KANGAROO ISLAND GLOSSY BLACK-COCKATOO 2021 NESTING SEASON REPORT

KARLEAH BERRIS, TORRAN WELZ, MIKE BARTH AND TRISH MOONEY
KANGAROO ISLAND LANDSCAPE BOARD
AUGUST 2021

LANDSCAPE SOUTH AUSTRALIA KANGAROO ISLAND

Report to the Australian Government and Glossy black-cockatoo Recovery Team.

Kangaroo Island Glossy Black-Cockatoo 2021 Breeding Season Report

Project Officer Contact Details
Glossy Black-cockatoo Project Officer
Kangaroo Island Landscape Board
35 Dauncey St
Kingscote SA 5223
Phone: (08) 8553 4444

Report prepared by:
Karleah Berris
Kangaroo Island Landscape Board
PO Box 39
Kingscote South Australia 5223

Staff involved in the delivery of this project:
Karleah Berris – Glossy black-cockatoo Project Officer
Trish Mooney – Team Leader, Animal and Plant Control and Post-fire Recovery
Torran Welz – Glossy black-cockatoo Field Officer
Michael Barth – Glossy black-cockatoo Field Officer
Paul Rogers – Manager, Biodiversity

Funding
This monitoring and report were funded by the Australian Government's Bushfire Wildlife and Habitat Recovery Fund Tranche 1 Project ID BWHR-T1_GA-2000584 and Australian Government's Regional Fund for Wildlife and Habitat Bushfire Recovery Project ID BRF-MU17-P2.

Front cover: A glossy black-cockatoo nestling that was banded in 2021 in the Stokes Bay flock area. Photo credit: Karleah Berris

Contents

Summary

- *This report outlines the results of nesting success monitoring for glossy black-cockatoos (GBC) by staff from the Kangaroo Island Landscape Board in 2021. This was the second breeding season after the 2019-2020 bushfires that burnt 54 % of the feeding habitat of the subspecies on Kangaroo Island.*
- Monitoring of the nesting success of GBC aligns with the broader vision, purpose and regional priorities outlined in the *Kangaroo Island Landscapes Plan 2021-26,* and the *Managing Australia's Landscapes Policy Overview.*
- This work was funded by the Australian Government's Bushfire Wildlife and Habitat Recovery Fund and Australian Government's Regional Fund for Wildlife and Habitat Bushfire Recovery Project.1
- *The key finding was that no discernible difference was found in the nesting success of GBC pairs in areas where >50% of feeding habitat had been burnt compared to areas where little or no feeding habitat was burnt. However, fewer nesting pairs were detected in flocks with >50% feeding habitat burnt. This is similar to results in 2020, and indicates that either fewer pairs are breeding or pairs have moved breeding sites to new areas post-fire.*
- *We recommend protection of nesting trees from predation and competition, protection of existing unburnt drooping sheoak feeding habitat from fire, and revegetation in ways that link corridors of their existing habitats as the three key management actions to support the Kangaroo Island population of GBC while the burnt nesting and foraging habitat regenerates.*

Acknowledgements

The 2021 nesting season monitoring and report were possible thanks to funding that was generously provided through the Australian Government's Bushfire Wildlife and Habitat Recovery Fund Tranche 1 and the Australian Government's Regional Fund for Wildlife and Habitat Bushfire Recovery. Thank you to all of the landholders who have allowed us access to their properties for this monitoring, particularly those who were impacted by the bushfires.

Introduction

The South Australian glossy black-cockatoo (GBC, *Calyptorhynchus lathami halmaturinus*) is listed as *Endangered* under the Environment Protection and Biodiversity Conservation Act 1999. The GBC is extinct on mainland South Australia, and restricted to Kangaroo Island. One of the key drivers that led to the original decline of the GBC on Kangaroo Island prior to 1995 was a lack of recruitment in the population, caused by predation of GBC eggs and nestlings by brushtail possums (*Trichosurus vulpecula*) (Joseph 1982; Pepper 1997, Garnett *et al.* 1999). Since 1995, management actions that have reduced the incidence of possum predation and improved nesting success rates have led to population growth in the South Australian GBC on Kangaroo Island (Berris *et al.* 2018). Due to the importance that recruitment has played in the recovery of the GBC, nest success monitoring was conducted as part of the GBC Recovery Program every year between 1996 and 2017. Monitoring was not conducted in 2018 and 2019 due to a lack of funding for the Recovery Program.

In December 2019 and January 2020, bushfires burnt 54% of GBC sheoak feeding habitat to an extent that it will not be suitable for use by foraging GBCs until it regenerates (Berris *et al.* 2020a). Post-fire recovery funding has enabled nesting success monitoring to be conducted in 2020 and 2021. Post-fire nest monitoring will help the Recovery Program to determine whether the loss of available feeding habitat in some flock regions is affecting nest success and recruitment. It will also help the Recovery Program to determine what factors are influencing the GBC population trajectory post-fire.

The De Mole, Western River, Middle River and Southern flock regions each lost a minimum of 71% of available drooping sheoak feeding habitat during the 2019-20 bushfires (Berris *et al.* 2020a). The remaining three flock regions including Stokes Bay, Wisanger and Eastern each lost a maximum of 32 % of available feeding habitat (Berris *et al.* 2020a). It is important to determine whether the large reduction in available feeding habitat, and nesting habitat, in the four western flock regions is influencing nesting success post-fire.

Objectives

In this report, we document the results of thenesting success monitoring in 2021 and compare nesting success to findings for previous years. The aims of GBC breeding success monitoring in 2021 were to:

- Determine the overall nest success on Kangaroo Island in 2021 (post-fire) and compare to previous years (2020 = post-fire, 1998-2017 = pre-fire);
- Compare nest success between flock regions that have lost > 50% of feeding habitat to those that have lost < 50 % feeding habitat;
- To compare the total number of nesting attempts between flock regions that have lost > 50% of feeding habitat to those that have lost < 50 % feeding habitat.
- *We recommend management actions to support the Kangaroo Island population of GBC based on the most recent assessment of nesting success.*

Methods

Known nest trees in each of the seven occupied flock regions shown in Fig. 1 were visited once a month between January and June 2021. When visited, nest trees were checked using the following methodology:

- The tree was first tapped at the base several times. If a female GBC came to the entrance of the hollow or nest box and no male was observed nearby, it was assumed that the female was incubating an egg or brooding a very small nestling. If a male was observed nearby, the pair were assumed to be prospecting for a nest, so the nest tree was rechecked at a later date.
- If there was no response when the base of the tree was tapped, a nest inspection camera on a 16 metre extendable telescopic pole was raised up to the entrance of the nest and the contents of the nest viewed with the camera. Nests were recorded as either empty or in use. If a nest was in use, the species using it was recorded and the estimated age of any nestlings present was recorded.

Nests in use by GBC pairs were checked monthly to determine the fate of nests. If a nest failure was recorded, staff attempted to determine the stage at which the nest had failed and the cause by inspecting the nest and the nest tree. Nest trees that recorded a failed nesting attempt were checked for signs of brushtail possum predation. Signs include fresh scratches and claw marks that correspond in size with possum claw marks on the branches and trunk of the tree, and evidence of eggshell or down from a nestling.

A nest was classified as successful if the following criteria were met:

- a nestling was observed in the nest at 7 weeks of age or older, and;
- a further inspection of the nest 13-15 weeks post-hatching was undertaken, by when the nestling should have fledged, and the nest was empty with a large amount of old faeces.

Motion activated cameras were also installed on 18 high used nests, approximately 1-1.5 metres from the nest entrance, to verify observation made using the nest inspection camera and fledging events. Nest success was calculated as the proportion of nests that successfully fledged a young GBC, only including nests where an outcome was determined. Nestlings over 250g in weight were banded with a stainless steel leg band provided by the Australian Bird and Bat Banding Scheme to enable long-term monitoring of population parameters, including survival and movement.

Staff conducted visits to known and potential nesting habitat in the evening to locate new nests, which is easiest late in the day when males and pairs are returning to nests from feeding grounds. This was primarily conducted in the De Mole and Western flock regions, which were impacted by the 2019-2020 bushfires.

Nest success was calculated for Kangaroo Island as a whole, as well as for the individual flock regions. Flock regions were assigned to one of two categories; > 50% feeding habitat burnt in the 2019-2020 bushfires (De Mole, Western River, Middle River and Southern flock regions) or < 50% feeding habitat burnt in the 2019-2020 bushfires (Stokes Bay, Wisanger and Eastern) using data from Berris *et al.* (2020a). We also compared nest success of flocks in both the feeding habitat categories (< 50 % burnt and > 50 % burnt in 2019-20 bushfires) to nest success in the previous three monitoring years (2015-2017) using a robust two-way ANOVA with 20% trimmed means.

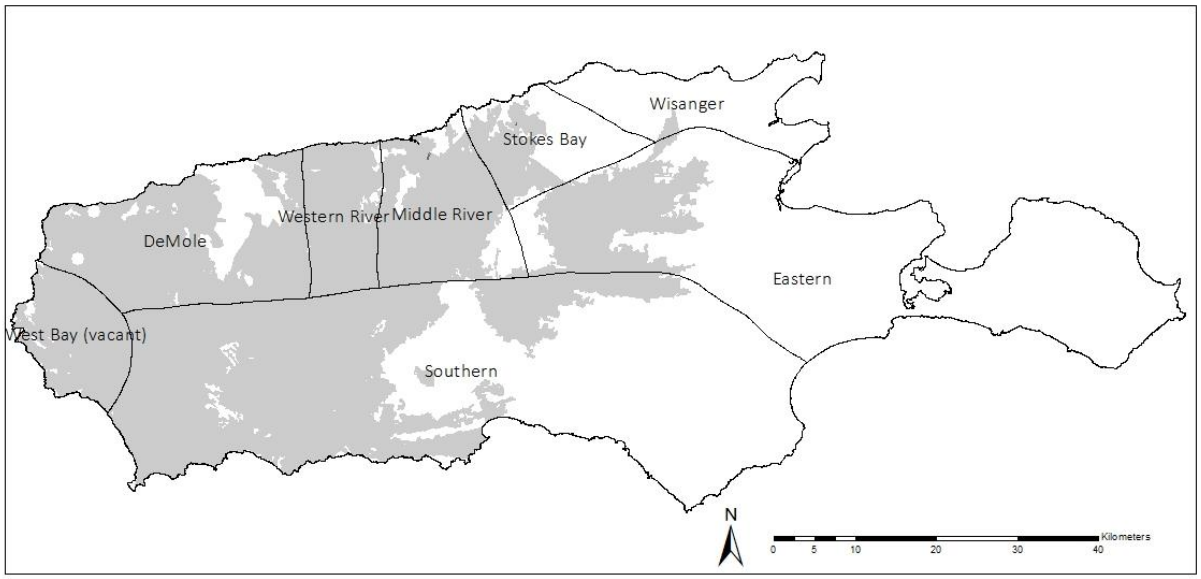

Figure 1. Map of flock regions on Kangaroo Island as defined by Mooney and Pedler (2005) with the Eastern flock region expanded to include all of the Dudley Peninsula reflecting recent range expansion of GBCs in this flock. Light grey represents the 2019-2020 bushfire burn area.

Results

Nesting success

A total of 87 nesting attempts by GBCs were recorded between January and 27 August 2021. We were able to determine an outcome for 83 (95 %) of those nesting attempts. Four nesting attempts were not able to be monitored frequently enough due to poor site access. Across Kangaroo Island, 60 % of GBC nest attempts resulted in a successful fledging. Nest success in 2021 was higher than the long-term average (53 %) based on 21 years of data between 1998 and 2021 (Figure 2). Nesting attempts were monitored in natural nests (24 %), PVC nest boxes (59 %), 'Cockatube' nest boxes (13 %) and wooden nest boxes (4 %).

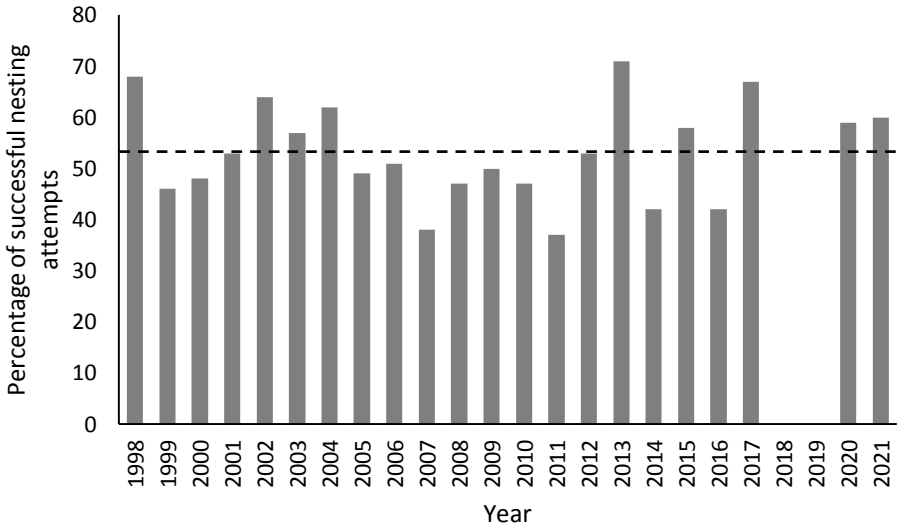

Figure 2. The annual percentage of successful nest attempts for glossy black-cockatoos on Kangaroo Island. Dotted line represents the average across all years.

The amount of feeding habitat burnt within each flock region (> 50% or < 50%) once again did not have a significant influence on nest success in 2021 (Robust two-way ANOVA; Q_a = 0.66, P = 0.43). Nest success was influenced by year (Robust two-way ANOVA; Q_b = 17.80, P = 0.03), and post-hoc testing revealed 2016 had a significantly lower nesting success than during some of the other years (Figure 3). There was no significant decline in nesting success in post-fire years in either habitat category.

Despite there being no discernible difference in nest success, fewer nest attempts were recorded in 2021 and 2020 in known nesting sites in flock regions with > 50% of feeding habitat burnt (Figure 4) compared to previous years. In total, 50 nestlings appeared to have fledged from monitored nests, and 37 (74%) of those were in flock regions where < 50% of feeding habitat was burnt in the 2019-20 bushfires. Forty-four nestlings were banded with a stainless steel leg band provided by the Australian Bird and Bat Banding Scheme, which will allow the Recovery Program to monitor the survival and movements of this cohort in future years.

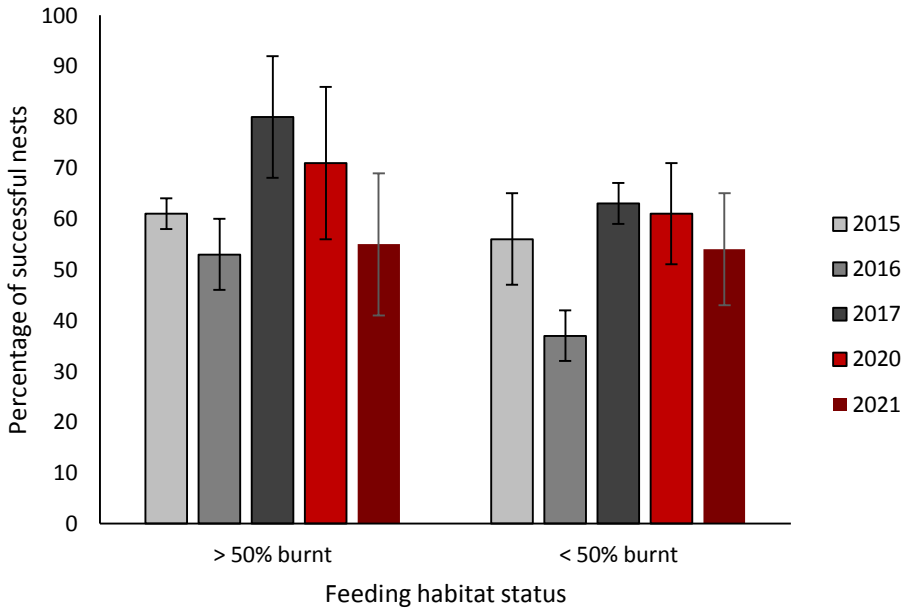

Figure 3. The mean percentage of successful nesting attempts pre-fire (2015-2017) and post-fire (2020-2021) in flock regions that had > 50% of remnant feeding habitat burnt in the 2019-20 bushfires (De Mole River, Western River, Middle River and Southern Rivers) and <50% feeding habitat burnt (Stokes Bay, Wisanger and Eastern).

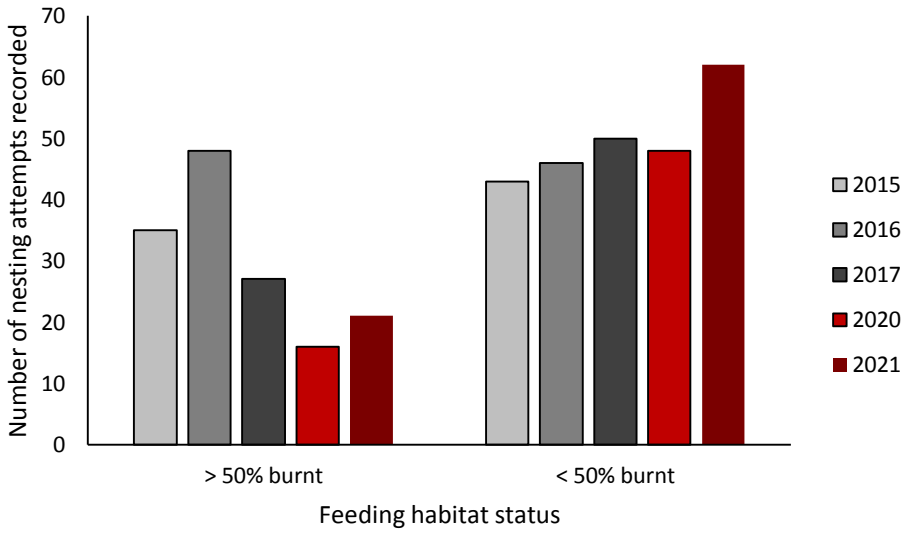

Figure 4. The number of nesting attempts recorded between 2015-2017 and in 2020 and 2021 in flock regions that had > 50% of remnant feeding habitat burnt in the 2019-20 bushfires (De Mole River, Western River, Middle River and Southern Rivers) and <50% feeding habitat burnt (Stokes Bay, Wisanger and Eastern).

Discussion

There has been no discernible difference in nesting success of GBC on Kangaroo Island in 2021 or 2020 (post-fire) when compared to recent pre-fire years. However, fewer nesting attempts were once again recorded in flock regions that had > 50% of their feeding habitat burnt in the 2019-2020 bushfires, as was recorded in 2020. Possible causes of the decrease in nesting attempts could be; 1) some breeding pairs have moved to different nesting areas within the same flock region post-fire and we did not detect where those nesting areas were, and/or 2) an increased number of breeding pairs did not attempt to nest in 2020 and 2021, and/or 3) a reduction in the number of breeding pairs in burnt flock regions due to movement or mortality.

In the eastern GBC subspecies *C. lathami lathami*, the principal determinant of reproductive productivity was the number of pairs attempting to breed in a season (Cameron 2009). In the subspecies C. *lathami*, rainfall was found to influence sheoak seed production and GBC breeding productivity the following nesting season (Cameron 2009), indicating that less available food leads to fewer pairs attempting to nest. Therefore, it is plausible that the reduction in sheoak feeding habitat in the four western flock regions post-fire could lead to fewer pairs attempting to breed post-fire. Although some effort was made to find additional nests in burnt flock regions, other project commitments meant this could only be done on a few occasions. However, a large flock containing numerous adult pairs were found in Kangaroo Gully (De Mole flock) during the breeding season, and it is anticipated that there were at least 3 nests that were not located based on observations of this flock. However, there also appeared to be many adult pairs that were not returning to nest trees amongst the flock. Further effort will be made to track pairs in this flock in 2022.

In 2021, 76 % of nesting attempts were in nest boxes installed by the Recovery Program. This is the highest number of monitored pairs using nest boxes ever recorded. Nest box use was high in the Eastern flock region, where natural hollow bearing trees are thought to be limiting, and in the Stokes Bay flock region, where a large proportion of nest trees were destroyed in the 2019-20 bushfires. Given the increasing size of flocks on eastern Kangaroo Island, use and refinement of nest boxes will likely continue to be an important part of the strategy to support the recovery of GBCs on eastern Kangaroo Island to ensure all breeding pairs have access to suitable nesting sites.

Management Recommendations

In the short-term, the most feasible way to support recruitment in the Kangaroo Island GBC population is to ensure that breeding GBC have a high likelihood of successfully raising their young to fledging. In the longer-term, it will be important to ensure that flock regions that lost significant amounts of available feeding habitat in the 2019-2020 bushfires do not suffer further loss of habitat through bushfires or clearance, and that further supplementation of feeding habitat occurs through strategic revegetation with drooping sheoak.

The following management actions are recommended and are unchanged from those identified in 2020:

- Allocate adequate resources to protect all known nests used by GBC from possum access through maintaining and improving tree collars and undertaking canopy pruning where necessary;
- Allocate adequate resources to finding and protecting new nests in areas where GBCs have relocated to new nesting areas;
- Ensure competitor species including feral honey bees, galahs, little corellas are not impacting on GBC nesting success;
- Install nest boxes in areas where the availability of natural nesting hollows is thought to be low;
- Contribute to fire management planning to ensure no further GBC feeding habitat is burned as a result of prescribed burning activities in flock regions heavily impacted by the 2019-2020 bushfires until the burnt feeding habitat recovers;
- Contribute to fire management planning to ensure protection of unburnt GBC feeding habitat is of high priority in future bushfire events;
- Strategically revegetate areas with drooping sheoak feeding habitat in a manner that will promote fast maturity (for example, planting seedlings with adequate spacing).
- Continue to monitor nest success and GBC flock sizes across Kangaroo Island to determine where the above actions are the priority and to measure the effectiveness of post-fire management actions.

References

Berris, K. K., Barth, M., Mooney, T., Paton, D., Kinloch, M., Copley, P., Maguire, A., Crowley, G., and Garnett, S. T. (2018). From the brink of extinction: successful recovery of the glossy black-cockatoo on Kangaroo Island. In: Recovering Australian Threatened Species: a book of hope (eds S. Garnett, P. Latch, D. Lindenmayer and J. Woinarski) pp. 75-84. CSIRO Publishing, Clayton South.

Berris, K. K., Barth, M, Welz, T., and Mooney, T. (2020a). The impact of the 2019-2020 bushfires on the feeding habitat, nesting habitat and carrying capacity of endangered glossy black-cockatoos on Kangaroo Island. Unpublished report to the Glossy Black-Cockatoo Recovery Team. Natural Resources Kangaroo Island.

Berris, K. K., Barth, M, Welz, T., and Mooney, T. (2020b). Kangaroo Island Glossy Black-Cockatoo 2020 Census Report. Unpublished report to the Glossy Black-Cockatoo Recovery Team. Kangaroo Island Landscape Board.

Cameron, M. (2009). The influence of climate on Glossy Black-cockatoo reproduction. *Pacific Conservation Biology* **15**, 65-71.

Garnett, S.T., Pedler, L.P., and Crowley, G.M. (1999). The breeding biology of the Glossy Black-Cockatoo *Calyptorhynchus lathami* on Kangaroo Island, South Australia. *Emu* **99**, 262–279.

Joseph, L. (1982). The glossy black-cockatoo on Kangaroo Island. *Emu* **82**, 46-49.

Pepper, J. W. (1997). A Survey of the South Australian Glossy Black-cockatoo (*Calyptorhynchus lathami halmaturinus*) and its Habitat. *Wildlife Research* **24**, 209-23