

Birdlife at Belmont Lagoon: past and present

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Belmont Lagoon is a coastal wetland adjacent to Lake Macquarie near Belmont NSW. Little is documented about the birdlife it supports. This paper describes a recent study which identified 113 bird species in a 14-month period. It summarises these data and compares them with an earlier report listing 66 species at the same lagoon. Differences between these bird lists, together with recent observations of habitat flora and hydrological evidence, suggest ecological changes to the Lagoon may have influenced migration of some wetland species to other local sites. Comparative data from coastal wetlands in the Hunter Region may assist our understanding of how the Lagoon conserves avifauna in this area.

INTRODUCTION

Belmont Lagoon (33°02'39"S, 151°39'48"E) is located between the Pacific Ocean and Lake Macquarie in the community of Belmont, NSW (see **Figure 1**). It has a rich indigenous cultural heritage for the *Awabakal* people, and its surrounding landscape also has an interesting war-time legacy. Nearby coastal scrubland, and Cold Tea Creek adjacent to the lagoon, were modified c.1942 as part of the region's defence against possible Japanese invasion. The Department of Defence dredged Cold Tea Creek to provide an anti-tank barrier, dividing the lagoon into two parts:

(<http://www.visitlakemac.com.au/belmont/belmont-lagoon-reserve>).

The Lagoon is a major wetland located on aeolian sand with a restricted connection to Lake Macquarie via Cold Tea Creek. Shortland Wetlands Centre (1989) described it as *estuarine/palustrine* with several local saline/brackish wetlands contributing to it after heavy rainfall. The landscape is dominated by Swamp She-oak *Casuarina glauca*, Broad-leaf Paperbark *Melaleuca quinquenervia* and Coast Banksia *Banksia integrifolia* plus wet heath species Crimson Bottlebrush *Callistemon citrinus*, and Swamp Paperbark *Melaleuca ericifolia*. It has quite a large surface area (approx. 40ha) and a shallow depth (10cm-1m). Despite being located between lake and sea the Lagoon is indirectly connected to the Lake via four concrete pipes (3m long x 60cm diam.), allowing water to flow into or

from Cold Tea Creek. The Lagoon's salinity in 1989 was reportedly lower than the Lake, but Brown (2003) has since provided revised data on the hydrology and ecology of the Lagoon – indicating that while the Lagoon may have originally been brackish, it is now saltwater. Increases in the Lagoon's salinity, and warmer temperature in summer support abundant new growth (saltwater plants, fish-fry) providing seasonal nutrition for many wetland species.

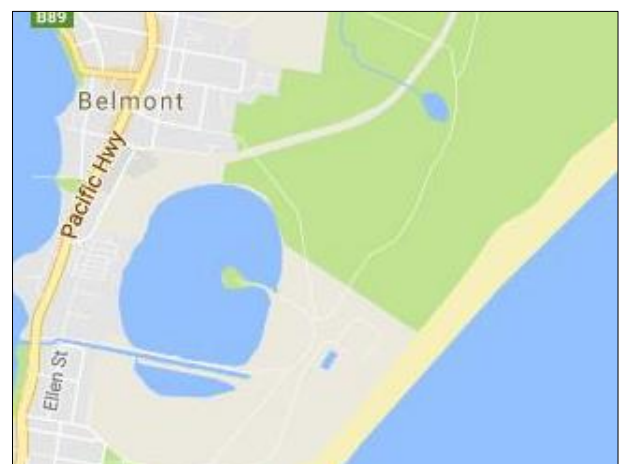


Figure 1: Map of Belmont Lagoon

Figure 1 shows Belmont Lagoon divided in two parts by Cold Tea Creek. Surveys were conducted around the larger northern part of the lagoon. The smaller southern part is subject to tidal flow, and is much shallower and more protected from adverse weather than the northern part. Its mudflats seem to attract several larger wetland bird species but it is difficult for observers to access and its mangrove trees restrict observation. The southern margin is

extensively overgrown with Broad-leaved Cumbungi (*Typha orientalis*).

The Lagoon attracts many wetland and woodland bird species but their identity and use of this habitat is not well documented. This paper draws on several data sources to improve our understanding. The first is a summary of surveys completed at the Lagoon from April 2015 to May 2016. The second is a list of birds reportedly observed here from 1968-73 (Holmes 1973), which includes species not seen here during recent surveys. The aim of this paper is not only to increase awareness of the Lagoon's ecological nature but also to assist conservation by encouraging the observation and reporting of wetland species in this area.

METHODS

Current Study

From 6 April 2015 to 30 May 2016 the author conducted a total of 37 surveys (typically 3/month). Each survey followed the same trail, recording bird species seen on a standard 3-4km walk around the northern part of the Lagoon and its surrounds, beginning

(and ending) at the western end of Cold Tea Creek. Each survey took approximately 90 minutes and was completed between 6:00 and 10:00am. All calling species detected were tape-recorded; birds identified on these recordings were later noted down, and the results were tallied and transferred to an Excel data file for statistical analyses involving maximum and mean counts as well as reporting rates.

Comparison of this survey data with the birds recorded by Holmes (1973) is used to highlight changes in bird diversity over time.

RESULTS

In total 113 species were recorded in the 14-month observation period: 34 wetland species and 79 others. This paper focuses on wetland birds (including three raptors and three passerines) which are listed in **Table 1**, in decreasing order of Reporting Rate (RR). The Reporting Rate is the percentage of surveys a species has been reported relative to the total number of surveys (37) completed. A relatively large number of both wetland species and other species with RR>40 was observed throughout the year, suggesting that many species are resident or visit the Lagoon and its surrounds regularly.

Table 1 – Wetland species recorded at Belmont Lagoon between April 2015 and May 2016

Common Name	Scientific Name	Maximum	Mean	RR (%)
Black Swan	<i>Cygnus atratus</i>	256	59.3	97.3
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	204	28.3	94.6
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	28	6.3	91.9
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	83	16.0	91.9
Chestnut Teal*	<i>Anas castanea</i>	40	14.6	86.5
Great Egret	<i>Ardea alba</i>	16	4.8	83.8
Australian Pelican	<i>Pelecanus conspicillatus</i>	71	16.0	81.1
Grey Teal*	<i>Anas gracilis</i>	32	9.3	67.6
Australian Wood Duck*	<i>Chenonetta jubata</i>	26	5.9	62.2
White-faced Heron	<i>Egretta novaehollandiae</i>	11	2.4	59.5
Masked Lapwing	<i>Vanellus miles</i>	8	3.0	56.8
Pacific Black Duck	<i>Anas superciliosa</i>	7	2.8	54.1
Little Egret	<i>Egretta garzetta</i>	15	4.3	51.4
Intermediate Egret*	<i>Ardea intermedia</i>	13	4.2	37.8
Great Cormorant	<i>Phalacrocorax carbo</i>	4	1.8	32.4
Australian White Ibis*	<i>Threskiornis moluccus</i>	5	2.2	29.7
Crested Tern	<i>Thalasseus bergii</i>	3	1.7	27.0
Striated Heron*	<i>Butorides striata</i>	3	1.3	24.3

Table 1 – Wetland species recorded at Belmont Lagoon between April 2015 and May 2016 cont.

Common Name	Scientific Name	Maximum	Mean	RR (%)
Black-winged Stilt*	<i>Himantopus leucocephalus</i>	15	6.2	24.3
Striated Heron*	<i>Butorides striata</i>	3	1.3	24.3
Black-winged Stilt*	<i>Himantopus leucocephalus</i>	15	6.2	24.3
White-bellied Sea-Eagle*	<i>Haliaeetus leucogaster</i>	2	1.3	16.2
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	2	1.5	10.8
Pied Cormorant*	<i>Phalacrocorax varius</i>	6	2.8	10.8
Caspian Tern	<i>Hydroprogne caspia</i>	3	1.5	10.8
Osprey*	<i>Pandion haliaetus</i>	1	1.0	8.1
Swamp Harrier*	<i>Circus approximans</i>	1	1.0	8.1
Tawny Grassbird	<i>Cinclorhamphus timoriensis</i>	1	1.0	8.1
Straw-necked Ibis*	<i>Threskiornis spinicollis</i>	10	5.5	5.4
Mangrove Gerygone	<i>Gerygone levigaster</i>	1	1.0	5.4
Australasian Darter*	<i>Anhinga novaehollandiae</i>	1	1.0	2.7
Aust. Pied Oystercatcher*	<i>Haematopus longirostris</i>	1	1.0	2.7
Red-necked Avocet*	<i>Recurvirostra novaehollandiae</i>	1	1.0	2.7
Australian Reed-Warbler	<i>Acrocephalus australis</i>	1	1.0	2.7

Note: *Species not recorded by Holmes (1973)

Species recorded and frequency

Twenty species were recorded with RR of 80 or more; seven wetland, and 13 other species. However, this criterion can underestimate species' dependence on the lagoon. Some wetland species (with RR as low as 30) move between Lake and Lagoon due to tidal or other factors, and may not be recorded. In high tide and strong winds, some wetland species (Intermediate Egret *Ardea intermedia*, Australian White Ibis *Threskiornis moluccus*) vacated the Lagoon but were later noticed nearby. Sixty-three species have been recorded with a RR between 10 and 80, including 18 wetland species and 45 other species. Thirty species were occasionally present, with RR<10 (i.e. observed on less than 10% of surveys). Of the

24 other species, 13 were observed once only at Belmont Lagoon. There are nine wetland species in this group. Among these Swamp Harrier *Circus approximans* and Osprey *Pandion haliaetus* were observed perched or hawking over the Lagoon or Cold Tea Creek. Australian Pied Oystercatcher *Haematopus longirostris*, Red-necked Avocet *Recurvirostra novaehollandiae* and Black-winged Stilt *Himantopus leucocephalus* were observed actively feeding in small groups, mid-lagoon in mid-summer.

It is notable that a total of nine raptor species were recorded at Belmont Lagoon during recent surveys, including six listed in **Table 2** that are not here treated as wetland species.

Table 2 – Additional raptor species recorded at Belmont Lagoon.

Common Name	Scientific Name	Maximum	Mean	RR (%)
Grey Goshawk**	<i>Accipiter novaehollandiae</i>	1	1.0	16.2
Brown Goshawk**	<i>Accipiter fasciatus</i>	2	1.2	13.5
Black-shouldered Kite	<i>Elanus axillaris</i>	1	1.0	10.8
Black Kite**	<i>Milvus migrans</i>	1	1.0	2.7
Collared Sparrowhawk**	<i>Accipiter cirrocephalus</i>	1	1.0	2.7
Nankeen Kestrel**	<i>Falco cenchroides</i>	1	1.0	2.7

Note: **Species not recorded by Holmes (1973)

Most other species that were recorded, including the regionally uncommon Brush Bronzewing *Phaps elegans*, were among those recorded in surveys of the Belmont Wetlands (an area partially visible in **Figure 1**, NE of Belmont Lagoon); this will be the subject of a subsequent paper. Non-wetland species that were not recorded at Belmont Wetlands include Blue-faced Honeyeater (RR 10.8), Fork-tailed Swift (5.4), Southern Emu-wren *Stipiturus malachurus* (5.4), White-winged Triller *Lalage tricolor* (2.7), White-browed Woodswallow *Artamus superciliosus* (2.7), and Black-faced Monarch *Monarcha melanopsis* (2.7). A full species list will be available on the HBOC website: <http://www.hboc.org.au/publications/the-whistler/>

Behavioural observations

During the surveys reported numerous memorable observations were made that reflect the ecological diversity of the wetland and its importance as a recreational asset readily accessible to the community. Little Egret, Great Egret, White-faced Heron, Little Black Cormorant, Australian Pelican and Silver Gull feeding collaboratively in shallows near mangroves on the eastern side. Egrets spring in the air, wings outstretched, herding fish-fry towards the water's edge where they are 'picked off' by others present. A pair of Chestnut Teal guide their 10 ducklings towards shelter on a brackish channel beside the lagoon as a Swamp Harrier attempts to capture one. On a calm morning in summer up to 256 Black Swan are grazing on water-weed. Australian Pied Oystercatcher, Black-winged Stilt and Red-necked Avocet search for molluscs or crustaceans at low-tide. Meanwhile a pair of White-bellied Sea-Eagles are perched like sentinels on a power-pole beside Cold Tea Creek in May. Perhaps the rarest of all observations was 30 or more Fork-tailed Swift *Apus pacificus* 'dipping' their wings in the Lagoon early one morning in December, seen from 100 metres away.

Holmes' report (1973)

In 1973, Glenn Holmes, a former member of the *Hunter Natural History Group*, published a report titled *Birds of Belmont Lagoon*. The report lists 66 species observed from 1968-73, and is based on casual observations at the Lagoon, immediately adjacent reeds, marsh and swamp forest.

It is, as Holmes admitted, "by no means a comprehensive account of the species present". For example, he provides only a short list of woodland bird species – presumably because of his stated focus. However, his data may indicate several key differences between the wetland birds using the Lagoon today compared with 42 years ago.

One difference is the current absence of certain species (e.g. Dusky Moorhen *Gallinula tenebrosa*, Purple Swamphen *Porphyrio porphyrio*, Eurasian Coot *Fulica atra*, Buff-banded Rail *Hypotaenidia philippensis* and Black-fronted Dotterel *Elseyaornis melanops*) recorded by Holmes (1973). These species mostly prefer habitats with freshwater weed and molluscs, which is consistent with the suggestion that their foraging habitat (i.e. the Lagoon itself) has become more saline over the years.

A second notable difference is the current absence of migratory shorebirds at the Lagoon. Holmes recorded, for example: Common Greenshank *Tringa nebularia*, Red Knot *Calidris canutus*, Great Knot *Calidris tenuirostris*, Sharp-tailed Sandpiper *Calidris acuminata*, Pectoral Sandpiper *Calidris melanotos*, Curlew Sandpiper *Calidris ferruginea* and Bar-tailed Godwit *Limosa lapponica*. He also noted Marsh Tern (Whiskered Tern) *Chlidonias hybrida* and Little Tern *Sternula albifrons*. Various explanations are possible. One is that some of these species may still visit the Lagoon in season, but these have not been recorded (by GF) to date. Perhaps these species still visit the south-eastern side of the Lagoon (as mentioned by Holmes). However, much of this area is difficult to observe at present due to mangroves. Another explanation is that significant declines in the populations of migratory shorebirds on the East Asian-Australasian Flyway since the 1970s (Clemens *et al.* 2016) have led to the absence of shorebirds at sites formerly used by relatively few birds.

A third and important difference, indicating the continuing ecological health of Belmont Lagoon, is the total of 15 wetland species currently observed there which were *not* reported by Holmes (see species with asterisk in **Table 1**).

A fourth difference is that, in the surveys then conducted by Holmes, only two species of raptor were recorded visiting the lagoon.

CONCLUSIONS

113 species were observed at Belmont Lagoon within 14 months; 34 were considered wetland species. The Lagoon attracts not only a healthy number of wetland species, but also sizeable flocks (e.g. at least eight species were recorded with over 20 birds on a survey). Some species are known as seasonal migrants (Stuart 2014).

The numbers appear comparable with those observed by Stuart (2015) at another coastal wetland. He identified 123 species, including 27 that are dependent on water, from surveys over a five-year period at Saltwater National Park (SNP) in the Manning Valley. His list includes 68 species in common with the present list for Belmont Lagoon, only 15 of which were wetland species.

Informed opinion and current data support the view that some wetland species recorded 40 years ago might still appear in season at the Lagoon. Three strategies may help achieve this:

- targeted observations in areas of the Lagoon where such species can most be expected;
- greater awareness of the optimal habitat and conditions under which migratory shorebirds and others roost or feed at similar sites;
- a realistic assessment (and effective management) of the habitat that would promote their return to the Lagoon or adjacent marshes.

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