laughing Kookaburra	*Dacelo novaeguineae*	0.0	8.8	8.3	5.9	0.0	13.9
Leaden Flycatcher	*Myiagra rubecula*	12.1	2.9	5.6	5.9	5.7	5.6
Lewin's Honeyeater	*Meliphaga lewinii*	24.2	32.4	44.4	50.0	51.4	63.9
Red-browed Finch	*Neochmia temporalis*	9.1	32.4	19.4	20.6	8.6	16.7
Rufous Whistler	*Pachycephala rufiventris*	18.2	17.6	30.6	11.8	11.4	13.9
Scarlet Honeyeater	*Myzomela sanguinolenta*	0.0	23.5	11.1	23.5	11.4	13.9
Silvereye	*Zosterops lateralis*	12.1	29.4	27.8	17.6	11.4	30.6
Speckled Warbler	*Pyrrholaemus sagittatus*	27.3	8.8	0.0	0.0	0.0	0.0
Spotted Pardalote	*Pardalotus punctatus*	36.4	38.2	52.8	73.5	40.0	47.2
Striated Pardalote	*Pardalotus striatus*	21.2	14.7	27.8	5.9	0.0	2.8
Striated Thornbill	*Acanthiza lineata*	27.3	32.4	47.2	32.4	48.6	27.8
Superb Fairy-wren	*Malurus cyaneus*	66.7	67.6	50.0	35.3	14.3	16.7
Variegated Fairy-wren	*Malurus lamberti*	21.2	23.5	36.1	29.4	25.7	8.3
White-browed Scrubwren	*Sericornis frontalis*	33.3	35.3	38.9	41.2	60.0	27.8
White-naped Honeyeater	*Melithreptus lunatus*	12.1	17.6	2.8	0.0	0.0	0.0
White-throated Treecreeper	*Cormobates leucophaea*	12.1	17.6	16.7	35.3	11.4	33.3
Yellow Thornbill	*Acanthiza nana*	21.2	26.5	8.3	14.7	8.6	11.1
Yellow-faced Honeyeater	*Caligavis chrysops*	63.6	79.4	91.7	82.4	85.7	97.2