

MONITORING POPULATIONS OF WATERBIRDS IN NEW ENGLAND, NEW SOUTH WALES: HOW IMPORTANT ARE SMALL WETLANDS?

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A cumulative total of 47 waterbird species was observed at five small wetlands around Armidale, northern New South Wales in 1985–86. Numbers of waterbirds peaked in March each year, with a maximum count of 3 074 in 1986, suggesting that these wetlands are important refuges at the end of summer. Monthly and bi-monthly surveys indicated similar fluctuations in population sizes. However, bi-monthly surveys decreased the detectability of vagrant species.

INTRODUCTION

Briggs (1977) and White (1987) identified four large lagoons (30–800 ha in area) on the Northern Tablelands of New South Wales as important drought refuges for some species of waterbirds. Often, smaller wetlands are not surveyed regularly because it is usually believed they do not support large numbers of waterbirds. We summarize here the results of regular waterbird surveys conducted in 1985 and 1986 at wetlands ranging from 8–48 ha in area in New England. Collectively these wetlands support a broad diversity of species and, at times, large species' populations. In addition, we discuss the frequency with which small wetlands could be surveyed in future.

METHODS

Lake Zot (maximum area about 8 ha), Dumaresq Dam (12 ha), Saumarez Ponds (30 ha) and Dangars Lagoon (48 ha), within a 30 km radius of Armidale (30°31'S., 151°39'E.), were surveyed in the first and third week of every month from February 1985 to November 1986, inclusive. The Armidale Sewage Ponds (total area about 20 ha) were surveyed at the same frequency

in August to November 1986. Each wetland was also surveyed for seven consecutive days in June 1985 and August 1986, and for 30 consecutive weeks between March and October 1986 to determine the appropriate frequencies of observation required to measure large-scale fluctuations in numbers of waterbirds.

All wetlands were surveyed between 0700 and 1500 h on the same day. The birds were observed with 8×30 mm field glasses from a position on a bank that allowed a view of much of the wetland. The observer then moved to other parts of the bank to survey areas of wetland which may have initially been hidden from view. Lengths of observation periods ranged from 10 to 45 minutes. Numbers of each waterbird species were noted in every observation period.

RESULTS AND DISCUSSION

Forty-seven species of waterbirds were observed in the study area (Table 1). Thirty-eight species were observed on Dangars Lagoon, 36 on Saumarez Ponds, 35 on Lake Zot, 32 on Armidale Sewage Ponds and 18 on Dumaresq Dam. Dangars Lagoon and Armidale Sewage Ponds had the most species in any three-month period (31

TABLE 1

Waterbird species seen in each wetland, 1985–86. ASP=Armidale Sewage Ponds.

	L. Zot	Saumarez Ponds	Dumaresq Dam	Dangars Lagoon	ASP
	1/85-3/85 4/85-6/85 7/85-9/85 10/85-12/85	1/85-3/85 4/85-6/85 7/85-9/85 10/85-12/85	1/85-3/85 4/85-6/85 7/85-9/85 10/85-12/85	1/85-3/85 4/85-6/85 7/85-9/85 10/85-12/85	1/85-3/85 4/85-6/85 7/85-9/85 10/85-12/85
Great Crested Grebe, <i>Podiceps cristatus</i>					* *
Hairy-headed Grebe, <i>Polyocephalus polyocephalus</i>	* * * * *	* * * * *		* * * * *	* * *
Australasian Grebe, <i>Tachybaptus novaehollandiae</i>	* * * * *	* * * * *		* * * * *	* *
Australian Pelican, <i>Pelicanus conspicillatus</i>				* * * * *	* * *
Darter, <i>Anhinga melanogaster</i>					
Great Cormorant, <i>Phalacrocorax carbo</i>	* * * * *			* * * * *	*
Little Black Cormorant, <i>P. sulcirostris</i>	* * * * *	*			* * *
Little Pied Cormorant, <i>P. melanoleucos</i>	* * * * *	* * * * *		* * * * *	* * *
Pacific Heron, <i>Ardea pacifica</i>					*
White-faced Heron, <i>A. novaehollandiae</i>	* * * * *	* * *		* * * * *	* * *
Cattle Egret, <i>Ardeola ibis</i>					*
Great Egret, <i>Egretta alba</i>		* * *			*
Little Egret, <i>E. gazetta</i>		* *			*
Sacred Ibis, <i>Threskiornis aethiopicus</i>	*	* * *		* * * *	* * *
Straw-necked Ibis, <i>T. spinicollis</i>		* * *		* * *	* *
Royal Spoonbill, <i>Patalea regia</i>	*	*			
Yellow-billed Spoonbill, <i>P. flavipes</i>	* * * * *	* * *			* * *
Plumed Whistling Duck, <i>Dendrocygna eytoni</i>					*
Black Swan, <i>Cygnus atratus</i>	* * * * *	* * * * *		* * * * *	* * *
Freckled Duck, <i>Sittonetta naevosa</i>					*
Australasian Shelduck, <i>Tadorna tadornoides</i>					*
Pacific Black Duck, <i>Anas superciliosa</i>	* * * * *	* * * * *		* * * * *	* * *
Grey Teal, <i>A. gibberifrons</i>	* * * * *	* * * * *		* * * * *	* * *
Chestnut Teal, <i>A. castanea</i>	* * *				* * *
Australasian Shoveller, <i>A. rhynchotis</i>	*	* * * * *		* * * * *	* * *
Pink-eared Duck, <i>Malacorhynchus membranaceus</i>	*				* * *
Hardhead, <i>Aythya australis</i>		* * * * *		* * * * *	* * *
Maned Duck, <i>Chenonetta jubata</i>		* * * * *		* * * * *	* * *
Blue-billed Duck, <i>Oxyura australis</i>				* * * * *	* *

Table 1 continued.

	L. Zot						Saumarez Ponds						Dumaresq Dam						Dangars Lagoon						ASP									
	1/85-3/85	4/85-6/85	7/85-9/85	10/85-12/85	1/86-3/86	4/86-6/86	7/86-9/86	10/86-12/86	1/85-3/85	4/85-6/85	7/85-9/85	10/85-12/85	1/86-3/86	4/86-6/86	7/86-9/86	10/86-12/86	1/85-3/85	4/85-6/85	7/85-9/85	10/85-12/85	1/86-3/86	4/86-6/86	7/86-9/86	10/86-12/86	7/86-9/86	10/86-12/86								
Musk Duck, <i>Biziura lobata</i>															*									*	*									
Dusky Moorhen, <i>Gallinula tenebrosa</i>		*	*	*	*	*	*							*	*							*	*	*	*	*	*							
Purple Swamphen, <i>Porphyrio porphyrio</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*								
Eurasian Coot, <i>Fulica atra</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
Masked Lapwing, <i>Vanellus miles</i>		*			*	*		*	*	*	*	*	*			*	*					*	*	*	*									
Red-kneed Dotterel, <i>Erythrogonyx cinctus</i>	*			*	*	*		*	*	*	*	*	*					*				*	*	*	*									
Black-fronted Plover, <i>Charadrius melanotos</i>	*	*		*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*									
Black-winged Stilt, <i>Himantopus himantopus</i>	*	*	*	*				*	*	*	*	*	*					*	*	*	*	*	*	*	*									
Red-necked Avocet, <i>Recurvirostra novaehollandiae</i>																		*	*			*	*											
Ruddy Turnstone, <i>Arenaria interpres</i>	*		*																						*									
Common Sandpiper, <i>Tringa hypoleucos</i>								*			*																							
Greenshank, <i>T. nebularia</i>	*		*					*		*	*										*													
Marsh Sandpiper, <i>T. stagnatilis</i>								*		*												*		*	*									
Sharp-tailed Sandpiper, <i>Calidris acuminata</i>								*				*	*								*		*	*	*									
Latham's Snipe, <i>Gallinago hardwickii</i>																					*		*	*	*									
Red-necked Stint, <i>Calidris ruficollis</i>	*		*					*		*																								
Silver Gull, <i>Larus novaehollandiae</i>	*								*	*	*	*	*					*	*		*	*	*	*	*									
Whiskered Tern, <i>Chlidonias hybridus</i>												*	*	*											*									
<i>Total number of species</i>	27	16	15	14	22	19	20	8	24	19	20	18	20	24	21	23	10	12	12	8	9	7	12	13	25	29	21	18	23	27	31	21	31	30

TABLE 2

Maximum population sizes of species commonly observed on L. Zot, Dumaresq Dam, Dangars Lagoon and Saumarez Ponds, and the timing of such occurrences, in 1985-86.

Species	No. wetlands in which recorded	Largest conc. at one wetland		Largest monthly aggregate		Month of largest aggregate
		No.	% wetland population	No.	% total counts	
Hoary-headed Grebe	4	390	21.5	730	23.7	March 1986
Australasian Grebe	4	66	25.4	159	5.2	March 1986
Black Swan	3	23	4.6	38	2.6	July 1986
Pacific Black Duck	4	790	46.4	1 082	40.6	June 1986
Grey Teal	4	700	49.4	1 354	49.6	June 1985
Australasian Shoveller	4	97	6.5	147	4.8	March 1986
Purple Swamphen	4	165	21.2	192	12.6	August 1986
Eurasian Coot	4	640	55.4	1 116	57.6	October 1986
Masked Lapwing	4	91	7.1	121	4.4	June 1985
Black-fronted Plover	4	48	3.2	72	2.3	March 1986
Black-winged Stilt	3	72	9.4	123	6.1	January 1986

species in July–September 1986). The number of species observed in the study area at any one time ranged from 33 to 37, except in July to September 1985 (26 species) and October to December 1985 (28 species).

Certain species were found only in micro-habitats which are confined to one or two wetlands. For instance, shallow marshes or flooded paddocks are the preferred habitats of Whiskered Terns (Bourke 1956; Crawford 1977) and Plumed Whistling Ducks (Frith 1982), which were only provided by Saumarez Ponds. Latham's Snipe was found only on the muddy edges of the sewage ponds and in the surrounding wet grass of lagoons, which Naarding (1983) listed as suitable habitat for this species. The shallow edge-waters and sandy or muddy banks of Lake Zot, Dangars Lagoon and Saumarez Ponds provided feeding grounds for waders, herons, egrets, ibis and spoonbills, unless the water was very high. The relatively deep waters in the centre of Dangars Lagoon accommodated 91 per cent (108) of all Musk Ducks counted. Dead trees with branches overhanging Dumaresq Dam, Lake Zot and Dangars Lagoon provided suitable perching spots for cormorants, whereas few cormorants were seen at the less-vegetated Saumarez Ponds. Therefore, in surveying small wetlands, it is necessary to select a wide range of habitats to increase the probability of encountering all waterbird species and the largest populations of each species in the region.

Numbers of waterbirds peaked in autumn (March–May) each year, whereas spring (September–November) was the time when fewest birds were recorded (Fig. 2). Saumarez Ponds had the largest numbers of birds, ranging from 308 in September 1985 to 1 674 in August 1986, whereas the smallest numbers were found on Dumaresq Dam (21 birds in October 1985 to 218 in March 1985). The total number of waterbirds in the wetlands (excluding the Armidale Sewage Ponds) ranged from 880 in October 1985 to 3 076 in March 1985 and March 1986. During the period in which the Armidale Sewage Ponds were surveyed, waterbird populations in this location accounted for 26.6 per cent (702 birds in October 1986) to 33.5 per cent (1 073 birds in September 1986) of all the birds counted. Although the waterbird populations in each wetland were small relative to those in much larger wetlands in other parts of Australia (for example, Jaensch 1984), the combined population sizes

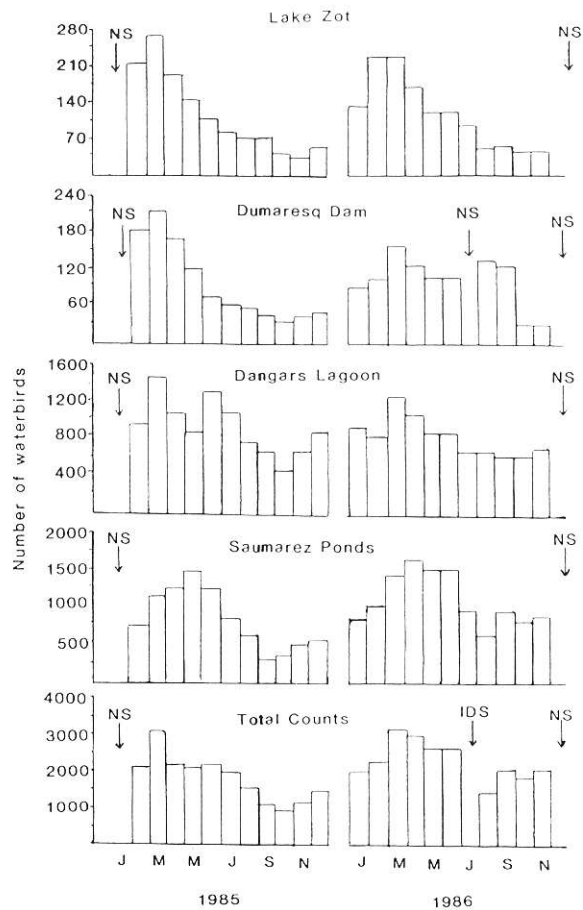


Figure 1. Monthly maximum counts of waterbirds in each wetland, 1985–86. NS=not surveyed; IDS=incomplete data set.

were large. Therefore, if a national programme for monitoring populations and movements of Australian birds is to be instituted (see Smith 1987), there may be a need to count waterbirds in regions where there are no large wetlands but in which there are numerous small bodies of water.

The most abundant species recorded were the Grey Teal, Eurasian Coot and Pacific Black Duck (Table 2). Large monthly totals for a species were usually the result of a concentration on one wetland. This was also found by White (1987) on the larger lagoons.

Hoary-headed and Australasian Grebes form large flocks on small bodies of water at the conclusion of breeding (Serventy and Whittell 1976), which may explain why the numbers of grebes observed in our study area peaked in March. Blakers *et al.* (1984) suggested that big flocks of Eurasian Coots consist of moulting birds. Therefore, those flocks observed in the present study may have been congregations of coots in post-nuptial moult. Numbers of waterfowl peaked in June (Table 2), followed by a marked decrease in July and August. This was particularly evident for the Pacific Black Duck (Fig. 2), and supports Frith's (1982) observation of this species forming large flocks before dispersing with the onset of winter rains to breed.

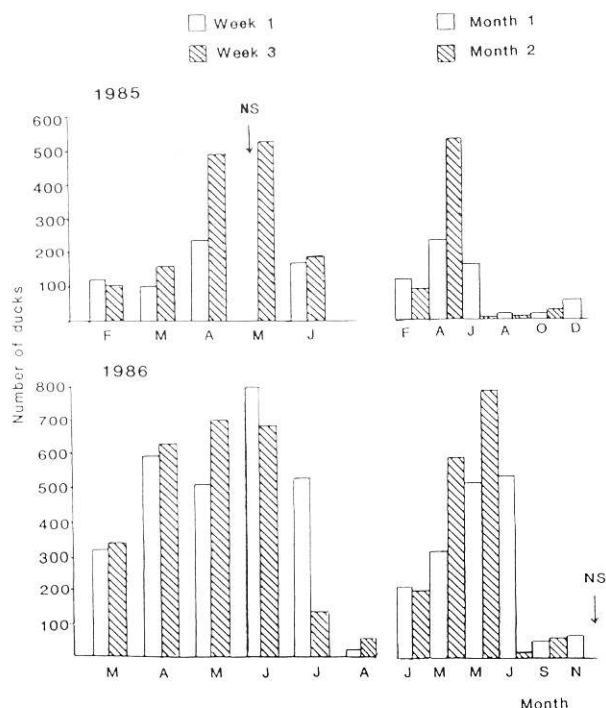


Figure 2. Results of fortnightly and monthly surveys of Pacific Black Duck populations on Saumarez Ponds, 1985-86. Monthly counts represent censuses conducted in the first week of each month. NS=not surveyed.

Only small numbers of migratory waders were observed in the wetlands. Of these, the Common Sandpiper and Red-necked Stint were the most numerous; 63 Sandpipers and 16 Stints were seen at Saumarez Ponds in February 1985. All other sightings were of single individuals or groups of up to six birds. These waders are probably on their way to the north coast of Australia, where Minton and Lane (1984) maintained that they build up body fat reserves before departing for their breeding grounds in the Northern Hemisphere in March-April each year. Lane (1987) showed that Sharp-tailed Sandpipers occur in inland sites in spring rather than autumn. We have seen this species in New England in both seasons (Table 1).

In general, when there were high concentrations of waterbirds on a wetland, there were relatively large daily fluctuations in numbers, whereas at low concentrations the daily fluctuations were small. For instance, in a survey of Pacific Black Ducks on Saumarez Ponds over a seven-day period in June 1985, the population size ranged from 105 on Day 2 to 420 on Day 3 ($\bar{X}=252$, $SD=101$). In contrast, the population size ranged from 35 on Day 1 to 52 on Day 2 ($\bar{X}=47$, $SD=6$) in a seven-day period conducted in August 1986.

Although fortnightly surveys sometimes produced different counts in a given month, each series of surveys indicated similar longer-term patterns of change in population sizes (for example Pacific Black Duck, Fig. 2). Monthly and bi-monthly surveys also indicated similar population trends. However, the following species, detected in monthly surveys, could have been missed had the surveys been conducted only once every two months: Pink-eared Duck, Plumed Whistling Duck, Common Sandpiper, Greenshank, Marsh Sandpiper and Red-necked Stint (on Saumarez Ponds), Straw-necked Ibis (140 on water, 1 200 flew overhead in September 1986), Freckled Duck (five in July 1986), Greenshank and Sharp-tailed Sandpiper (on Dangars Lagoon), Cattle Egret and Hardhead (on Lake Zot), and Great Cormorant and Ruddy Turnstone (on Armidale Sewage Ponds). Therefore, we recommend that small (less than 50 ha) wetlands should be surveyed at least once per month.

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A DISPLAY OF THE SPANGLED DRONGO *Dicrurus hottentottus*

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Behaviour of lesser known Australian birds is often better documented than that of more common species. In Brisbane, Queensland, the Spangled Drongo *Dicrurus hottentottus* is considered a local resident and also a common species. Its movements are generally regarded as well known. Reader's Digest (1986) indicate that the species is "nomadic and part-migratory in the east", saying that the birds display close to the nest, and described a pre-copulatory display performed by both sexes near the nest.

In September 1988 a pair, accompanied occasionally by a third bird, constructed a standard suspended nest in an Ironbark *Eucalyptus* cf. *paniculata* at Toowong, a western suburb of Brisbane. The nest site was at the end of a branch some 15 m above ground level. The birds had previously nested in the immediate vicinity for at least two years. Actual nest construction was not observed, but a nest watched by one of us (NWL) while under construction at Mount Nebo was being built by two adults. We did not

ascertain whether eggs were laid in the Toowong nest although one adult was seen sitting on the nest on a few occasions. We also noted the close attendance of some nest predators, the Pied Butcherbird *Cracticus nigrogularis* and Pied Currawong *Strepera graculina*.

We maintained observations over the ensuing two months when it could be anticipated that, if breeding had been successful, young birds would be visible either being fed by their parents or near the nest. On no occasion during the period were young observed. This apparently unsuccessful nesting attempt was due in all probability to human interference. Immediately prior to nest construction, limbs and leaves were lopped cutting a swathe through the local trees, presumably to enhance the view of a number of adjoining apartment units. This opened the nest site to potential predation.

On 28 October 1988, at 1745 hrs, a single bird was heard giving a distinctive song, consisting of five or six single notes uttered in series. After a