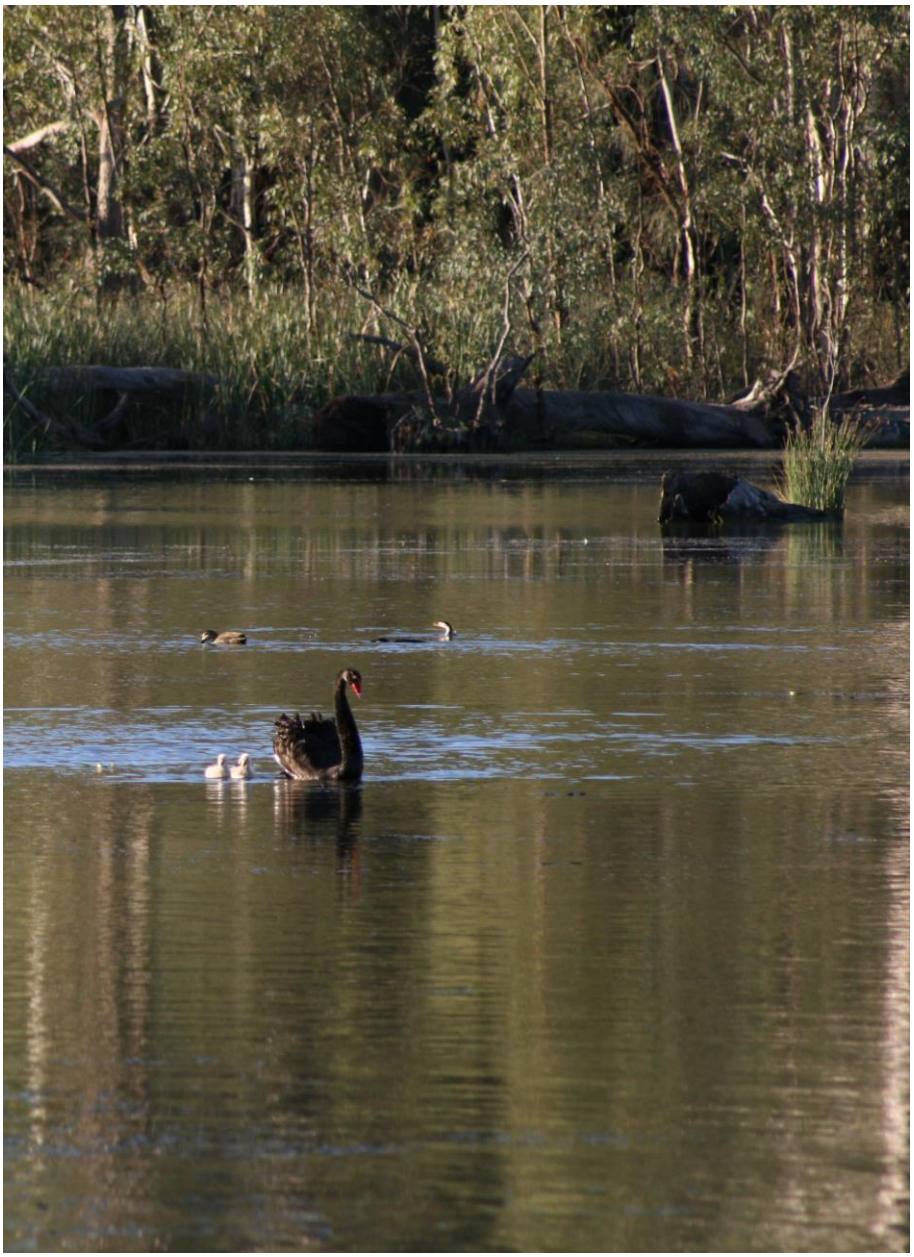
Waterbird abundance and diversity at the Mallee Icon Sites



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Executive summary

The wetlands on the Lindsay-Mulcra-Wallpolla icon site were dry except for Lake Wallawalla. Given that the other wetlands were dry, waterbirds were only recorded on Lake Wallawalla. However, this did not mean that the abundance or diversity was reduced. More birds were counted on the lake this year than on any of the previous counts at the icon site. This may have to do with this wetland being the last remaining wetland on the icon site.

The species richness was slightly lower than in 2013/2014, but this is likely attributable to the lack of piscivores on the wetland, possibly due to the lack of food in the lake.

The Hattah lakes Icon site showed that both species richness and abundance was high. Although abundance seem to showing an upward trend since the first use of the water delivery infrastructure at Hattah, diversity has remained relative constant.

At both icon sites, the waterbird populations appear to be robust. Waterbird populations fluctuate with water availability across the landscape and the patterns in abundance reflect the water availability at the icon sites.

Introduction

The Living Murray program is a large-scale project aimed at restoring and protecting floodplains of the River Murray through the restoring more natural flood events to the floodplains. Under the broad objectives, the project aims to show improvement in the condition of floodplain woodlands (Red Gum and Black Box), native fish populations including Murray Cod and waterbird populations

The two icon site contain recognised wetlands, with the Lindsay-Mulcra-Wallpolla Islands (LMW) containing Wetlands of National Importance and 12 of the Hattah Lakes listed as Ramsar wetlands. Although not specifically listed for waterbirds, waterbirds form an important part of the ecosystem at these sites.

Since 2012, selected wetlands at the icon sites have been monitored as part of the condition monitoring program. At the LMW site six wetlands are have been monitored during this period, and eight at the Hattah Lakes site.

Methods

Surveys were conducted in June at six wetlands at the LMW icon site and eight wetlands at the Hattah Lakes Icon site. Surveys were conducted using a fixed point area search of a wetland. Surveys were conducted for 20 minutes at each point. One the larger wetlands, two fix point searches were made. Species were identified and abundance estimates of each species were recorded at each wetland.

Results and Discussion

Lindsay-Mulcra-Wallpolla (LMW) Icon Site

Only one wetland, Lake Wallawalla, contained water during the monitoring period. As a result waterbirds were not present in any of the dry wetlands. The most abundant guild was the duck and grebe guild with about 4,500 individuals counted on Lake Wallawalla. Further analysis of this guild reveals that grey teal were most abundant, with 3140 individuals counted. Notable by their absence was the pacific black duck, a species usually common through this region.

In addition to the absence of pacific black duck, no piscivores were counted. In previous years pelican were relatively common and in years when water was deeper, darter were also common. With about a metre of water in the lake at the time of sampling this may indicate a lack of depth required to support cormorant colonies. On the other hand, the lack of pelicans could suggest a lack of fish in the lake rather than shallow water.

Migratory shorebirds were not present, but red-capped plover and masked lapwing were relatively abundant. These species are resident populations that are frequently recorded at Lake Wallawalla. A single Caspian tern and whiskered tern were observed and may form part of a very small resident community in the icon site. The paucity of migratory shorebirds is not surprising given the sampling was in winter when the migratory species would be in the northern hemisphere. However, past condition monitoring has shown that migratory shorebirds are not very common at Lake Wallawalla.

Table 1 The species richness and abundance of waterbirds observed in June 2016 at the Lindsay-Mulcra-Wallpolla Icon Site

		Wallawalla1	Wallawalla2	Websters Lagoon	Stockyards	Mulcra horseshoe west	Mulcra horseshoe east	Lilyponds	Wallpolla horseshoe west	Wallpolla horseshoe east	Total per species
Ducks and grebes	Australian Shelduck	2	2	0	0	0	0	0	0	0	**4**
	Australian Wood Duck	0	240	0	0	0	0	0	0	0	**240**
	Pink-eared Duck	1040	70	0	0	0	0	0	0	0	**1110**
	Australasian Shoveler	130	30	0	0	0	0	0	0	0	**160**
	Grey Teal	2515	625	0	0	0	0	0	0	0	**3140**
Large wading bird	White-faced Heron	0	2	0	0	0	0	0	0	0	**2**
	Yellow-billed Spoonbill	5	0	0	0	0	0	0	0	0	**5**
Herbivores	Black Swan	1	0	0	0	0	0	0	0	0	**1**
Shorebird	Red-capped Plover	57	2	0	0	0	0	0	0	0	**59**
	Masked Lapwing	12	10	0	0	0	0	0	0	0	**22**
	Caspian Tern	1	0	0	0	0	0	0	0	0	**1**
	Whiskered Tern	1	0	0	0	0	0	0	0	0	**1**
	Total per lake	**3764**	**981**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4745**

Data collection since 2012 suggests that there is no trend in either the abundance or diversity of waterbirds at the LMW Icon site (Figure 1). Apart from Lake Wallawalla that can hold water for up to 18 months, most of the wetlands at the icon site dry within 6 months after filling. This means that the timing of sampling wetlands may have a string influence on abundance of waterbirds recorded.

This year's abundance was highly skewed by a very high count of Grey Teal on Lake Wallawalla. This high abundance of ducks may be the result of Lake Wallawalla concentrating water into a single wetland. Whereas in previous years water was also pumped into other wetlands, this year Lake Wallawalla was the only wetland with water in the icon site.

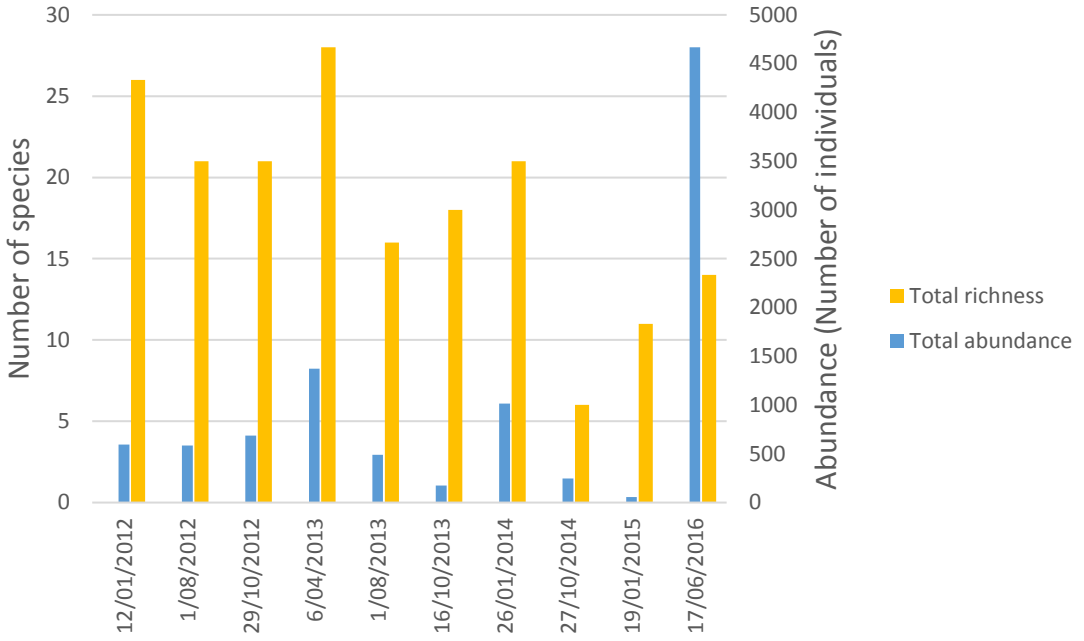

Figure 1. The Species richness and abundance of waterbirds across the Lindsay-Mulcra-Wallpolla Icon site from 2012 to 2016.

Hattah Lakes Icon Site

At the Hattah lakes icon site the lakes were in drawdown following the environmental water delivery in 2015. All the lakes except Lake Little Hattah contained water. The water depth varied through the lakes depending on the individual wetland.

As is the case with Hattah in the past, the largest populations of birds belonged to the Duck and Grebes guild. The two most common species were grey teal using the northern lakes (Bitterang and Woterap) and hoary-headed grebe using the southern lakes (Hattah, Bulla and Kramen). Pink-eared duck were relatively abundant on Lake Bitterang (Table 2).

The piscivores guild was reduced in number from previous years with pelicans the most abundant bird from this guild. The reduced number of cormorant may be linked to the much shallower water present in the lakes at the time of sampling. Further, the smaller cormorant colonies may be the result of dispersal following fledging of their young.

There appears to be an increase in the number of large waders with yellow-billed spoonbill the most common (60) followed by white-faced heron and great egret (Table 2). The receding lakes may be providing better wader habitat, with shallower water in the lakes providing easier access to feeding habitat. In addition to the physical improved habitat, the environmental water delivery may have improved the abundance of food including invertebrates, frogs and fish.

Shorebird populations showed the resident species were present around the lakes, with the absence of migratory shorebirds. This may not be surprising as the migrants would be in the northern hemisphere this time of the year. However, the condition monitoring to date has not found large numbers of migratory shorebirds using the Hattah Lakes system.

Table 2. The abundance of birds at the Hattah Lakes Icon Site in June 2016

		Bitterang1	**Bitterang2**	**Woterap**	**Mournpall**	**Yerang**	**Little Hattah**	**Hattah**	**Bulla**	**Kramen**	**Total per species**
Ducks and grebes	Musk Duck	0	0	0	2	0	0	2	0	0	**4**
	Australian Shelduck	0	0	0	0	8	0	0	0	0	**8**
	Australian Wood Duck	0	2	0	0	6	0	0	12	4	**24**
	Pink-eared Duck	45	647	0	20	1	0	0	0	0	**713**
	Australasian Shoveler	6	10	0	12	0	0	0	0	0	**28**
	Grey Teal	300	500	256	10	310	0	4	40	43	**1463**
	Chestnut Teal	0	0	0	0	1	0	0	0	0	**1**
	Pacific Black Duck	0	0	0	1	0	0	0	0	0	**1**
	Hardhead	0	11	0	0	4	0	0	0	0	**15**
	Hoary-headed Grebe	14	40	0	60	40	0	580	100	658	**1492**
	Great Crested Grebe	0	0	0	3	0	0	0	0	0	**3**
Piscivores	Australasian Darter	0	0	0	2	0	0	20	2	1	**25**
	Little Pied Cormorant	0	0	0	0	0	0	11	1	1	**13**
	Great Cormorant	0	0	0	0	0	0	0	40	2	**42**
	Pied Cormorant	0	0	0	0	0	0	1	5	0	**6**
	Australian Pelican	0	28	3	0	16	0	70	70	14	**201**
Large wading bird	White-necked Heron	0	0	0	0	0	0	0	0	3	**3**
	Eastern Great Egret	0	0	0	0	0	0	5	1	5	**11**
	White-faced Heron	0	0	1	0	3	0	0	1	13	**18**
	Little Egret	0	0	0	0	0	0	1	0	0	**1**
	Yellow-billed Spoonbill	0	0	13	0	0	0	9	0	38	**60**
Herbivores	Eurasian Coot	0	20	0	1	0	0	1	20	0	**42**
	Black Swan	0	24	0	0	0	0	0	2	0	**26**
Shorebird	Black-winged Stilt	4	0	0	0	0	0	0	0	0	**4**

	Black-fronted Dotterel	0	27	0	0	0	0	0	0	0	**27**
	Masked Lapwing	4	0	2	0	2	0	2	0	1	**11**
	Caspian Tern	0	0	0	0	0	0	1	0	0	**1**
	Total per lake	**373**	**1309**	**275**	**111**	**391**	**0**	**707**	**294**	**783**	**4243**

Comparing the abundance and species richness over time (Figure2) for the Hattah Lakes Icon Site shows variation in both abundance and species richness. From 2005, water was pumped into the Hattah Lakes system at various times as an emergency measure in response to the ongoing drought conditions. This was followed by natural flooding into some of the lakes in 2010/11. From the floods in 2010/11 to the first pumping event in 2013, the lake system was drying. Partly this was to do with the need to maintain dry conditions for the completion of construction of the infrastructure.

By October 2013 all the lakes except for Lake Mournpall were dry. It is not surprising that the richness and abundance is low at this time. However, since then, the response to watering seems to indicate that species richness has been maintained consistently above 15 species since January 2014. Abundance has been more variable and seems to have a partial lag, but consistently increasing over time. There does seem to be an occasional count when abundance increases very suddenly. This appears to be related to particularly large flocks of a single species appearing in the sampled lake. In the Hattah Lakes, this is very often Grey Teal.

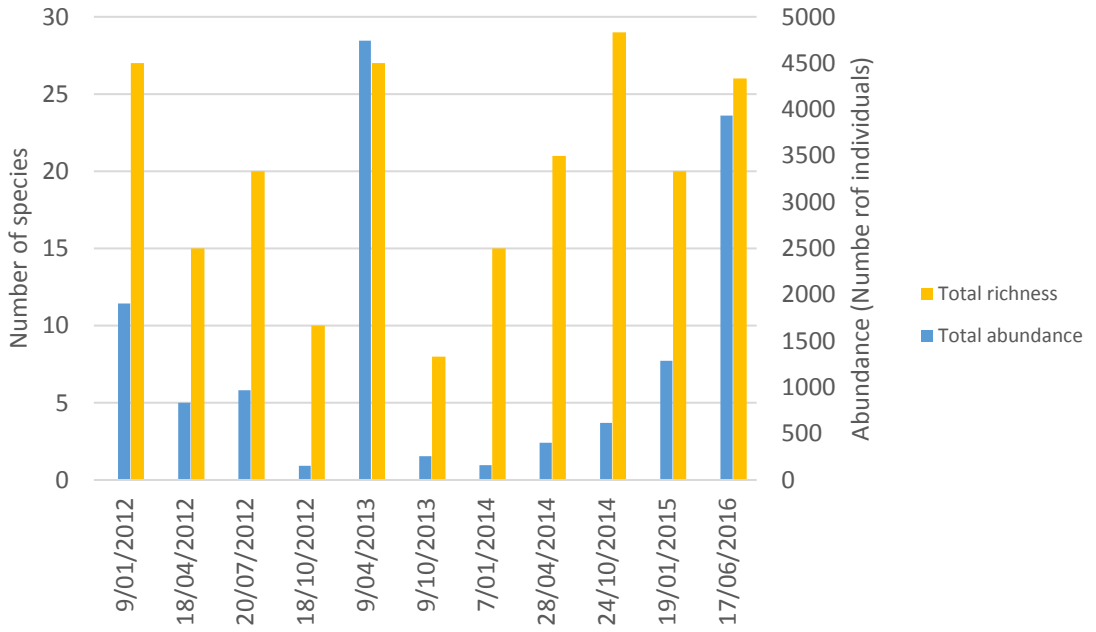

Figure 2. The species richness and abundance (total number) of waterbirds from the 8 sampled lakes in the Hattah Lakes Icon site.

Conclusion

From the data collected this year, both icon sites have supported a large number of waterbirds as well as a fairly diverse group of waterbird species. At the icon site level, the changes in abundance and richness are what can be expected given the changing habitat availability. In addition, only a

subset of the lakes are sampled, and this could also contribute to the variability in abundance and species richness. Regardless of the limitations it can be said that the condition of waterbird populations has been maintained and improved.