Submission Concerning the Proposed Development of Golf Course at Long Bow Point (DA/1178 & SSD 8406)

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Introduction

I began counting the waterbirds on Lake Wollumboola in1993 and continued doing so on a monthly basis up to May 2015. The records of the 259 counts are archived in the BirdLife Australia database and are also with the NSW National Parks & Wildlife Service. The counts encompassed five openings and closings of the lake entrance. They demonstrated the relationship between water levels and bird species on the water body. They also provided an estimation of the number of birds using the 60% of the lake that I surveyed. The counts did not include birds around Downs Creek or in the bay between Boalla and Arrow Points. The results up to 2003 were analysed in Keating & Pegler (2003). Since 1993 the lake has supported more than 100 wetland bird species including 17 on the NSW threatened species list. Populations of two species - the Black Swan and the Chestnut Teal - exceeded the 1% of the Australian population threshold, ten thousand birds and one thousand respectively. On this basis the lake was accepted as an Important Bird Area (IBA) by BirdLife Australia and BirdLife International. The designation 'IBA' has now been changed to KBA: Key Biodiversity Area.

Previous Submissions

To date I have contributed to three Government enquiries that considered the status of the lake: the Lake Wollumboola Commission of Inquiry (1999); the Independent Inquiry into Coastal Lakes (2002); and the South Coast Independent Review Panel (2006). In 2011 and 2012 I put in two submissions to the Shoalhaven City Council that criticised the proposed development of the golf course on Long Bow Point at Culburra. As a consequence of the council deferring zoning in the lake catchment in the current LEP, I wrote to both the Department of Planning & Infrastructure and the Office of Environment & Heritage about the apparent connection between the behaviour of Black Swans and ground water seepage (Pegler 2013).

Freshwater Inputs into the Lake

It is now incontrovertible that a very large component of the total volume of water in the lake is sourced from ground water. Haines et al (2001) found that the salinity varied from 20 ppt to 42 ppt; Scanes et al (2013) reported a mean value of 24.53 ppt. All of the samples by Baiada et al (2018) taken around the entire edge of the lake had a salinity level between 11-12 ppt. My own samples taken immediately off the lake shore at its southern (n=105) and northern (n=135) edges provided mean readings of 18.3 and 17.5 ppt respectively (Pegler 2013). Frith (1977) was the first to note that in the saline Coorong the Black Swan had

recourse to fresh water soaks on shore. At Lake Wollumboola I commonly observed flocks drinking on shore at either narrow or diffuse freshwater sources. The location of many of these – e.g. W1, W3, near W7 (Figure 1) and near W14 - corresponds with radon detections by Baiada et al. Occasionally the species has been observed 'shovelling' with its beak into sandy substrate above the shoreline, seemingly to access fresher water.

Figure 1: Black Swan drinking at the freshwater soak near W7 at the SW corner of the lake on 15/4/2013. The lake had been closed for 19 months. Note also the moulted down feathers that covered the water surface.

Importance of the Submerged Vegetation

Scanes et al point out that low phosphate concentrations in the ground water of the lake are necessary for the survival of its particular submerged vegetation dominated by Ruppia and Lamprothamnium. An increase in available phosphate would lead to accelerated algae growth, reduced oxygen levels in the water and the destruction of the present vegetation. In this scenario the primary production supporting the lake ecosystem would collapse. Another probable outcome would be an increase in hydrogen sulphide emissions that are now controlled by photosynthesis in the submerged vegetation (Haines et al).

Lake Wollumboola is not the only lake where large numbers of water birds are supported by Ruppia and Lamprothamnium. Kingsford and Porter (1994) found that saline Lake Wyara in SW Queensland had around a ten times higher population of waterbirds than the nearby freshwater Lake Numalla. Black Swan and duck spp. were the most numerous species on Lake Wyara. This is similar to Lake Wollumboola where the most numerous species have been the Black Swan (13,000), Hardhead (7000), Grey (5000) and Chestnut Teal (1600). An example is shown in Figure 2: an enormous flock of Hardhead with some Teal spp. taken on 30/10/2012. Sudden influxes of flocks of various waterfowl often occur on the lake.

Figure 2: The mixed flock of Hardhead and Teal spp. on 30/10/2012

However the productivity benefits supplied by the submerged vegetation at Lake Wollumboola carry on through the opening and closing cycles of its entrance: species richness increases with the lower water levels. For example on 17 February 2014, when the lake had been closed for six months and the water height was 0.02 metres AHD, there were almost 10 000 birds and 27 species present in the count areas. An example is shown below in Figure 3 where six species of a variety of guilds can be seen: Black Swan, Royal Spoonbill, Great Egret, Grey and Chestnut Teal, Silver Gull.

Figure 3: Mixed Guilds of Water Birds present on Lake Wollumboola on 17 February 2014

Discussion

The importance of Lake Wollumboola as a major site for waterfowl has long been recognised, leading to its inclusion in the Australian Directory of Important Wetlands; in the N.S.W. Jervis Bay N.P. and internationally as an Important Bird Area. It is clear that the many and diverse bird species that the lake supports is primarily dependent upon the continuing protection of its existing submerged vegetation of macrophytes and charophytes. I have given below (Table 1.) the maximum reported abundances of Black Swan in eastern coastal Australia from 1999 to 2003 (References primarily from the NSW Annual Bird Reports 2001 - 2003 by A.K. Morris in *Australian Birds*).

Table 1: Maximum Abundances of Black Swan, Eastern Australia, 1999 - 2003

Location	**Maximum Numbers**
Lake Wollumboola	13 000
Corner Inlet, Victoria	10 438
Western Port, Victoria	5402
Swan Bay & Swan Island, Victoria	4365
Tuggerah Lakes	3630
Shallow Inlet, Victoria	1400
Swan Lake (Cudmirrah)	1000+
The Coorong, South Australia	~ 1000

What is particularly notable about the figures quoted above, apart from the numbers at Lake Wollumboola, is the lack of Black Swan reported in the Coorong. Frith (ibid) reported that there were 50,000 birds there in 1957, and similar numbers on Lake Albert.
In their 2017 aerial survey of wetland birds, Porter et al (2017) recorded less than 12, 000 Black Swan over **all** of the ten survey bands in Eastern Australia and > 4,000 for Band 2 that included the Coorong. These are dire figures for wetland birds – the situation aggravated no doubt by the effects of climate change and the continuing wrangling over environmental flows in the Murray Darling Basin.

The radon and carbon dioxide results reported by Baiada et al confirm that the major input of fresh water into Lake Wollumboola is sourced from its western perimeter. In a previous submission (Pegler 2013), I criticised the optimistic prediction of the proponent that no phosphate would enter the lake by the use of fertilizers on the proposed golf course (Martens 2011). In actual fact the use and quantity of all chemicals on the course would be up to the discretion of the manager and would be determined by the state of the greens and fairways. That kind of pollution potential could not be quantified either in time or in concentration. Knowledge of any pollution would only be obvious when algal blooms occurred in the lake. With the construction of the golf course, this uncertainty would carry on in perpetuity.

Conclusion

The environmental attributes of Lake Wollumboola with regard to the protection of Australian birds have been acknowledged for many years. The importance of the influx of unpolluted ground water into its waters has now been scientifically described. To allow the construction of a Golf Course within its catchment would require ignoring the precautionary principle. With the effects of phosphate pollution on the primary producers of the lake having been described as catastrophic and permanent, approval for the construction of the golf course at Long Bow Point should be denied.

References

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