

The National Flying-fox Monitoring Program

Report on the February 2014 count

Background

Data on population size and distribution is essential to inform the conservation management of any species. Monitoring programs are essential to enable the collection of these data and, over time, to identify trends.

Monitoring of flying-foxes is required because they are often the focus of conflict. Furthermore, two species, the grey-headed flying-fox (GHFF) and the spectacled flying-fox (SFF), are listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and relevant state legislation. This program will provide data to inform decision making for flying-fox conservation and will also help inform responses to public concerns about the impact of flying-foxes on industry, agriculture and public health, including Hendra outbreaks.

The large size of flying-fox aggregations (or camps) and their extreme mobility means that flying-fox monitoring is not a straightforward task. The National Flying-fox Monitoring Program (NFFMP) uses a method that is specifically designed to collect data on the abundance and distribution of flying-foxes in eastern Australia. This method has been developed to:

- i. be appropriate for the spatial ecology and behaviour of flying-foxes, and,
- ii. allow estimation of the errors associated with counting animals.

This last point is critical as all monitoring methods have errors and without quantifying these it is impossible to determine the degree of confidence that we have in any population estimate.

In the NFFMP, the flying-foxes at small camps are counted directly while a method called distance sampling is used at larger camps. Distance sampling uses estimated flying-fox density and the area of the camp to provide an estimate of the number of animals present at a camp. It uses changes in the detection of flying-foxes with distance from the observer to estimate detection error, a key type of error. The NFFMP is attempting to simultaneously monitor all known camps of both EPBC-listed species each quarter. The program also aims to monitor as many camps of little-red (LRFF) and black flying-foxes (BFF) that occur in eastern Australia as resources allow.

The February 2014 Survey Results - a Summary.

The February 2014 survey marked the sixth count of the project. In this round counts were conducted at a total of 269 grey-headed flying-fox camps with flying-foxes found at 118 of these. With 95% of the data submitted the estimate for the total grey-headed flying-fox population in these camps was 610,000 animals. In the report for the August 2013 count we confidently predicted that the low numbers seen in that count would bounce back up in November to the high numbers we had seen in the previous November and February counts. Our confidence was based on our experience with SFFs where every year there is a dramatic fluctuation in counted population with low numbers in the cooler months and higher numbers in

the warmer months. Of course our bold prediction didn't come to pass in November but it seems that the numbers were back up in February. In the case of the SFF the exact timing of the rise and fall of numbers varies slightly depending on the year and it appears that this is also the case with the GHFF with the move back into camps occurring sometime after the November count. Exactly what drives this move in and out of camps, and the timing of this shift, is not yet clear but we suspect that it is related to patterns of flowering and fruiting. This is the sort of question that the long-term monitoring from a project like this can help answer.

In this count 81% of the counted grey-headed flying-foxes were in NSW, 11% in Qld, 7% in Victoria while <1% were recorded in SA and the ACT. There were five GHFF camps with >30,000 individuals, these being Kendall, Macksville, Bellingen, Fig tree, Centennial Park and Yarra Bend. The majority of the population was clustered along the coast, especially in Bellingen, Macksville and Port Macquarie areas. We know we missed a few camps in this round of surveys, however, we believe that the known major camps were covered. If you find that you cannot count your camp for some reason please let us know as soon as possible as it is sometimes possible to find another counter.

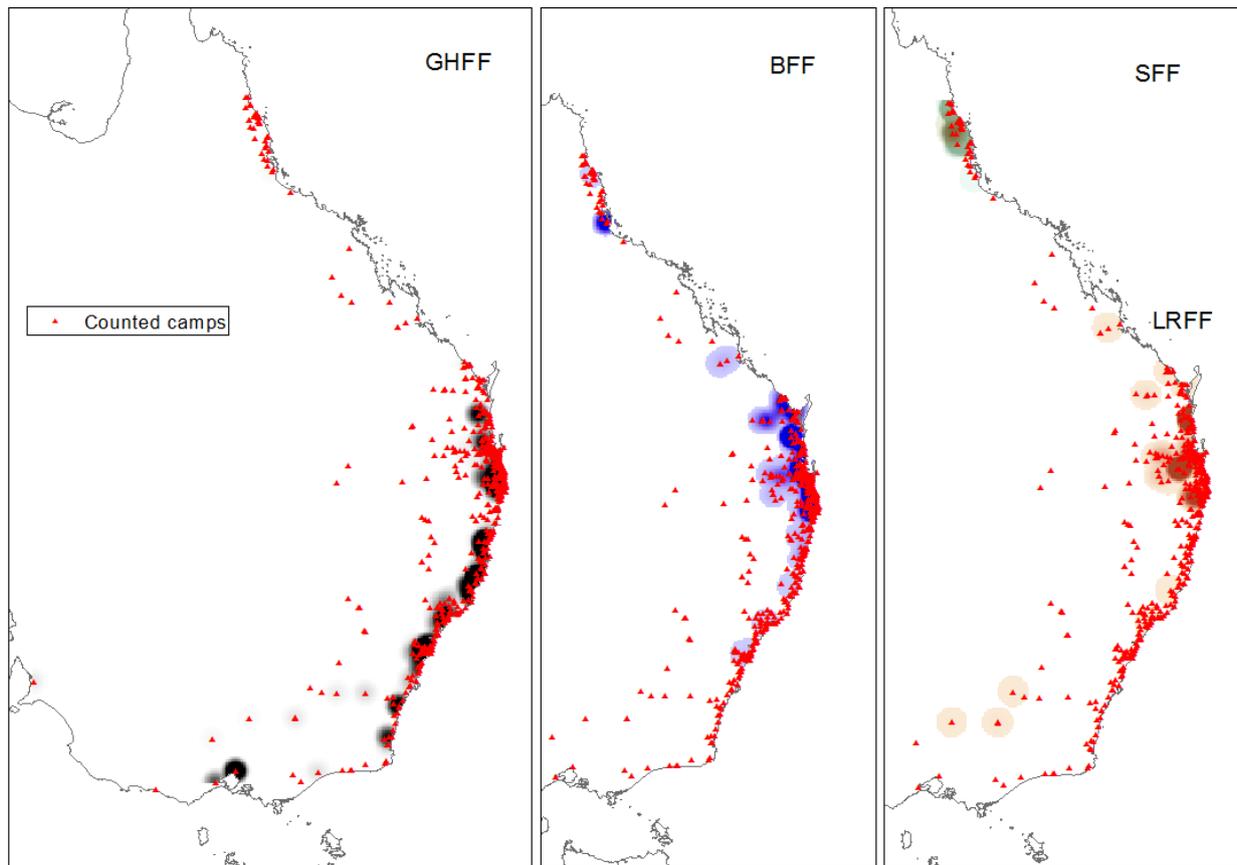
SFF numbers totalled 56,000 animals, with 35,000 of those found in the Port Douglas camp. As was the case for the GHFF this is much lower than we would expect for this time of the year. Hopefully the 'missing' animals are roosting at locations unknown to us. Again, why this might be the case is currently not known.

The NFFMP currently covers only part of the range of the black and little-red flying-foxes, so while we present results from that part of the range, it needs to be remembered that these are not estimates of the total population size for these species. In total 131,000 BFF were recorded at 96 camps and 825,000 LRFF were recorded at 34 camps. There were particularly large numbers at Noosaville and Boonah in Qld. We'd like to acknowledge the efforts of the Queensland Government and its staff in increasing the coverage of the counts in the BFF and LRFF only area along the Qld Central Coast. These efforts mean that the NFFMP is now covering nearly the entire east coast and adjacent inland areas of the range of flying-foxes.

A map of the camps covered in the NFFMP surveys can now be viewed at <http://www.environment.gov.au/node/16393>. Clicking on a camp icon will show a plot of species composition and numbers recorded at that camp during NFFMP surveys. Results from the February 2014 survey will be added once all data has been submitted.

Where were the flying-foxes in February?

The heat maps below show the distribution of the different flying-fox species across the region of the NFFMP. The darker the colour the greater the abundance of flying-foxes in an area. Black dots represent visited camps



As usual a reminder, we have provided numbers to give counters a feel for the outcome of the count and caution that at this point in time they are indicative only. We are still refining analysis methods and estimating some errors. As a consequence it is not yet possible to say what level of confidence can be assigned to the estimate. Describing the errors is a focus of our ongoing research.

The aim of the program is to establish a reliable baseline estimate of the flying fox populations in 2013 and over time to estimate trends. This will take a number of years. Each quarterly count will be subject to various factors which may influence the results. For example, the February 2013 count took place shortly after severe storms and flooding in northern Queensland and an unprecedented January heat wave in south-eastern Australia, which saw many flying foxes stressed or killed.

In order to achieve the best possible estimate it is important that surveys are performed using the methods correctly. We are continuing to conduct training sessions and the CSIRO urges any counters who have any questions or concerns about count methodology to contact Dr David Westcott at david.westcott@csiro.au or Mr Adam McKeown at adam.mckeown@csiro.au.

We are continually updating the database and adding new camps as we are made aware of them. If you know of camps that are not being counted please contact us at the CSIRO.

Thank you to all the counters who put in the hours to assist the program. Your effort is greatly appreciated.

If you would like to participate please contact:
 New South Wales - Sarah.Pizzey@environment.nsw.gov.au

Queensland — Katrina.Prior@ehp.qld.gov.au

If you know of additional camps or have questions about the counts please contact:
david.westcott@csiro.au or adam.mckeown@csiro.au

Additional information about the program can be found at:
www.environment.gov.au/biodiversity/threatened/species/flying-foxes-monitoring-program.html

The National Flying-fox Monitoring Program is collaboration between the Australian Government, the South Australian, Victorian, New South Wales, Australian Capital Territory and Queensland governments, CSIRO, local governments and volunteers in New South Wales and Queensland. The CSIRO was contracted by the Rural Industries Research and Development Corporation to undertake this research project. This research was funded by the Commonwealth of Australia, the State of New South Wales, the State of Queensland and the Corporation under the National Hendra Virus Research Program.