

Bush bird Monitoring

in Barmah-Millewa Forest



1999 to 2018

Report Title: Bush Bird Monitoring in Barmah-Millewa Forest, 1999 to 2018

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Report prepared for: Murray Darling Basin Authority, as part of the Living Murray Condition Monitoring Program.

Front cover photo: Bush bird monitoring plot, Fisherman’s Bend Rd (spring 2017) – Ali Borrell

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Acknowledgements.

This project was funded by The Living Murray (MD3090-2). The Living Murray is a joint initiative funded by the New South Wales, Victorian, South Australian, Australian Capital Territory and Commonwealth governments, coordinated by the Murray–Darling Basin Authority.

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Summary

The Barmah-Millewa Forest bush bird surveys in 2017-18 identified a total of 60 woodland bird species in the survey plots. Total species recorded from both the survey plots and the adjoining habitat was 65. This is the average yearly species count from all survey years. There were 1,420 individual birds recorded in the plots from across twenty sites in the Barmah-Millewa Forest.

- Ten declining species within the temperate agricultural zone of southern Australia (Reid, 1999) were recorded through the year (brown treecreeper *Climacteris picumnus*, rufous whistler *Pachycephala rufiventris*, crested shrike-tit *Falcunculus frontatus* dusky woodswallow *Artamus cyanopterus*, jacky winter *Microeca fascinans*, red-capped robin *Petroica goodenovii*, restless flycatcher *Myiagra inequita*, hooded robin *Melanodryas cucullate*, western gerygone *Gerygone fusca*, white-browed babbler *Pomatostomus superciliosus*).
- Five vulnerable/significant species (NSW *Threatened Species Conservation Act* [TSC Act] 1995, Victoria DSE 2013) were recorded during the current surveys: superb parrot *Polytelis swainsonii*, flame robin *Petroica phoenicea*, hooded robin *Melanodryas cucullata*, scarlet robin *Petroica boodang* and dusky woodswallow *Artamus cyanopterus*. The superb parrot is also listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act* 1999.
- The most common species recorded were striated pardalote *Pardalotus striatus*, white-plumed honeyeater *Lichenstomus penicillatus* and weebill *Smicrornis brevirostris*.
- Icon site condition assessment scores indicate that forest health decreased in 2017-18 with all habitat types except sandhill, dropping into the 'poor' category in summer. The sandhill habitat improved from poor to moderate, whilst river red gum site quality 1 and box habitats continued a downward trajectory. River red gum site quality 3 is recorded as being in the 'very poor' category and site quality 1 and 3 returned scores as low as in the 2008 drought.
- An analysis of the program was conducted via an oversample (see report: Robinson, 2018) and the results show that bush bird assemblages are highly variable across all habitats, and surveys are likely to not be detecting all the species present in each habitat, however they are useful for detecting change over time.

1. Introduction

A baseline monitoring survey of bush birds (1999-2002) was undertaken between 1999 and 2004 (Webster 2004a, b). Follow-up seasonal surveys were conducted during 2008, 2010, 2011/12, 2012/13, 2015-16, 2016-17 (Webster 2008a, b, c, d, 2010a, b, c, d, OEH 2012a, b, c, 2013; OEH; 2016, 2017). The current year of surveys were undertaken as part of the ongoing condition monitoring program within Barmah-Millewa Forest – a Living Murray icon site. To date, 767 20-minute surveys have been conducted as part of this project.

The surveys aim to monitor bush bird assemblages to provide information on species richness and relative abundance. This information can be used to identify changes in bird assemblages in the forest over time. Reference scores have been created using the data to show changes in condition over time.

This report presents an overview of the 2017-18 monitoring results and a brief discussion on observational trends in bush bird diversity and abundance within the Barmah-Millewa Forest icon site.

2. Methods

Census Methodology

Twenty woodland bird monitoring sites were established within the Barmah-Millewa Forest (Figure 1) in 1999, in conjunction with the Forestry Corporation of NSW (formerly Forests NSW) and the Victorian Department of Environment, Lands, Water and Planning (DELWP) (formerly Department of Sustainability and Environment). Sites were selected to represent the following habitat types:

- River red gum (*Eucalyptus camaldulensis*) Site Quality 1
- River red gum Site Quality 2
- River red gum Site Quality 3
- Box woodlands (western grey box *E. microcarpa*, yellow box *E. melliodora*)
- Sandhills (includes river red gum [1], box/pine (*Callitris* sp.) [2], box [1])

These sites were also selected based on accessibility during major floods, and in New South Wales, and previous fauna surveys.

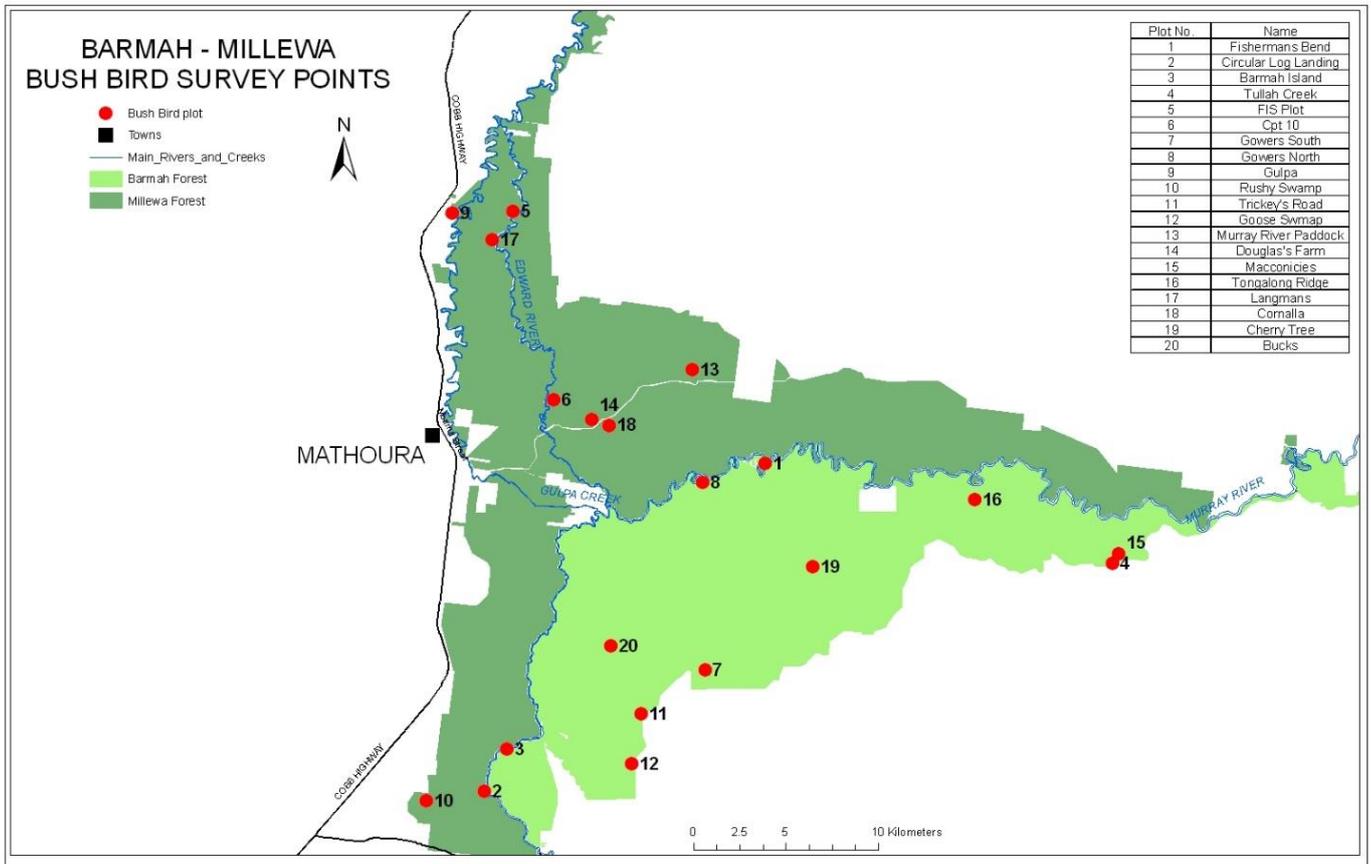


Figure 1: Location of bush bird monitoring sites within the Barmah-Millewa Forest icon site.

Across the five habitat types, 2-hectare plots were established in both the Murray Valley National Park (NSW) and in Barmah National Park (Vic). Surveys at each plot are carried out for twenty minutes and are repeated once each season. During the twenty-minute survey all birds observed or heard on the plot are recorded. Birds seen or heard outside of the plot are recorded as being present within that habitat type, if the observer was confident that this was the case. Birds flying over or through the plot were recorded as on the plot only if they were species that utilise the air space to forage for food (e.g. brown goshawk *Accipiter fasciatus*, tree martin *Hirundo nigricans*).

In the event of excessively windy weather (i.e. crowns of the trees moved violently) or rain, surveys were not undertaken. Each plot was visited either prior to 9am (early) or between 9am and 12pm (late). This ensures all counts are completed by 12:20pm. Early and late sessions alternate across the four seasons at each site, to minimise potential bias in the results.

No nocturnal bird surveys are undertaken as part of this project. There were also no targeted surveys undertaken for significant, rare or threatened species.

Data Interpretation

The objective adopted by the project is that overall health or condition of floodplain and non-floodplain woodland habitats within Barmah-Millewa Forest would be reflected by healthy woodland bird populations (Robinson, 2014b). Three parameters were used in developing the Icon Site Condition Assessment (ISCA). The score aims to reflect the richness of the Victorian temperate Woodland Bird Community (VWBC), the extent of VWBC species and total species richness.

The VWBC species list was extracted from the Flora and Fauna Guarantee and includes woodland dependant and woodland associated bird species (Appendix). The VWBC index has been viewed as a truer indicator of bush bird community health, as it only considers species that are reliant on temperate woodlands, and not species which actively utilise other habitats.

Using these indices, icon site condition assessment scores have been implemented for the five site types in the Barmah-Millewa condition monitoring program (Table 1). The reference scores are based on the 90th percentile species richness for the year. The scores show species diversity over time, and by comparing yearly scores, changes in forest condition from year to year can be quantified.

Habitat	Number of surveys in database	90 th percentile total species richness	90 th percentile VWBC species richness
BOX	118	11	4
RRGQ1	118	9	2
RRGQ2	112	9	3
RRGQ3	115	9	3
SANDH	114	10	3

Table 1: Calculated reference scores for Barmah-Millewa habitats.

Following on from the development of the scores, questions were raised about how accurate the survey sites were for recording species richness across the habitats. This resulted in a 'Bush bird Blitz', where an extra 66 sites were sampled across two seasons. Findings showed the as sites have a high bird species turnover temporally and spatially, using richness as a measure is not particularly sensitive (Robinson, 2018). This can be improved by including in the indices a guild type measure that is independent of sampling effort, with the project showing that survey sites are still able to show differences in bush bird communities using this measure. This information will be considered and if possible, included in analysis in coming years to improve the bush bird condition monitoring program. See Report: 2018 Bushbird Blitz, BMF, by Wayne Robinson.

3. Results

A total of 62 species was recorded in 2017-18. The surveys were conducted across four seasons (Table 2). 1 additional species was recorded in the adjoining habitat. Several migratory species to the region were recorded such as the rufous whistler, sacred kingfisher and golden whistler. Ten species that have been identified as declining were recorded. These were brown treecreeper, rufous whistler, crested shrike-tit dusky woodswallow, jacky winter, red-capped robin, restless flycatcher, hooded robin, western gerygone, white-browed babbler). The three most common birds identified across the surveys were striated pardalote, white-plumed honeyeater and weebill (Table 3).

Season	Date Surveyed	Individuals Counted	Species Recorded	Listed Species
Spring	October 30 th to 10 th of November	386	41	Brown Treecreeper, Black-chinned Honeyeater, Scarlet Robin, Superb Parrot, brown treecreeper,
Summer	January 16 th to 20 th of February	343	50	Brown Treecreeper, Dusky Woodswallow, Scarlet Robin, White-Bellied Sea Eagle,
Autumn	30 th of April to 8 th of May	430	35	Brown Treecreeper, Dusky Woodswallow,
Winter	23 rd of June to the 27 th of June	276	36	Brown Treecreeper, Flame Robin, Hooded Robin,

Table 2: Dates that surveys were conducted, individuals counted within each season and the numbers of species recorded. All data can be viewed in Appendix 1.

Common name	Reporting Rate (%)	Abundance	Guild
Striated Pardalote	56	2.40	Canopy: Invertebrates
White-plumed Honeyeater	53	3.29	All Levels: Nectar
Weebill	49	2.79	Canopy: Invertebrates
Brown Treecreeper	41	1.79	Trunks/Branches: Invertebrates
Yellow Rosella	34	3.0	All Levels: Seed and Fruit
Buff-rumped Thornbill	29	3.26	Low: Invertebrates
Superb Fairy Wren	29	3.13	Low: Invertebrates
White-throated Treecreeper	29	1.43	Trunks/Branches: Invertebrates
Jacky Winter	26	1.52	Perch Aerial Feeders
Sulphur-Crested Cockatoo	23	3.50	All Levels: Seed/Fruit
Willie Wagtail	21	1.18	Low: Invertebrates
Rufous Whistler	20	1.19	Canopy: Invertebrates
Galah	20	3.13	Ground: Seed/Fruit
Red-Capped Robin	20	1.69	Low: Invertebrates

Table 3: All species recorded in 2017-18 with a reporting rate of greater than 20%.

Species diversity was representative of the diversity experienced since 2013, and a gradual decline since the early 2000’s (Figure 3) can be seen across the survey period.

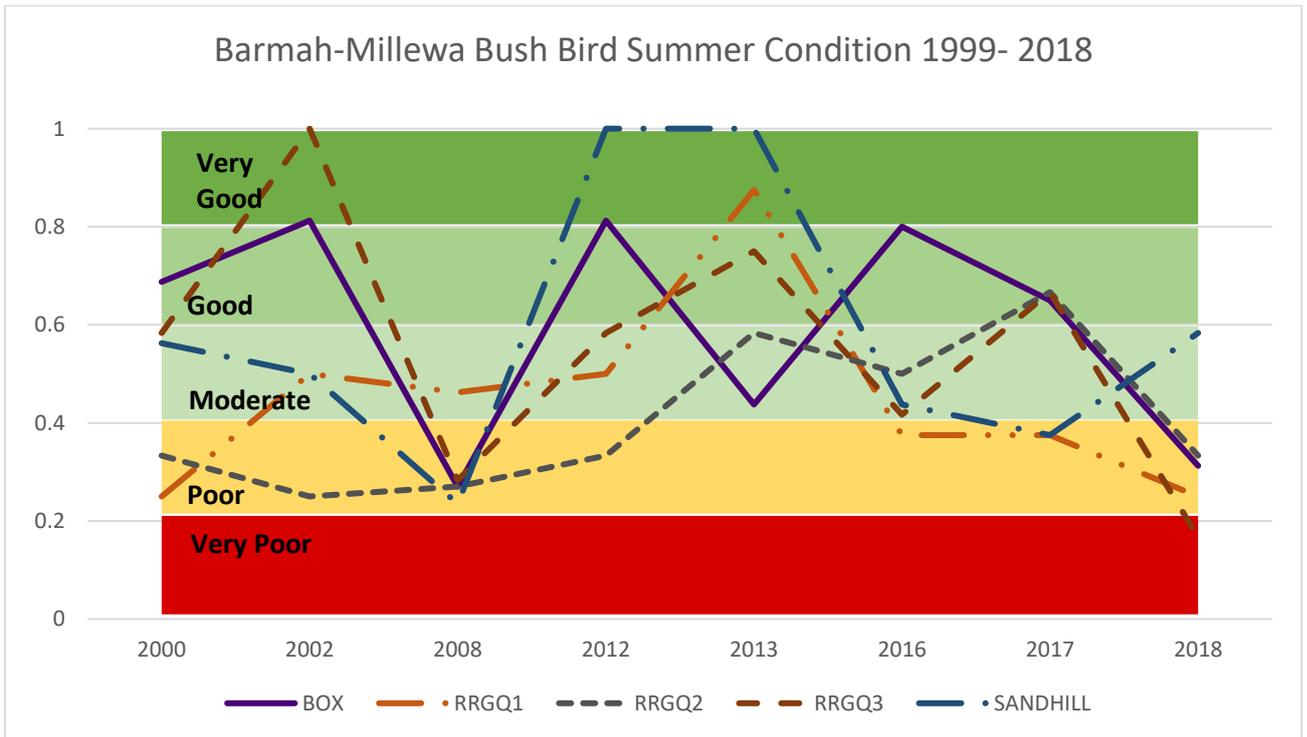


Figure 2: Summer Icon Site Assessment Scores from 2000 to 2017.

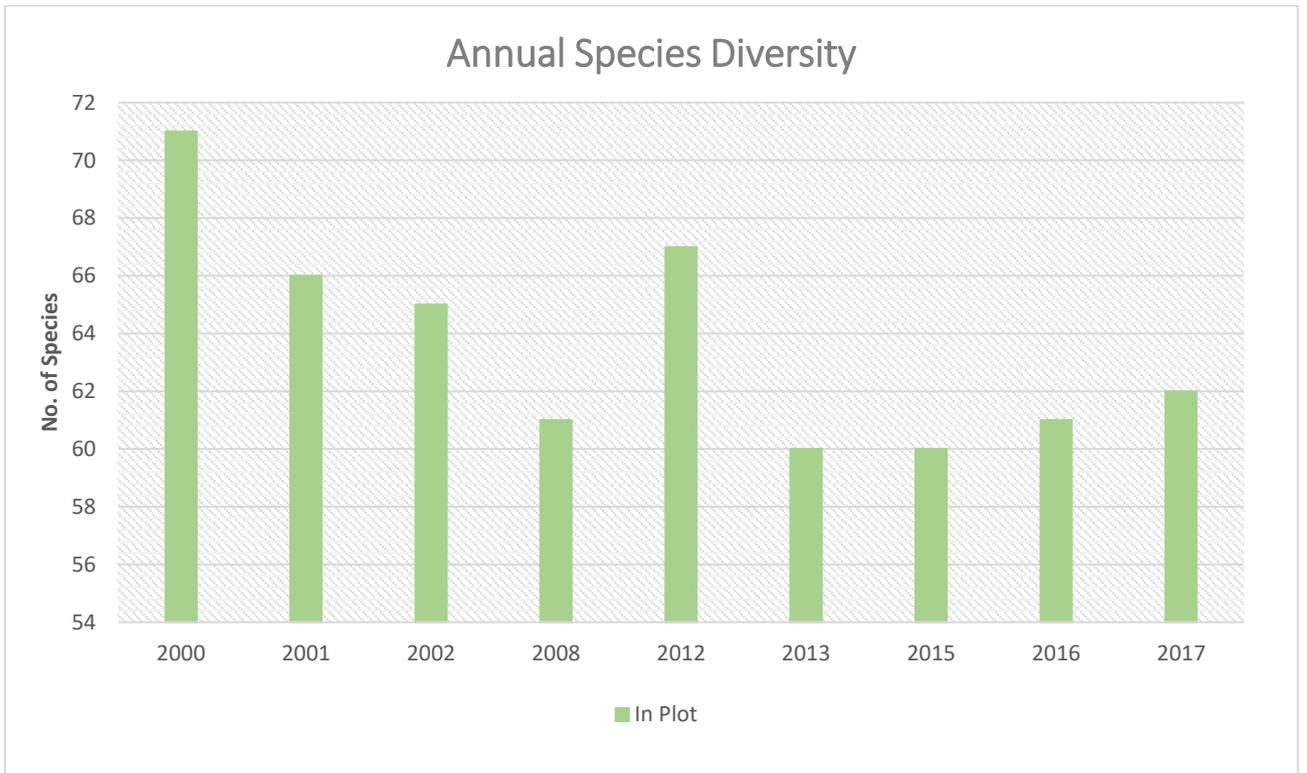


Figure 3: Species diversity across all years.

4. Discussion

Barmah-Millewa Forest provide critical habitat for a range of species, and the productive wetland complexes support a diverse woodland bird community. Surveys have collected data on woodland bird assemblages within the state forest turned national park, across nine in nineteen years providing temporal and spatial trends in woodland bird abundance and diversity.

This year surveys recorded a total of 62 species within the survey sites, a total of 98 woodland bird species have been identified in the Barmah-Millewa survey sites. Previous research has yielded varying species diversity within these habitats. Chesterfield et al, in 1984 surveyed only Barmah Forest and recorded 108 terrestrial bird species, which included historical, incidental and opportunistic observations. Tzaros in 2002, surveyed riparian habitats from the Ovens to Walpolla Island and identified 143 species utilising Victorian River Red Gum forests (1 NSW site was included). Webster recorded 79 species across the central Murray from 1999 to 2004 and found that Millewa Forest possessed the most diverse habitat surveyed, with a total of 67 different species. The maximum species recorded in one year across the central Murray was 79 in 2001/02. These earlier records from the wider region show that a higher diversity of woodland birds was identified pre- millennium drought, and Barmah-Millewa Forest doesn't represent the full diversity of woodland birds across the central Murray.

The maximum species diversity recorded across the entire survey period was 71 species (2000) and a minimum of 60 species (2013, 2015-16). 62 species were identified in the surveys in 2017-18. Since 2008, the diversity has remained close to the minimum with a brief increase recorded in 2012. The increase could be the result of improvements in productivity and tree canopy conditions in 2010 and 2011. Data was not collected between 2008 and 2012, meaning that species diversity could have potentially further decreased before the recorded increase in 2012. The data from 2014 onwards suggest that bush bird assemblages have not fully recovered from the impacts of the millennium drought.

Reid (1999) identified a list of 24 woodland birds that have been found to be declining in the Southern Wheat Belt (SWB). These species often have large extents, and declines are seen locally. Across the stretch of their distribution in the SWB, numbers have been declining however Reid (1999) states that this effect is likely to be less prevalent in large remnant patches or managed forest such as Barmah-Millewa Forest. The reporting rates and abundances of individual species classed as declining varies greatly between species in the Barmah-Millewa dataset. The brown treecreeper, jacky winter, rufous whistler and red-capped robin have remained present and relatively stable in all years across the survey period. Species including western gerygone, hooded robin, crested shrike-tit and white-browed babbler were not reported at all or decreased rapidly from 2008 to 2012 in both presence and abundance. These species have all been increasing steadily since 2012 and now show a more stable reporting rate. This can

probably be accounted to the increased frequency of flooding that the forest has experienced since 2010 improving the soil and vegetation condition.

Icon site assessment scores have been developed to enable quantitative measure of condition across years. Summer was found to be the only season which had statistically significant differences between years, so these surveys are currently used as a comparison across years. All the habitat types (prior to this year) recorded the lowest scores in 2008 (except for RRGQ2), which was the only year that data was collected in peak of the millennium drought. This year scores dropped below 2008 in the red gum site quality 2 and red gum site quality 3. Red gum site quality 1 returned the same score as it did in 2000 (the lowest on record).

These indices use the Victorian Woodland Birds Communities (VWBC) list to calculate the values, meaning that if not many of the listed VWBC species (Appendix C) aren't identified, a habitat will score poorly. Whilst the annual species diversity and number of individuals counted (abundance) were higher than in the last two years, this is not reflected in the indices. The only habitat to show an increase this year was the sandhill habitat, after two years of decreasing scores.

The icon site reference scores reflect the research which has shown red gum habitats possess lower species diversity than box and sandhill/pine habitats (Antos and Bennett, 2005). Barmah-Millewa river red gum sites have lower scores throughout the survey period than both sandhill/pine and box sites. River red gum habitats also display lower species diversity and abundance than black box (McGuinness et al, 2010) and white cypress pine habitats have been shown to have the greatest richness in terms of ground foraging species (Antos & Bennett, 2005).

In 2017 an 'oversample' of habitat was conducted to assess whether the sites surveyed are reflective of species present across the entire forest. Dubbed the 'Bush bird Blitz', analysis of the extra survey effort across two seasons has found that species richness is not the most sensitive indicator we could be using to evaluate bush bird health over time (Robinson, 2018). Community assemblages and guild functional groups have been determined to be a better way to look at changes in communities over time, as richness is highly variable. This will be investigated going forward and potentially incorporated into future reporting to increase accuracy of reporting.

Woodland bird habitat quality has been highly degraded and altered across the Murray-Darling Basin, which further illustrates the importance of wetland watering for holistic outcomes including woodland bird assemblages. Floodplain habitats have not been widely researched in the past for terrestrial fauna outcomes, however the bush bird condition monitoring program is critical for assessing the benefits of environmental watering for the whole of system. The long-term collection of bird data is an important tool to assess overall forest health and ensure a holistic approach to management. The ability to assess

habitat condition through bush bird assemblages is a cost-effective and effective way to monitor vegetation health through time.

Objective Evaluation

<i>Objective</i>	<i>Met?</i>	<i>How</i>
'Facilitate healthy and diverse vegetation to provide suitable breeding and foraging habitat for a diverse range of waterbirds and bush birds'	Partially Met	All red gum and black box reference scores decreased in 2017-18, indicating that vegetation in these habitats may not currently be displaying the full range of bush bird assemblages that could potentially be present. The Sandhill habitat showed increases which may be an indication of revegetation programs providing improved vegetation condition for bush birds to utilise.

As birds are mobile, other factors in the landscape could be impacting on the bush birds found in Barmah-Millewa. However, using the reference scores it appears that the red gum and box habitat quality has decreased in 2017-18. This may be due to a lack of resilience within the forest due to long dry periods and reduced inundation of the floodplain. This impacts the long-term health of the forest and its ability to rebound when conditions improve. Bush birds are only one indicator of forest health and all monitoring should be considered when evaluating the impacts of watering Barmah-Millewa.

5. Recommendations

The bush bird monitoring program is an important component of evaluating the health of wetland systems. To strengthen the bush bird monitoring program, it is recommended that a review into all the icon sites data is conducted to accumulate a greater data set and enable the analysis of trends across the landscape, rather than in individual patches.

Other analysis that could further the bush bird monitoring program could include:

- Incorporating a guild analysis which would group birds and provide trends on functional groups.
- Incorporate recommendations made by the bush bird blitz analysis (Robinson, 2018).
- Conduct an in-depth analysis in relation to inundation levels in Barmah-Millewa to correlate bush birds more strongly to environmental watering and the state of wetlands.
- Create objectives specifically to track the health of bush birds in Barmah-Millewa over time. The use of reference scores will assist this, and the development of clear objectives will enable clearer evaluation of the program temporally.

6. Appendices

Appendix 1

Bush bird records for 2017-18 in attached spreadsheet.

Appendix 2

Barmah-Millewa Site photos in attached PDF.

Appendix 3

Listed in VWBC	VWBC Scientific name	VWBC classification
Apostlebird	<i>Struthidea cinerea</i>	Specific
Barking Owl	<i>Ninox connivens</i>	Specific
Black-chinned Honeyeater	<i>Melithreptus gularis</i>	Specific
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	Specific
Brown-headed Honeyeater	<i>Melithreptus brevirostris pallidiceps</i>	Specific
Bush Stone-curlew	<i>Burhinus grallarius</i>	Specific
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	Associated
Crested Bellbird	<i>Oreoica gutturalis</i>	Associated
Crested Shrike-tit	<i>Falcunculus frontatus</i>	Associated
Diamond Firetail	<i>Stagonopleura guttata</i>	Specific
Dusky Woodswallow	<i>Artamus cyanopterus</i>	Associated
Eastern Yellow Robin	<i>Eopsaltria australis</i>	Associated
Emu	<i>Dromaius novaehollandiae</i>	Associated
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	Specific
Gilbert's Whistler	<i>Pachycephala inornata</i>	Associated
Glossy Black-cockatoo	<i>Calyptorhynchus lathami</i>	Associated
Grey Falcon	<i>Falco hypoleucos</i>	Associated
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	Specific
Ground Cuckoo-shrike	<i>Coracina maxima</i>	Specific
Hooded Robin	<i>Melanodryas cucullata</i>	Specific
Jacky Winter	<i>Microeca fascinans</i>	Specific
Little Lorikeet	<i>Glossopsitta pusilla</i>	Specific
Major Mitchell's Cockatoo	<i>Cacatua leadbeateri</i>	Associated
Malleefowl	<i>Leipoa ocellata</i>	Associated
Masked Owl	<i>Tyto novaehollandiae</i>	Associated
Painted Button-quail	<i>Turnix varia</i>	Specific
Painted Honeyeater	<i>Grantiella picta</i>	Specific
Powerful Owl	<i>Ninox strenua</i>	Associated
Red-capped Robin	<i>Petroica goodenovii</i>	Specific
Red-tailed Black-cockatoo	<i>Calyptorhynchus banksii</i>	Specific
Regent Honeyeater	<i>Xanthomyza phrygia</i>	Specific
Regent Parrot	<i>Polytelis anthopeplus</i>	Associated
Restless Flycatcher	<i>Myiagra inquieta</i>	Associated
Rufous Songlark	<i>Pachycephala rufiventris</i>	Associated
Southern Whiteface	<i>Aphelocephala leucopsis</i>	Associated
Speckled Warbler	<i>Chthonicola sagittata</i>	Specific
Square-tailed Kite	<i>Lophoictinia isura</i>	Associated
Superb Parrot	<i>Polytelis swainsonii</i>	Specific
Swift Parrot	<i>Lathamus discolor</i>	Specific
Turquoise Parrot	<i>Neophema splendida</i>	Specific
Varied Sittella	<i>Daphoenositta chrysoptera</i>	Associated
Western Gerygone	<i>Gerygone fusca</i>	Specific
White-browed Babbler	<i>Pomatostomus superciliosus</i>	Associated
White-browed Woodswallow	<i>Artamus superciliosus</i>	Associated
Yellow-tufted Honeyeater	<i>Lichenostomus melanops meltoni</i>	Specific

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