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A case of anthropogenic pond draining causing nest failure in a waterbird

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INTRODUCTION

Vast areas of natural habitat for wildlife have been progressively converted to anthropogenic environments comprising suburban, urban and rural landscapes (Gaston *et al.* 2003; Ramankutty *et al.* 2008). While several species have adapted to these modified environments (Sarkar and Bhadra 2022), these landscapes expose wildlife to new pressures and threats (Referowska-Chodak 2019; Chaves *et al.* 2022). Widely reported impacts include electrocution on overhead powerlines (Guil and Pérez-García 2022), motor vehicle collisions (Riley *et al.* 2014), pollutants (Work 2022), and domestic animal attacks (Rebolo-Ifrán *et al.* 2021; Zamora-Nasca *et al.* 2021). However, other impacts are more subtle, such as impacts on wildlife populations' reproductive success (Aulsebrook *et al.* 2020).

Waterbirds comprise a diverse group of avian taxa exhibiting highly contrasting responses to anthropogenic land conversion (Traut and Hostetler 2003). Some species have remained or become abundant in modified environments (Martin *et al.* 2012; Minias *et al.* 2018), while other species are adversely affected by the loss of natural areas (Onmus and Siki 2013; Rajashekara and Venkatesha 2018). The Dusky Moorhen *Gallinula tenebrosa*, a medium-sized waterbird found across parts of Australia and South East Asia, is one species that has been notably successful in modified environments (Marchant and Higgins 1993). They are commonly seen in waterways and watercourses in suburban, urban and rural areas (Pywell and Lill 2003; Shirley *et al.* 2003; Hodgkison *et al.* 2007; Mo 2018), including parklands within built-up cities (Putland and Goldizen 2001; Mo and Waterhouse 2020). Despite being able to readily exploit these environments, they are nevertheless also susceptible to human-induced pressures. This note reports an observed case of nest failure in the Dusky Moorhen caused by anthropogenic draining of a waterbody.

OBSERVATIONS

On 16 December 2024, we observed two Dusky Moorhen nests at a manmade pond in Mosman, New South Wales. The pond was approximately 220 m^2 in area and the nests were approximately 30 m from each other. Tall Sedge *Eleocharis sphacelata*, the dominant aquatic vegetation visible above water level, was the major structural component of both nests. The nests were situated over the water, composed almost exclusively of dead Tall Sedge culms and anchored to sections of live Tall Sedge (Fig. 1). One nest (nest 1) was only anchored to the live sedges for approximately two-thirds of its circumference and relied on floating on the water to keep its structure level. In contrast, the other nest (nest 2) was more concealed and surrounded by live sedges for almost its entire circumference. During these initial observations, both nests had brooding birds sitting.

Figure 1. *A Dusky Moorhen attending its nest after the pond was drained and the nest tipped.*

Photo: Matthew Mo

Approximately two hours after initially locating the nests, we returned to the pond to find the pond drained for maintenance works. With the water depleted, nest 1 had tilted substantially (~60°) due to the structure relying on one side floating on water to remain level. There was now no brooding bird sitting, revealing an empty nest. Instead, four eggs were located within a 2-m radius on the muddy bottom (Fig. 2), likely having rolled out of the tilted nest. Although each egg held shape, we observed cracks on each of them, which was not surprising given the nest was approximately 50 cm above the muddy bottom. It was unknown, however, whether the eggs landed in the water first or fell directly onto the muddy bottom when the water was completely drained. Since the eggs were no longer viable, no attempt was made to return them to the nest.

The second nest was much higher above the muddy bottom, closer to a height of 1 m, but had remained level due to the structure being supported by live sedges across its entire circumference. This nest was still attended by a brooding bird; thus, the egg clutch or nestlings concealed were probably not affected by the draining of the pond.

Figure 2. *Four Dusky Moorhen eggs on the bottom of the pond after falling from the nest. A yellow arrow points to a concealed egg in the bottom image.*

Photos: Matthew Mo

After approximately 10 min of examining the state of the nests post-draining, we observed a Moorhen climb onto nest 1 (Fig. 1). This bird spent approximately 2 min re-arranging nest materials, suggesting it was of the breeding pair that was using this nest. Its activity partially rectified the tilt before it then moved away.

DISCUSSION

These observations shed light on the potential for works such as pond draining to impact the reproduction of waterbirds. With Dusky Moorhens common at most wetlands throughout their distributional range, reflecting their Least Concern conservation status under the IUCN Red List of Threatened Species (BirdLife International 2016), the outcome we documented may not be considered weighty from a biodiversity conservation perspective; however, the observations do raise the question whether such activities impact upon less common species, including threatened species, in similar ways. The Australasian Bittern *Botaurus poiciloptilus*, for instance, is listed as Vulnerable under the IUCN Red List of Threatened Species (BirdLife International 2022) and its breeding biology is poorly understood (O'Donnell 2011), though it is also known to constructs nests over water anchored to living vegetation (Marchant and Higgins 1990).

Comparison between outcomes for the two nests and their differences in construction highlight the weakness of nests like nest 1 that rely on floatation to keep their platform level. Nests of this construction type would presumably also be susceptible to other circumstances causing water levels to drop. However, we would expect that natural causes of water levels dropping occur over protracted periods, enabling breeding birds adequate time to respond. Our observations certainly demonstrated how a Moorhen can re-arrange nest material to remediate tilting in a relatively short space of time. Depending on the size of the waterbody, anthropogenic draining may occur rapidly, limiting the window for breeding birds to react and protect their egg clutches.

The breeding biology of the Dusky Moorhen is well-documented. Clutch sizes range from five to 18 eggs, with larger clutches more likely the result of laying by multiple females (Garnett 1980; Marchant and Higgins 1993). We were only

able to locate four eggs from nest 1 after the draining occurred, which either represented a small egg clutch for the species or there were other eggs not able to be accounted for. Laying occurs from August to March (Bedggood 1980; Czechura 1983; Jaensch *et al.* 1988), with incubation lasting between 21 to 24 days (Lord 1936; Marchant and Higgins 1993). Our observations of brooding birds were within this seasonality, with the loss of nest 1's egg clutch an unfortunate coinciding of the incubation period with the time of works requiring the pond draining (apart from risks associated with the construction type discussed above). Land managers can avoid similar scenarios occurring by observing the state of birds' breeding prior to undertaking works and scheduling work outside of sensitive breeding cycles.

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