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# MONITORING WATERBIRD ACTIVITY IN MILLEWA FOREST: 2016 – 2017

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Report Title: Monitoring Waterbird Activity in Millewa Forest 2016-2017  
Monitoring waterbird activity in Millewa Forest: 2016-17

Author: Alison Borrell, Amanda Liefting, Rick Webster  
Parks & Wildlife Group  
Western Rivers Region

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Front cover photo: Top: Great Cormorant *Phalacrocorax carbo* sitting in a nest at St Helena Swamp (A.Borrell); Bottom Left: Little Pied Cormorant *Microcarbo melanoleucos* eggs (A.Borrell); Bottom Right: St Helena Swamp (A. Liefting)

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Inquiries regarding the licence and any use of the document are welcome at:

NSW National Parks and Wildlife Service  
23 Neil St, Moama  
03 5483 9100

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# SUMMARY

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Murray Valley National Park possesses known colonial waterbird nesting sites. Monitoring of waterbird breeding events has been undertaken in the forest since 1999. During the 2016-17 water season, environmental water was delivered to Millewa Forest for 86 days from November to the end of January. Colonial waterbirds began nesting later than the previous year due to high water levels from the natural flood event and cooler than average water temperatures. This report presents the results of the intervention monitoring program undertaken during the natural flood and environmental flow event.

Two aerial surveys were conducted between the 31<sup>st</sup> of October and the 12<sup>th</sup> of December. These surveys were carried out by New South Wales National Parks and Wildlife Service (NSW NPWS). These surveys assisted in identifying the extent of colonial waterbird nesting sites. Colonial nesting waterbirds were recorded breeding at five sites. The total number of breeding pairs on the wetland monitoring sites within Forest was ~2828. The number of breeding pairs on each wetland supporting nesting colonial waterbirds were:

- White Swamp – 34 pairs;
- Black Swamp – 13 Pairs
- St Helena Swamp – 88 pairs; and
- Reed Beds wetland complex (North, South and Coppingers) - ~1018 pairs
- Gulpa Creek Cutting – 144 pairs;

Eleven colonial nesting species were recorded nesting:

- Australian white ibis *Threskiornis molucca*;
- straw-necked ibis *Threskiornis spinicollis*;
- royal spoonbill *Platalea regia*;
- Eastern great egret *Ardea modesta*;
- Intermediate egret *Ardea intermedia*;
- Nankeen night heron *Nycticorax caledonicus*;
- White-necked heron *Ardea Pacifica*;
- Little black cormorant *Phalacrocorax sulcirostris*;
- Little pied cormorant *Microcarbo melanoleucos*;
- Great cormorant *Phalacrocorax scarbo*;
- Australasian darter *Anhinga novaehollandiae*.

This monitoring identified 30 species of waterbird utilising the wetland monitoring sites within Millewa Forest. This included the eastern great egret listed on the China-Australia Migratory Bird and Japan-Australia Migratory Bird Agreements

### Monitoring Waterbird Activity in Millewa Forest 2016-2017

In 2016-17, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) was undertaking year two of a study for the Environmental Watering Knowledge and Research (EWKR) project in Millewa's Reed Beds North. This project involved setting up remote cameras around nesting areas to assess the nesting behaviour of colonial nesting waterbirds. To minimise disturbance to nesting waterbirds, NSW NPWS limited visits for this monitoring, to these areas during the breeding season. On the ground reports were received from CSIRO regarding nesting stage to assist with informing watering actions. As per the objectives outlined in the basin plan, this breeding event was a successful fledgling event and was able to sustain breeding of thousands of colonial and migratory waterbirds.

# 1. INTRODUCTION

The Barmah–Millewa Forest is in the central Murray Valley between the towns of Tocumwal, Deniliquin and Echuca. The forest has been identified as one of the icon sites under the Murray Darling Basin Authority’s ‘The Living Murray’ (TLM) program. The icon site totals 66,600 ha in size. The Millewa portion of the icon site is reserved as the Murray Valley National and Regional Parks comprising the Millewa, Moira and Gulpa Island precincts (hereafter called Millewa Forest). Millewa Forest covers an area of 41,957 ha comprising of Inland Riverine Forests, Inland Floodplain Woodlands, Floodplain Transition Woodlands, Riverine Sandhill Woodlands and Inland Floodplain Swamps (Keith, 2004).

During flood events, the Inland Floodplain Swamps are known to support large numbers of waterbirds including colonial nesting species (e.g. egret and ibis species). Large waterbird nesting events have been recorded within Millewa Forest since early in the 20<sup>th</sup> century (Mattingley, 1907, 1908). Although these breeding events still occur, they are much smaller in size compared to historical events (Maher, 1993) and occur less frequently (Leslie, 2001). This has been attributed largely to removal of water from within the Murray River system.

A water recovery initiative was developed as part of the TLM program. The water recovered as part of this initiative is then available for use within the icon sites to achieve ecological objectives as outlined in the Environmental Water Management Plans for each icon site. The environmental water release included the delivery of 46 gigalitres (GL) of TLM environmental water delivered into Millewa Forest (Table 1) and 4.48GLs delivered into Reed Beds which allowed waterbird fledging to reach a successful completion. River flows were elevated over spring/summer due to the delivery of River Murray Increased Flows (RMIF), Planned Environmental Water (PEW) and 110GL from the Commonwealth. This report presents the results of the intervention monitoring program undertaken during this flood/environmental flow event.

Site	Volume	Who By	Objectives
Reed Beds	4,488	<b>NSW AEW</b>	Maintain water levels to support colonial waterbird breeding including Eastern great egrets, royal spoonbills and Australasian bittern.
Pinchgut Regulator	2,033	<b>TLM</b>	To promote native fish movement, recruitment and condition.
Mary Ada	2,439	<b>TLM</b>	To promote native fish movement, recruitment and condition.
Multi-Site Watering	84,032 50,000 107,481 40,700	<b>PEW</b> <b>RMIF</b> <b>CEWO</b> <b>TLM</b>	Flows from Hume throughout the system. This included trialling flows into Toupna Creek for large bodied native fish habitat.

Table 1: Water Delivery relevant to Millewa Forest for 2016-17

## Monitoring Waterbird Activity in Millewa Forest 2016-2017

### Main Objectives:

As Millewa is recognised as a historically important waterbird breeding ground, it is imperative that conditions in Millewa continue to promote waterbird breeding, with the aims of maintaining and improving waterbird population abundance and resilience. The purpose of intervention monitoring is to locate colonies and monitor their extent, abundance and richness over the breeding season, informing management decisions. Many factors will contribute to waterbird breeding success, with the correct water levels critical. Sudden drops in water level can cause waterbirds to abandon their nests, and possibly abandon their young, greatly reducing the effectiveness of watering actions which aim to promote ecological outcomes and increase waterbird populations.

Aims of waterbird monitoring in response to breeding events:

- Ensure that waterbird colonies can be supported throughout the season.
- Collect data to contribute to an extensive body of data that has been collected over 20 years, to inform targets and progress over this time and feeding into Long Term Intervention Monitoring programs.
- Communicate status of waterbirds and ecological outcomes to stakeholders over the season.
- Quantify success of management actions in real time.

## 2. METHODOLOGY

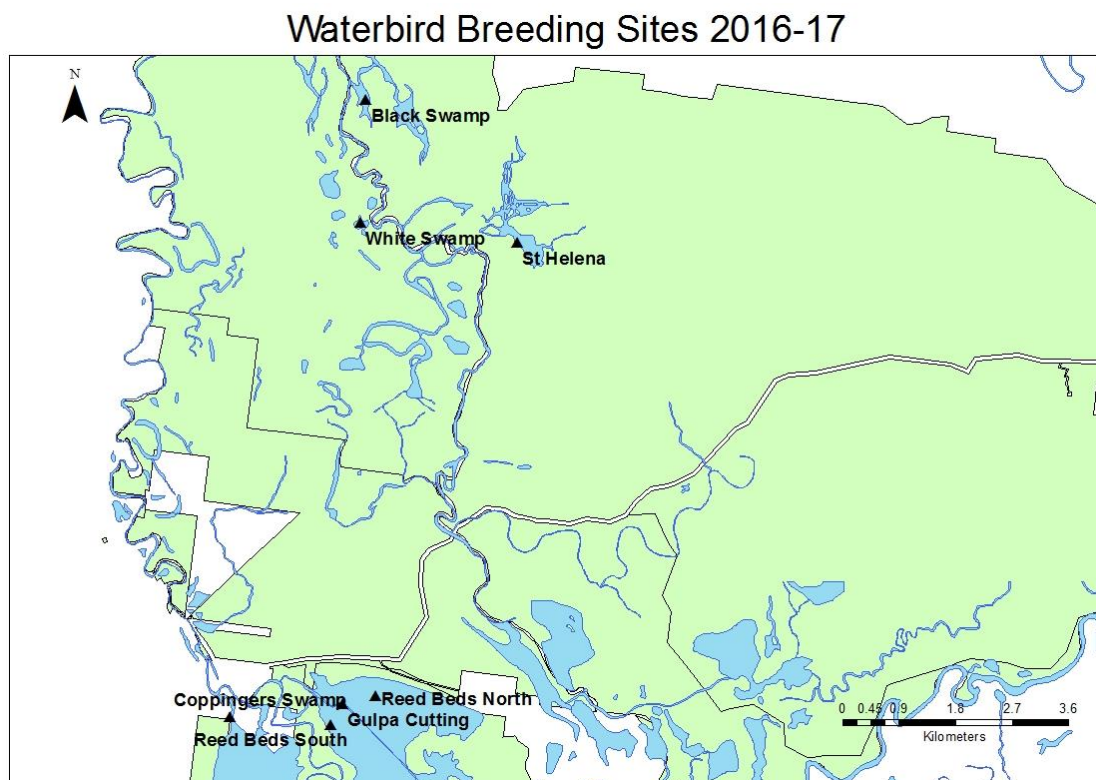
### 2.1 Study Sites

The sites included in the intervention monitoring project were based on:

- on-ground surveys conducted as part of the TLM condition monitoring;
- aerial surveys undertaken to determine extent of flooding and location of colonial waterbird breeding colonies; and
- New South Wales National Parks & Wildlife Service (NSW NPWS) staff knowledge.

During spring 2016 and summer 2017, waterbird monitoring was conducted at six sites where colonial nesting waterbirds were identified as breeding. The six sites were (Figure 1):

- White Swamp;
- Black Swamp;
- St Helena Swamp;
- Reed Beds North (east and west);
- Reed Beds South
- Coppingers Swamp



**Figure 1:** Wetlands that breeding of colonial waterbirds was recorded to be occurring within Millewa, 2016-17.



## Monitoring Waterbird Activity in Millewa Forest 2016-2017

Surveys were carried out from October to February. As CSIRO were also undertaking surveys in Reed Beds North, NSW NPWS conducted fewer surveys in Reed Beds North than it normally would have if CSIRO were not conducting their project work, to limit the exposure of the nesting birds to disturbance.

### 2.2 Survey Methodology

To count and identify waterbirds on individual wetlands, a survey transect or a survey point was established. A single traverse of each transect starting and finishing at the survey point was completed for all wetlands except Reed Beds North (west). At Reed Beds North (west) each survey was undertaken from the bird hide located on the northern shore of the wetland. Each transect was located to survey as much of the waterbird breeding colony as possible while being undertaken in a manner so as to not unduly disturb the nesting birds. Survey transects were completed from a boat, kayak or on foot depending on the depth of water present within each site. The group of birds known as waterbirds contains many species. For the purposes of this monitoring study species from the following families were considered waterbirds:

- Anatidae (Swans, Geese, Ducks);
- Podicipedidae (Grebes);
- Anhingidae (Darters);
- Phalacrocoracidae (Cormorants);
- Pelecanidae (Pelicans);
- Ardeidae (Herons, Egrets, Night Herons, Bitterns);
- Threskiornithidae (Ibises Spoonbills);
- Accipitridae (Hawks, Harriers);
- Gruidae (Cranes);
- Rallidae (Crakes, Rails, Gallinules);
- Scolopacidae (Snipe, Godwits, Curlews, Sandpipers, Stints, Phalaropes);
- Recurvirostridae (Stilts, Avocets);
- Charadriidae (Plovers, Dotterels, Lapwings);
- Laridae (Gulls, Terns)
- Halcyonidae (Sacred Kingfisher *Todiramphus sanctus*)
- Alcedinidae (Azure Kingfisher *Alcedo azurea*); and
- Sylviiidae (Old World Warblers).

All waterbird species observed on the wetland or flying over were recorded. If a species was breeding then the number of nests, eggs and chicks were also recorded. Surveys were conducted at each site approximately every three weeks throughout the season.

### 3. RESULTS

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Two aerial surveys were conducted between 23<sup>rd</sup> of October and the 1<sup>st</sup> December 2016. In addition to these, Goulburn Broken Catchment Management Authority (GB CMA) conducted four aerial surveys, and included a portion of the Reed Beds wetland complex (north and south) in their survey. The aerial surveys identified eastern great egrets nesting in willow trees, along the Gulpa Creek cutting (Figure 1), identified nests in the duck lagoon complex and allowed accurate estimates of the number of breeding pairs of ibis and spoonbills to be made in Reed Beds. Due to the density of the vegetation within the wetland complex, it is difficult to accurately assess nesting numbers from the ground. Photos taken on the aerial surveys allowed estimates of nesting colonial waterbirds to be made within the Reed Beds wetland complex as the entire wetland complex was not accessible on ground. These estimates were used to determine the total number of colonial nesting waterbirds utilising the wetland.

A total of ten species were recorded nesting in these wetlands. Pair numbers were established through both ground surveys and aerial estimates. Species recorded breeding were:

- Straw-necked Ibis– 360 prs
- Australian white ibis – 529 prs
- Royal spoonbill–129 prs
- Little pied cormorant– 199 prs
- Little black cormorant – 175 prs
- Great cormorant – 3 prs
- Eastern great egret– 169 prs
- Australasian darter – 10 prs
  
- Nankeen night heron – 1385 prs
  
- White-necked heron – 4 prs

The 2016/17 intervention monitoring identified XX species of waterbird utilising the wetland monitoring sites within Millewa Forest (Appendix 1). This included the Australasian bittern *Botaurus poiciloptilus* which is listed as threatened under the NSW threatened species legislation. The Australasian bittern is also listed as endangered under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) 1999. 73 male Australasian bitterns were identified calling at nine wetlands across both Barmah and Millewa during the 2016-17 flood event (Belcher *et al.* 2017). The intervention monitoring surveys identified two Australasian bitterns, calling in Reed Beds north and one Australian little bittern in Reed Beds south.

## 4. DISCUSSION

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In the 2016/17, widespread inundation occurred across floodplains in the southern basin. This contributed to large waterbird breeding events in many catchments. A small amount of environmental water was used to ensure that the waterbirds could successfully fledge their young. Use of environmental water for other colonial waterbird nesting events has occurred in 2000-01 (5,008 pairs NSW only, 335GL), 2005-06 (5,421 pairs, 513GL), 2010-11 (7,420 pairs, 428GL) (Webster 2012), 2015-16 (1,098 pairs, 375GL) (OEH, 2016).

- Nankeen Night herons bred at picnic point, alongside eastern great egrets. This is the first time they have nested in Millewa since 2010/11, suggesting that they require large-scale flooding for breeding success. The large colony nested on both banks of the Murray in tall river red gums with a dry understorey. As the Murray provides higher flows every breeding season, it appears they require the boost in productivity and additional floodplain inundation to encourage nesting.
- Cormorants nested across several wetlands in mature red gums and saplings, in St Helena, Black Swamp, White Swamp, Coppingers Swamp, along the Gulpa cutting and a small amount in Duck Lagoon. Cormorants were fledging through to the end of February, taking advantage of the high flows throughout the season. St Helena nesting appeared to move as water levels increased, with the cormorants settling high in river red gums.
- Straw-necked ibis appeared to have nested twice, one at the start of the season mixed in with the white ibis at sites in Reed Beds North. This was deemed to have not been greatly successful by CSIRO who were monitoring the nests. It is unclear why. They re-nested in Reed Beds South with eggs still present in February. Flows were held up in the Gulpa Creek until the end of February to ensure a successful fledgling and a slow recession was implemented throughout March.
- Historical rookery sites around Moira Lake and Porter's Plain were not found to have been utilised in 2016-17.
- Australasian Bitterns were surveyed separately and were found to be present in three of the six wetlands colonial waterbirds nested in. These were Coppingers Swamp, Reed Beds North and Reed Beds South. Strong calling was recorded throughout November – December, suggesting that nesting was being established over that period. As water levels were held up throughout January, it is assumed that breeding was given the opportunity to be successful, however this was not able to be confirmed in any capacity.
- Waterbirds responded to the flows throughout the event. Early breeding commenced/bitterns began calling in September with initial winter/early spring inundation, however the 178,000ML/day peak in mid-October meant that many of the waterbirds had to re-position their nests and begin later in the season. Straw-necked ibis, little pied cormorants and Australasian darters all took advantage of the high flows and opportunistic breeding occurred across the season, with species fledging from early January through to Mid-February.

## Conclusions

This event was recorded to be smaller than all previous waterbird breeding events that have occurred on the back of large flood peaks. The duration of overbank flows was less than previous flood years (2010-11) and this may have impacted the scale of the event. Other factors might be that we share colonial waterbirds in the basin, and the large numbers breeding elsewhere impacted on the size of the events in Barmah-Millewa. The importance of the wider basin and the interconnectivity across river catchments.

Waterbird Ecological Outcome	Objective Met?	How?
Promote and/or sustain <b>successful breeding</b> events for <b>thousands</b> of colonial and migratory waterbirds in at least <b>3 years in 10</b> by inundating selected floodplain and wetland areas to provide suitable nesting and feeding habitat.	Met	2016/17 was the sixth year out of ten that a successful breeding event occurred in Millewa.

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