Flood recovery: availability of suitable tree hollows for Regent and Superb Parrots

Artificial hollows unlikely to improve habitat after flooding

June 2024

Key Messages

- We used ground-based and climbing surveys of River Red Gums in the breeding distribution of Regent and Superb Parrots to estimate how common the hollows preferred by these species are.
- We also re-assessed trees that had been recorded as standing prior to the 2022/23 flooding events and found that less than 2% of these trees had collapsed post-flood.
- Suitable hollows for these threatened parrots are rare, but this is not a result of flooding impacts, and generic nest boxes are unlikely to meet the nesting requirements for these species.

Regent and Superb Parrots nest in large old River Red Gums along the Murray River corridor, and it was unclear how these trees were impacted by extreme flooding in the 2022/23 summer.

Threatened parrots, picky about their hollows

Two species of parrots that are nationally listed as Vulnerable nest along the Murray River: the Regent (*Polytelis anthopeplus*) and the Superb Parrot (*Polytelis swainsonii*). Both of these species are highly selective about the types of hollows that they will use for breeding – hollows need to be deep and have narrow entrances, to protect chicks from predators and ensure that the nest stays at the right temperature.

Following the large-scale flooding events of 2022/23, there was some concern that the large old trees that typically contain these types of hollows may have collapsed during or after the floods, and that artificial hollows such as nest boxes might be needed to address the shortfall.

It was difficult to assess where these artificial hollows would be needed, as only tree climbers can take the measurements necessary to identify suitable hollows, a process which is time consuming and expensive.

Project aims

- To determine the prevalence of tree hollows that are potentially suitable for nesting by Regent and Superb Parrots, and assess ground-based surrogate measurements;
- To assess the extent of tree collapse following the 2022/23 flooding events; and
- To evaluate whether natural tree hollows are currently limited, and assess if artificial nesting structures would improve breeding opportunities for these hollow-dependent species.

Arthur Rylah Institute for environmental research

VICTORIA State Government | Energy, Environment and Climate Action

Survey methods

In May 2024, in a period outside of the parrot breeding season, we conducted 15 days of climbing and ground-based assessments of River Red Gum (*Eucalyptus camaldulensis*) trees and hollows along the Murray River (Figure 1). We preferentially selected trees that superficially appeared to contain at least one hollow. Tree climbers took a range of measurements, and scored each hollow as being potentially suitable for nesting (yes/no), based on the profile of hollows that the species has been observed using for nesting in the past. 'Potentially suitable' hollows were those with a depth of 64-137 cm, an entrance diameter of 8-13 cm, and a floor diameter of 14-34 cm.

We also re-visited trees that had been recorded as standing prior to the 2022/23 floods in long-term vegetation monitoring plots, to assess for collapse or other signs of persistent flood damage.

Study Area

The survey focused on two areas used by Regent and Superb Parrots for breeding: the 'Mid-Murray' (Murray River Park, Murray-Kulkyne Park, and Hattah-Kulkyne National Park) and Barmah National Park (Figure 1).

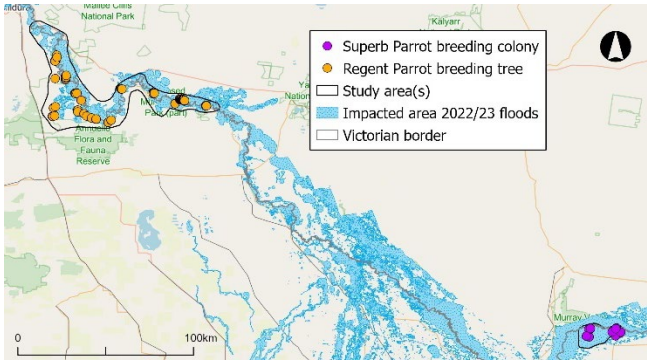

Figure 1: Map of survey locations showing the Mid-Murray in the west and Barmah National Park in the east.

Results

In our surveys we climbed 95 River Red Gum trees and measured 391 tree hollows. These trees ranged in size from 53 – 495 cm DBH (diameter at breast height), and on average there were 3.9 hollows per tree.

There was a strong correlation between the number of hollows in a tree counted from the ground, and the actual number of hollows the climbers counted. The ground counts tended to slightly overestimate the 'true' number of hollows, such that for an average River Red Gum with four 'true' hollows (as determined by climbing), the ground count would estimate five hollows (Figure 2).

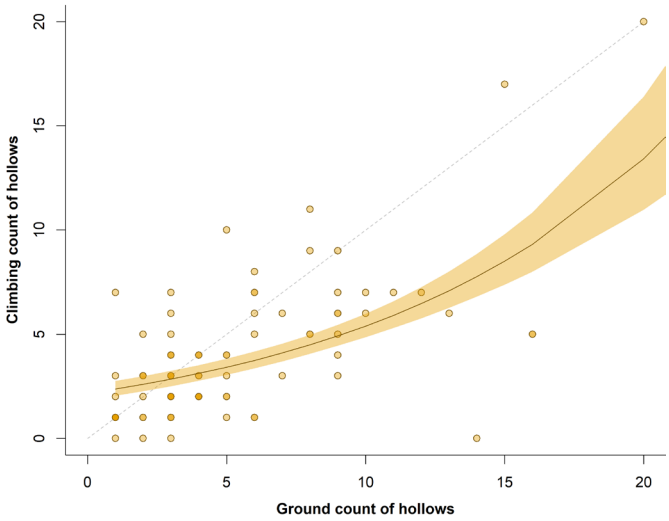

Figure 2: Fitted line with 95% confidence intervals for the relationship between the ground versus climbing counts of hollows in each tree. Points show the raw data, dashed grey line indicates what a 1:1 relationship would look like.

All of the trees identified as containing potentially suitable hollows for Regent and Superb Parrots were >83 cm DBH. We found that 18/95 of the trees that we assessed (18%) contained at least one potentially suitable hollow, and that 24/391 of the individual hollows (6%) fitted this profile. The number of hollows estimated from the ground was the best predictor of whether a tree actually contained a potentially suitable nesting hollow. For every five extra hollows estimated from the ground, the probability that that tree would contain a suitable hollow increased by 10% (Figure 3).

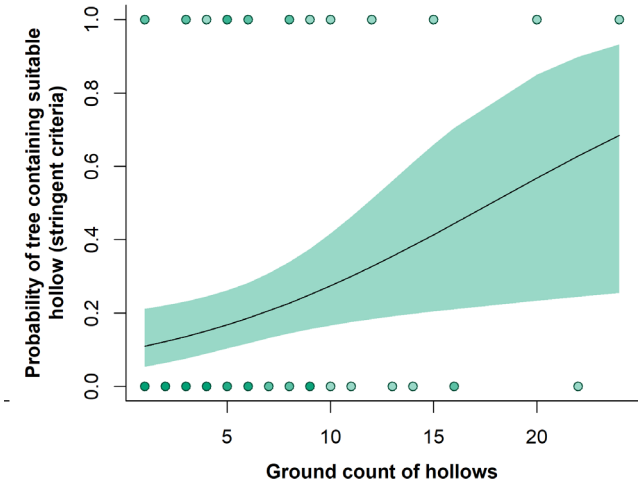

Figure 3: Fitted line with 95% confidence intervals for the relationship between the probability of a tree containing a hollow which appeared to be suitable for nesting, and the number of hollows estimated from the ground counts. Points show the raw data.

We re-visited 300 trees as part of our tree collapse assessments, including 145 River Red Gum and 155 Black Box (*E. largiflorens*) trees, ranging in size from 17 – 324 cm diameter. Despite evidence that many of the sites visited had experienced significant flooding, with water marks up to 3 m high on tree trunks, only five of the trees (less than 2%) appear to have collapsed during or after the floods. These collapsed trees were spread across both study areas and included River Red Gums and Black Box, ranging in size from a 25 cm DBH sapling to a 170 cm fully mature tree.

Figure 4: A group of Regent Parrot chicks in the nest hollow (photo taken as part of a different project).

Credit: Dejan Stojanovic, The Australian National University.

Implications

While suitable nesting hollows for Regent and Superb Parrot appear to be a scarce resource even in areas where these species breed, it is unlikely that this is the result of the flooding event. We found little evidence that the types of trees that are most likely to contain suitable hollows, i.e., large, mature River Red Gums, were impacted by the floods. River Red Gums are dependent on frequent flooding for reproduction, and their growth and size are linked to water availability.

A legacy of water regulation and forestry in some parts of our study area has led to an increase in stem densities of the River Red Gum forests. In turn, there has been a reduction in the average diameter of individual trees and the number of hollows they support, making them less suitable for hollow-dependent species.

It is unlikely that the installation of nest boxes would be effective in helping to address the shortfall of suitable nesting sites, given the highly specific requirements of these parrot species, and the fact that there have not yet been any records of either species successfully breeding in artificial hollows. This work would greatly benefit from follow-up surveys conducted during the breeding season to confirm whether the hollows assessed as suitable are used by nesting parrots, and to collect general measures of population health.

Recovery Outcomes

Through this project we have:

- Demonstrated that major floods are not a substantial threat to the integrity of large River Red Gum trees that support nesting hollows for Regent and Superb Parrots, and that installation of nest boxes is unlikely to be an effective recovery action.
- Developed models to predict the probability that a tree contains a potentially suitable hollow for nesting by Regent and Superb Parrots, based on ground-based measurements. In cases where rapid assessments are required in River Red Gum forests, ground-based counts appear to be a useful index for the abundance of hollows in general.

For further information contact Dr Pia Lentini (pia.lentini@deeca.vic.gov.au).

This project was conducted in partnership with Dr Dejan Stojanovic, The Australian National University.

Banner Photos: Louise Durkin, Arthur Rylah Institute for Environmental Research.

ISBN 978-1-76136-814-1 (pdf/online/MS word)

Accessibility

If you would like to receive this publication in an alternative format, please telephone the DEECA Customer Service Centre on 136186, email customer.service@delwp.vic.gov.au, or via the National Relay Service on 133 677 www.relayservice.com.au.

We acknowledge Victorian Traditional Owners and their Elders past and present as the original custodians of Victoria's land and waters and commit to genuinely partnering with them and Victoria's Aboriginal community to progress their aspirations.