

## Extended seasonal closure of Penguin Island: a step towards protecting little penguins' breeding activity

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### Background

The Western Australian Government has taken steps to protect little penguins (*Eudyptula minor*) at Penguin Island, following the continued decline in animals breeding at this site. As of August 2022, management interventions include extending the island closure period by four weeks to accommodate a protracted breeding season. The island is now closed to visitation by the public from early June to mid-October, protecting the vulnerable breeding phases (egg lay, incubation, guard) of the island's colony of little penguins.

Recent research shows that marine heat waves on the west coast of Australia have negatively impacted the breeding of little penguins on Penguin Island, by affecting their diet composition, nesting distribution and breeding success (Cannell et al., 2023). Since the 2011 marine heatwave event, there has been a notable decline in the number of little penguin pairs using nest boxes for breeding. Although breeding success rates have remained, on average, higher than those observed before the heatwave, population size has declined more than 90% since 2007 on Penguin Island. Recruitment back to the colony determines overall population size and is influenced by the proportion of breeding penguins, their breeding success and the survival of juveniles to breeding age. Monitoring these parameters is at the core of DBCA's long-term nest box monitoring and citizen science beach return programs, which play a crucial role in understanding the dynamics of the Penguin Island colony and guiding management and conservation efforts.

Artificial nest boxes are a commonly used method for monitoring species that use cavities such as burrows or hollows for nesting and shelter. Little penguins on Penguin Island have been monitored using artificial nesting structures since 1986. Currently, 112 nest boxes are monitored on a fortnightly basis to understand the breeding status of the population (DBCA, 2022).

Metrics used for reporting include nest box occupancy (number of nest boxes used for breeding), breeding success (the percentage of eggs that successfully produce fledglings), and body mass of adults and fledglings (weight). The term 'fledged' is used to describe a chick that is presumed to have reached 35 days old and entered the water independently (Figure 1).



Figure 1. Little penguin chick (6.5 weeks-old) recorded as part of DBCA's nest box monitoring program. Photo: Inês Leal (DBCA).

These metrics provide important information on the condition of little penguins in the Shoalwater Islands Marine Park. Our assessments are annually reviewed by an external auditor (Conservation and Parks Commission).

# Findings

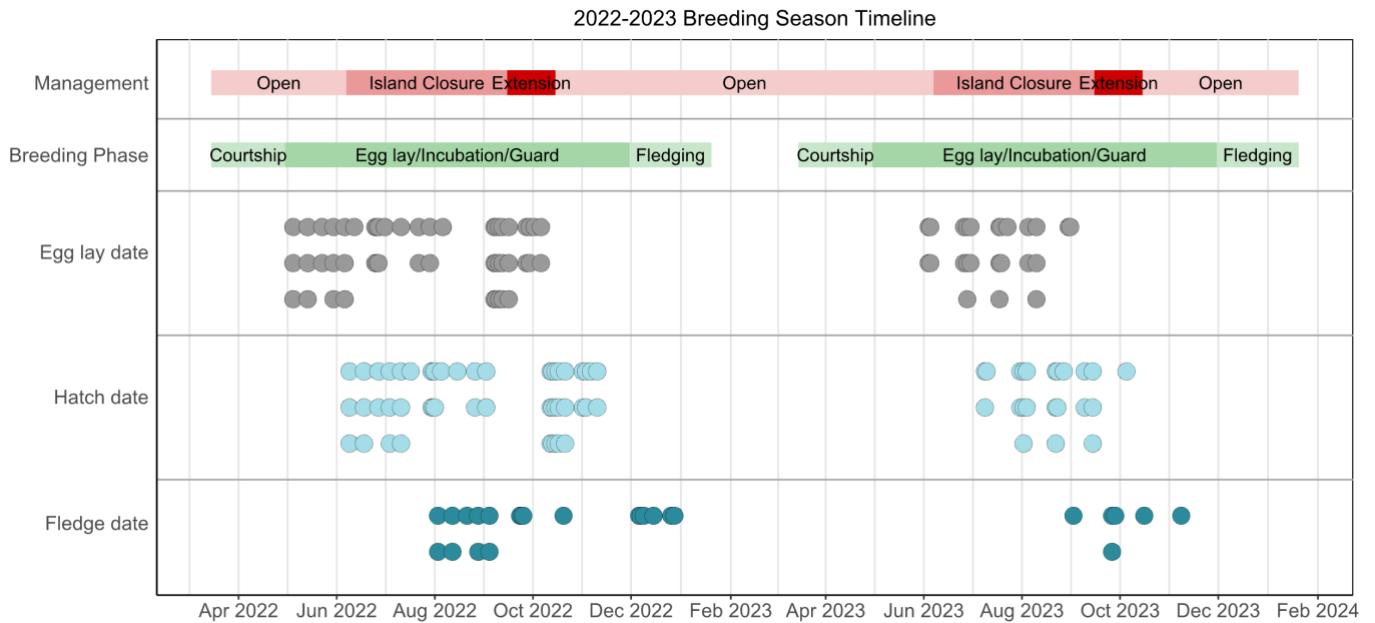


Figure 2. Timeline showing the breeding activity of little penguins on Penguin Island since 2022. Dates of egg lay and hatched and fledged chicks were obtained from monitoring artificial nest boxes as part of DBCA’s long-term nest box monitoring program.

Penguins start returning to Penguin Island to begin their nesting activities in March. Courtship is the first stage of breeding for mature adult penguins. If successful, parent penguins then cycle through egg laying/incubation followed by chick rearing. This includes a guard period, where one parent stays with the chicks, and a post-guard period, during which both parents leave to forage. If conditions are ideal, some penguins will lay a second clutch of eggs in the same breeding season with the cycle beginning again from the courtship stage.

On Penguin Island, egg lay is asynchronous and protracted. Eggs can be laid as early as April and as late as October, with a peak in egg lay often occurring in June and July (Figure 2), during the winter closure period. Another peak can be observed during spring, in September and October. The extended period of island closure recently implemented (15 September to 15 October) coincides with this latter peak. The last chicks fledge in late December or early January. Up to January 2024, 18 nests containing eggs being incubated or chicks under 2 weeks old were protected by the extended winter closure – 43 % and 33 % of the total nests used for breeding in 2022 and 2023, respectively.

## Management implications

Nest box monitoring data of little penguins breeding on Penguin Island has showed that lengthening the winter closure to visitation protected a higher proportion of eggs and young chicks. Alongside other management strategies in place, extending the island closure to visitation further protected the colony by minimising disturbance, thereby reducing the likelihood of nests being abandoned during incubation and/or guard, and potentially increasing the chances of chick survival and breeding productivity overall.

## Further information

Cannell, B.L., Kendall, W.L., Tyne, J.A., Bunce, M., Hetzel, Y., Murray, D. and Radford, B., 2023. Marine heatwaves affect breeding, diet and population size but not body condition of a range-edge little penguin colony. *Marine Ecology Progress Series*.

Clitheroe, E., 2021. Can artificial habitat mitigate impacts of climate change? Quantifying nesting habitat microclimate and use by little penguins (*Eudyptula minor*) (Doctoral dissertation, Murdoch University).

DBCA, 2022. Standard Operating Procedure SC22-30: Using Artificial Nest Boxes to Monitor Little Penguins (*Eudyptula minor*). Department of Biodiversity, Conservation and Attractions, Perth.