

The use of nest boxes for blue penguins (*Eudyptula minor*)

D. M. Houston,
Department of Conservation, P.O. Box 388, Oamaru

Summary

Some 300 wooden nest boxes have been used for blue penguins in the Oamaru area. Experience suggests that many blue penguins prefer nest boxes to natural nest sites. Reproductive success in nest boxes is high and the use of tanalised timber appears to present no risk.

Introduction

Artificial nest boxes for blue penguins (*Eudyptula minor*) were first placed in the Oamaru area by the Waitaki Branch of the Royal Forest and Bird Protection Society, at the suggestion of Euan Kennedy, then working for the New Zealand Wildlife Service. 18 boxes were placed at Boatman's Harbour August 1985, in an attempt to provide nesting sites for penguins displaced by the Oamaru Borough Council's activities in the Oamaru harbour quarry.

The design used for the first nest boxes was obtained by Kennedy during a private visit to Phillip Island Penguin Reserve in Victoria, Australia during the early 1980's and it was of the "T" shaped design illustrated in figure 1.



Figure 1. T shaped nest box

A small number of boxes of the same design were used in a portion of the Oamaru quarry around the same time after an unsuccessful attempt by the Borough Council to fence penguins out of the area.

After joining the Department of Conservation in 1987, Kennedy installed a number of nest boxes at Pilots Beach on the Otago Peninsula, after blue penguin habitat there was largely destroyed by the construction of a picnic area.

Kennedy used boxes that were similar to that illustrated in figure 2, except that they had smaller tunnel entrances and non-removable lid. The boxes were covered externally in

black polythene plastic as a precaution against tanalising chemicals leaching out of saturated timber onto the birds' plumage (E. Kennedy, pers. comm.). The boxes were dug into sloping ground and completely covered with soil, leaving only the entrance visible. Some boxes were promptly occupied by blue penguins, but little work was carried out at this time on monitoring the boxes and their inhabitants.

In 1989 a number of Kennedy-designed nestboxes were installed at Oamaru creek during a cleanup of an area adjoining a former timber treatment plant.

Design refinement

It had been observed that the tunnel entrances to the boxes were too small for large pre-moult blue penguins. The small entrances also made it difficult for staff monitoring the boxes to get their hands inside to determine if penguins were present.

It was decided enlarge the internal size of the entrance to the 150x150 mm.

The development of the Oamaru quarry area as a blue penguin viewing area for tourists necessitated the placement of nest boxes to supplement the existing sites and to replace those under piles of wharf timbers and power poles, which were subsequently removed.

A monitoring programme was established to determine if the quarry penguins were adversely affected by the tourism development. In order to gain easy access to the nests, the front portion of the lid was left exposed and removable. Existing boxes at both sites were modified.

After the first breeding season of weekly monitoring of nest sites at the Quarry and Oamaru creek, it was noted that some boxes, mostly those with 2 chicks, became very wet and smelly. In an attempt to alleviate this problem two 25mm ventilation holes were drilled in the sides of the boxes. While this has not eliminated the problem, it does allow the boxes to dry out more rapidly after the departure of the chicks.

Tanalised timber

In 1990, it was discovered that the Oamaru creek site was extensively contaminated with heavy metals from the former timber treatment plant there. There was concern that the blue penguins nesting in the contaminated soil and sawdust may have elevated levels of the heavy metals. The livers of blue penguins killed by dogs were tested for arsenic and chromium by the Ministry of Agriculture and Fisheries (MAF) Invermay laboratory and shown in table 1.

Table 1 - Copper and arsenic levels in blue penguins

	Bird 1	Bird 2	Bird 3	Bird 4	Bird 5
Liver copper (ppm)	8.31	6.03	6.60	7.42	8.25
Liver arsenic (ppm)	<0.007	<0.007	<0.007	<0.007	<0.007

MAF considered that the arsenic and copper levels were well below that found toxic in other species.

If the penguins nesting on high concentrations of tanning chemicals do not have elevated levels of heavy metals in their tissues then it was reasonable to assume that the tanned timber used in the construction of the nest box itself is of no danger.

Removable lids

While removable lids make the checking of the box and its contents easy, they are not without problems. Securing lids has been a problem. Initially screws were used, but the time taken to open and refasten the lids was excessive and there are problems with corrosion of the screws and warping of the timber.

Lids not securely fastened are prone to being dislodged by the penguins themselves during courtship and territorial defence. Most lids are currently held in place with stoppers (to stop them sliding off) and weighed down with a rock. A small number of boxes have had a one piece lid fitted. In this way the entire lid is removed to gain access to the nest. They have not however been well received by the monitoring staff who find them difficult to manage.

The use of removable lids means that the top cannot be protected from water infiltration by polythene plastic. This however has not proved to be a problem in the relatively dry Oamaru climate.

Placement

The optimum placement for nest boxes has proved to be into a slope. It is desirable to have the entrance as the lowest point so that any water finding its way into the box can escape.

Boxes should be placed no closer than 2 metres apart, as blue penguins will vigorously defend their nest site out to a radius of about 1 metre.

Breeding success

Blue penguins using nest boxes at Oamaru have achieved reproductive success of up to 70% and fledging rates up to 2.06 per pair. Because of the difficulty of accessing "natural" nests, no comparable data is available for non-nest box breeders in Oamaru.

It has been noted that several pairs of penguins have moved out of natural sites and into nest boxes, with some natural sites remaining vacant for three years now.

In a study of breeding success in at Taiaroa Head, Perriman and McKinlay (1995) observed that the mean number of chicks fledged per pair was 2.5 ± 1.35 (n=10) for pairs

using nest boxes compared to 1.42 ± 0.96 (n=52) chicks per pair for pairs using burrows for breeding.

Discussion

The nest box design in figure 2 is the result of several modifications of the original design. Its tunnel was designed to allow the bulk of the box to be buried and also to restrict the access of dogs and cats.

Nest boxes are useful where it is desirable to gain easy access to nests for research purposes. They are an effective way of increasing the number of available nest sites in areas where nest sites are at a premium. They may be used to replace existing nests that have been destroyed.

Conclusion

Over three hundred nest boxes are now in place in Oamaru, the majority of which are occupied. Their use has assisted in the dramatic growth of the Oamaru blue penguin population and enabled many of the nests to be monitored closely with minimal disturbance.

The use of tanalised timber in the construction of the boxes presents no risk to the penguins.

Breeding success in nest boxes is superior to that in “natural” sites.

Acknowledgements

Thanks must go to Euan Kennedy who provided the initial nest box plans and prompted their placement at Boatman’s Harbour.

The Waitaki branch of the Royal Forest and Bird Protection Society has played a significant part in the protection of Oamaru's blue penguins and was able to provide me with much information. Harold Coker was of particular assistance.

Suggestions for design refinement have come from the Oamaru Blue Penguin Colony monitoring team, namely Mandy Home and Tony Hocken, as well as from Kevin Pearce (DoC Oamaru), who has overseen the construction of countless boxes.

Finally, thanks to Bruce McKinlay who prompted me to write this and offered critical comment.

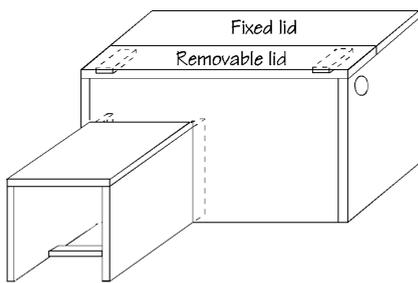
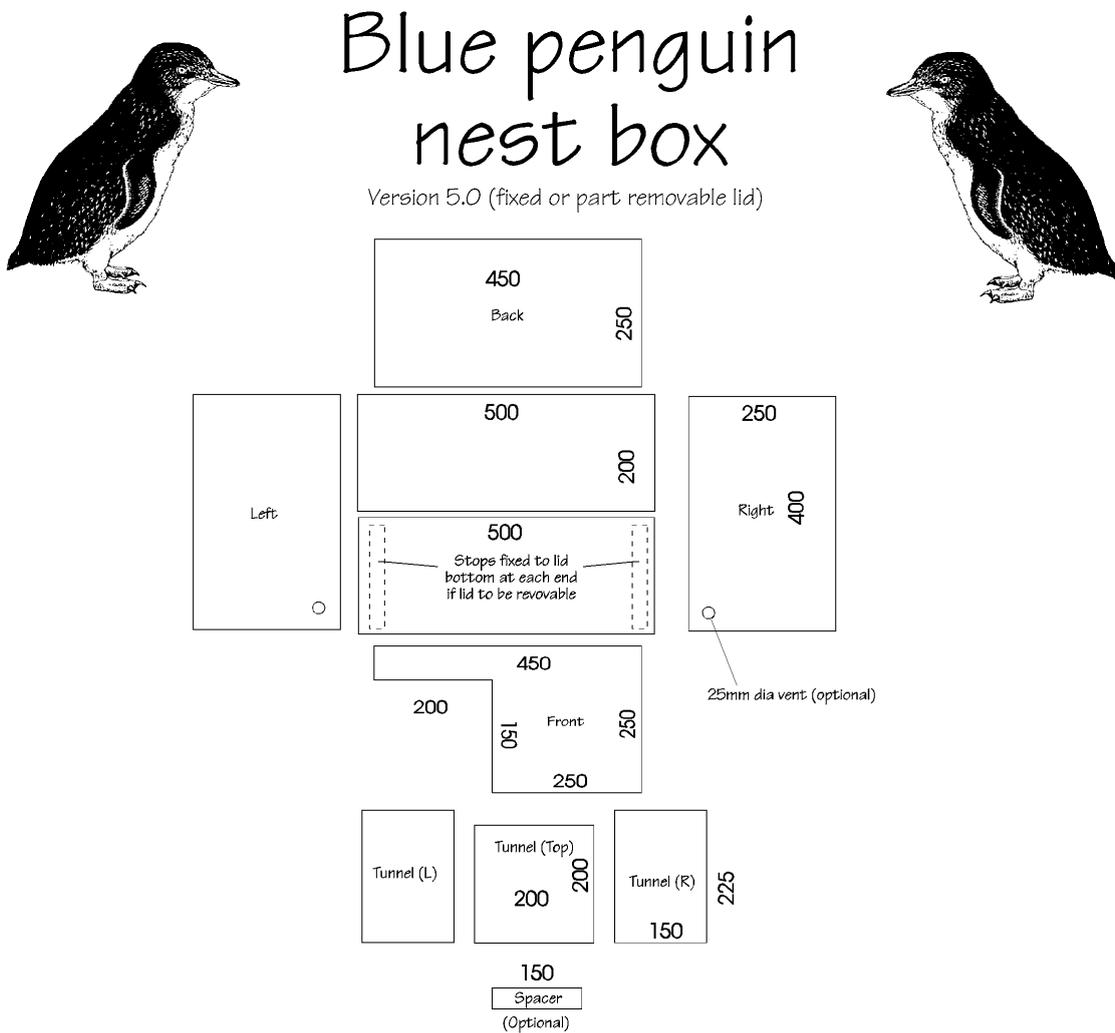
The use of nest boxes for blue penguins (*Eudyptula minor*). Ecological Management No 7, 7-11.
Department of Conservation, Wellington. 1999

References

Perriman L. and McKinlay B. 1995. The blue Penguin (*Eudyptula minor*) at Taiaroa Head, Otago, 1992-1993. Department of Conservation Science & Research series No. 86.

Royal Forest and Bird Protection Society. Minutes of the Waitaki Branch, Oamaru. 1984 - 1993.

Department of Conservation, Dunedin Field Centre. Departmental files BIR 7/2/10 (Vol. 1, Oamaru) and BIR 7/2/10 (Vol. 1, Dunedin).



Materials

- All timber H3 P. rad
- 1.2m 200*25
- 1.7m 250*25
- 0.45m 150*25
- Scraps for spacer and stops
- 25mm holes (2)
- Quantity 75mm galv flathead nails



Department of
Conservation
Te Papa Atawhai

Dave Houston
Oamaru Field Centre
Department of Conservation
Box 388, Oamaru, New Zealand
dhouston@doc.govt.nz

Figure 1. Nest box design