

REPORT: Flying-fox mass mortality event – Spring/Summer 2016-17

The purpose of this report is to document the mortality event and provide a descriptive analysis of the observational data collected. It is based on data provided by individual reporters who submitted a 'Flying-fox mass mortality incident report form' (Attachment 1), and by wildlife rescue group WIRES through the NSW Office of Environment and Heritage (OEH). The incident report form was developed for this event and distributed by Wildlife Health Australia (WHA).

From September 2016, wildlife rescuers began reporting mass mortality incidents at camps distributed along the eastern seaboard of Australia.

Six incident report forms were received, covering a total of 13 individual locations or flying-fox camps in Queensland and NSW (Table 1, Figure 1). The first incident commenced in Cairns in Far North Queensland at the start of September. It affected predominantly neonate and juvenile spectacled flying-foxes with around 600 deaths, reported to represent over 50% of juvenile recruitment. In mid-September, a camp in Townsville in northeastern Queensland began observing significant mortality and pup abandonments of black and little red flying-foxes, affecting all age groups, with more severe effects observed in black flying-foxes. Both of these incidents continued until approximately December-January. These incidents were characterised by premature births, abandoned pups, respiratory distress and dehydration. In Cairns, the abandoned or dead flying-foxes appeared emaciated, however in Townsville the adults found did not show obvious signs of starvation. The reporter for the Townsville event advised that camp dispersal activities had been undertaken around this time. No conclusive findings were identified from post mortem examination of a small number of available carcasses and no increase in cleft palate was observed.¹

Further incidents were reported two months later among grey-headed flying-foxes (GHFF) in Dubbo in the NSW Central West, and in the Wide Bay-Burnett region of southern Queensland from mid-November to early December 2016 (Figure 2). GHFF pups in Dubbo were observed to be undernourished, with adult flying-foxes observed to be searching for food in flight. Apiarists in the Dubbo region reported a coincident nectar shortage across the district. In the Wide Bay-Burnett region of Queensland, the incident appeared as two separate mass mortality events affecting neonates approximately 3 weeks apart, and abnormal GHFF movements had been observed in the 18 months preceding the events. Losses of GHFF were significant in this region, with one report involving over 900 neonates dead and 320 in care.

The final incident reported occurred in Lismore and Dorrroughby in north-eastern NSW in December 2017, affecting GHFF and black flying-fox neonates. Sub-adults appeared to be undernourished, and bats were observed returning to the colony after daybreak. A eucalypt flowering shortage was reported in the region.

Data from WIRES, a wildlife care group, were provided for analysis by the NSW Office of Environment and Heritage (OEH) (Figure 3). The data represent reports to WIRES from across NSW of flying-foxes requiring rescue, from mid-November 2016 to mid-March 2017. These data were kindly provided by WIRES to NSW OEH outside of normal reporting and in a short time frame, so the numbers should be considered as approximate only. The WIRES data show a high number of reports in mid-November which may be linked to the events described in this report, however it is noted

¹ Cleft palate and other congenital defects have previously been reported in spectacled flying-fox neonates (Olsson A and Woods W (2008). Bats. In *Medicine of Australian Mammals*. (Eds Vogelnest L and Woods R) pp. 465–502. CSIRO Publishing, Melbourne).

that data were only provided for analysis from November 2016, which was after the initial reports of pup abandonment.

Discussion

Disease, weather conditions and food shortage were proposed as potential causes at some locations, but these factors were not considered a problem at others, particularly some sites in Queensland. Reporters noted that the events did not appear to be entirely attributable to heat, as some reported mild temperatures, or mortality preceding the start of hot days. Some unusual GHFF behaviour had also been noted in the lead-up to these events in some locations. Investigation of a disease process was not possible due to very limited fresh carcasses available for examination.

In summary, no common underlying cause of the pup abandonment/mass mortality events was definitively found. While the aetiology is uncertain, general observations include: mortality incidents were reported in the more northerly populations first; mortalities in all regions appeared to end around December-January; and significant losses were observed, with greatest mortality reported in GHFF colonies.

Previous events

There are anecdotal reports of similar events occurring in previous years, including a GHFF mortality in 2011 with reports of pup abandonment, atypical feeding behaviour and day roosting. Juvenile mortalities were reported in 2009, primarily in GHFF on the north coast of NSW and south-east Queensland. Widespread food shortages were suggested as a likely cause of both these events. There have also been reports of widespread little red flying-fox juvenile deaths from the Northern Territory to Cape York to Charters Towers, particularly severe in Charters Towers in September 2017.

Public health

Mortality events such as these can pose a public health risk, as they may lead to increased contact between people and flying-foxes with the accompanying risk of transmission of Australian bat lyssavirus (ABLV)². Increased contact can occur when large numbers of sick and dying animals are found on the ground, and when carers and members of the public attempt to rescue these animals. Every person who comes into contact with flying-foxes during a response should be vaccinated against rabies with evidence of current immunity, be experienced in handling flying-foxes and use appropriate protective equipment. A well-coordinated response to mortality events will help to reduce the public health risk.

Table 1 – Details of reports received

Camp Location	Start (approx)	End	Estimated duration (weeks)
Cairns	1/09/2016	Ongoing at 27/01/2017	≥21
Townsville	15/09/2016	Ongoing at 23/12/2016	≥14
Dubbo	13/11/2016	23/12/2016	6
SE QLD (8 locations / camps)	14/11/2016	8/12/2016	3
Lismore / Dorroughby	1/12/2016	Ongoing at 8/12/2016	≥1

² ABLV infection is in low levels in the wild bat population (<1%) but is more common in sick, injured and orphaned bats.

Timeline of FF mass mortality incidents, September 2016-January 2017

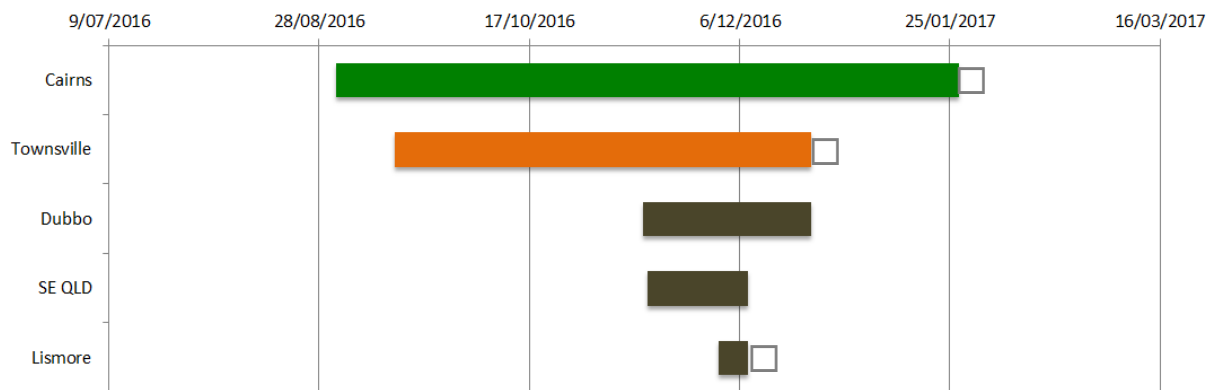


Figure 1 - Timeline of events. Green = spectacled flying-foxes, Orange = little red and black flying-foxes, Grey = grey-headed +/- black flying-foxes. □ Event ongoing at time of reporting.

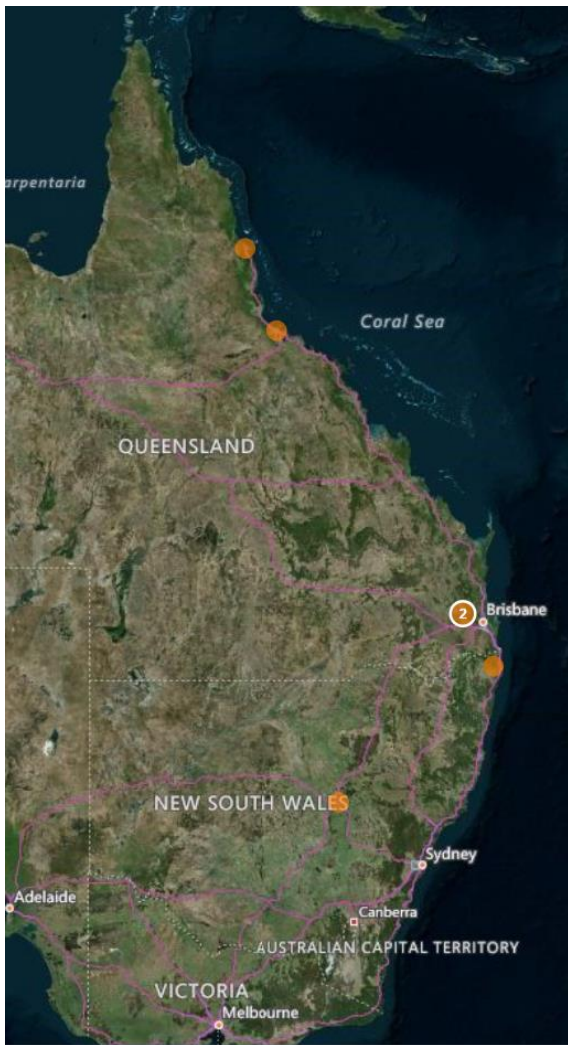


Figure 2 - Geographical distribution of affected camps

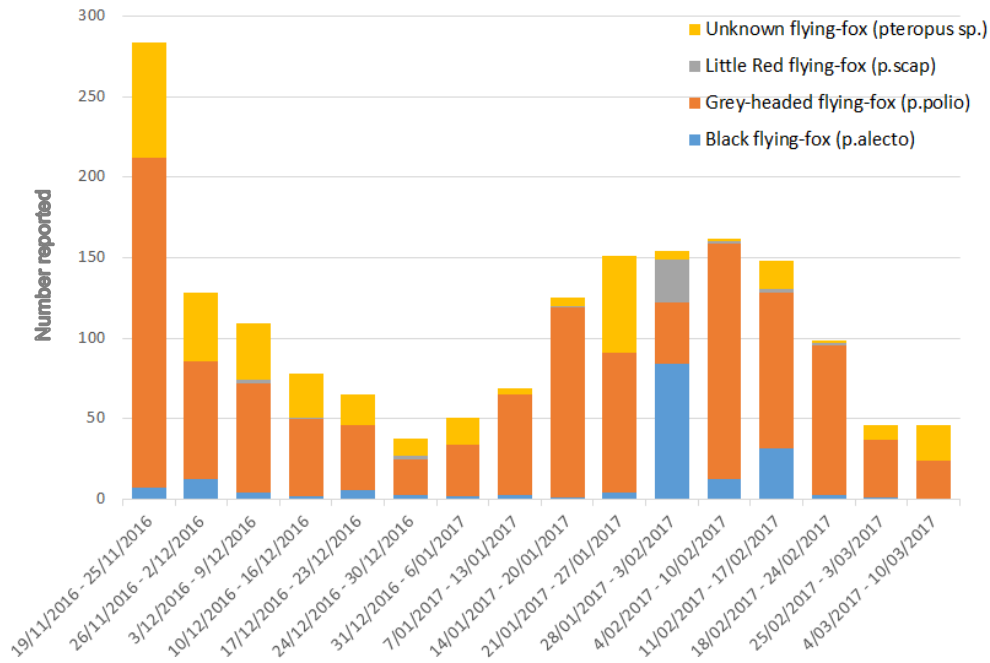


Figure 3 – Flying-foxes reported to WIRES, November 2016 - March 2017

This report was prepared by Dr Kat Taylor (Hunter New England Population Health, HNEPH) with input from Hume Field (EcoHealth Alliance), Claire Harrison (NSW Department of Primary Industries), David Durrheim (HNEPH) and Keren Cox-Witton (WHA).

Attachment 1: Flying-fox mass mortality incident report form
Spring/Summer 2016-2017

There are reports of increased numbers of sick or dead grey-headed flying-foxes across eastern Queensland, NSW, Victoria, and in the ACT. Primarily, there appears to be abandonment of pups in camps and starvation. In some areas, there have also been reports of unusual behaviour in adult flying-foxes such as day roosting and flying and foraging in unusual areas. This form is to collect information to help determine the extent and nature of this event.

REPORTER'S DETAILS
Your name:
Your organisation/affiliation:
Your contact details for any follow-up:
The date you filled out the form:

ABOUT THE INCIDENT (when and where did it happen, and who was affected)
Location of incident (camp name if known plus nearest suburb/town):
Date of first occurrence/awareness:
Description of incident (attach extra pages if needed):

Species involved	Number affected (approx; includes number dead)	Number dead (approx.)	Age (neonate, juvenile or sub-adult/adult)*
Grey-headed			
Black			
Little red			
Spectacled			

* Neonate (birth to weaning ~12 wks), juvenile (weaning to 12 mths), sub-adult/adult (>12 mths)

If mixed species in the colony, are all the species similarly affected? Y N Not mixed

Details:

Have you noticed or heard of any unusual behaviour relating to flying-foxes in the area? Y N

Details:

ABOUT THE BATS (describe the 'syndrome', treatment and outcome)

Details of flying-foxes taken into care (clinical presentation; illness or complications; veterinary treatment; approx. numbers recovered/died/euthanased):

Is the incident ongoing? Y N

Details:

Any other relevant details e.g. weather, local food availability, human disturbance, etc.

Any other comments? What do you think has caused the mortality event?

Please return this form to:

Keren Cox-Witton
Wildlife Health Australia
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