# Gray-headed flying-fox population is stable—10 years of monitoring reveals this threatened species is doing well

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Grey-headed flying foxes sleep and socialise during the day but are often well aware of approaching humans. Credit: Adam McKeown, CSIRO

Flying foxes, or fruit bats, are familiar to many Australians. So it may come as a surprise to learn two of the four mainland species, both gray-headed and spectacled flying foxes, are threatened with extinction.

But our decade-long survey of one of these species—the gray-headed flying fox—brings some encouraging news. Our data show the population has been relatively stable since 2012, when surveys first began under the National Flying-fox Monitoring Program.

Incredibly, the species emerged from the Black Summer of 2019–20 relatively unscathed. Flying foxes also suffer in heat waves and many die, but overall numbers have remained stable.

While this study is good news for the species, we must not become complacent. Heat waves are expected to become more frequent and intense as the climate changes. Only further monitoring can determine its effects.

## Hanging out with flying foxes

The gray-headed flying fox (*Pteropus poliocephalus*) is common in most cities and towns across south-eastern Australia. More recently, colonies have become established in South Australia.

The species can be found anywhere from Maryborough, on Queensland's Fraser Coast, to Adelaide, with some outlying populations as far north as Ingham in north Queensland. There's also a breakaway group in Port Augusta, 300km north of Adelaide.

The "vulnerable" listing means the species is at risk of extinction. But it's not as dire as if it were "endangered".

The original vulnerable assessment, endorsed in 2001, was based on a

population decline of about 30% over ten years and the potential for ongoing land clearing in the gray-headed flying fox's core range.

But this is the flying fox you're most likely to see and hear in south-east Australia, from Sydney to Adelaide.

During the day, flying foxes like to hang out together. They rest and socialize in large roosts, sometimes numbering more than 100,000 animals.

As the sun sets, they take to the sky, departing in large streams to forage during the night in the surrounding landscape. They can travel long distances to find food, sometimes venturing more than 40km from home, and flying more than 300km in a single night.

More than 150,000 grey-headed flying foxes roosted in Gympie, Queensland, after much of their habitat burned during the Black Summer of 2019-20. Credit: Eric Vanderduys, CSIRO

Their food of choice is nectar from a wide variety of eucalypt, bloodwood and melaleuca species. In return, they play an important pollination role, as if they were nocturnal bees with a one-meter wingspan.

They also feed extensively on native figs. In urban areas, they feast on the nectar and fruit of introduced species found in gardens and street trees.

Individuals regularly change roosts. They move throughout the species' range, following food resources.

That means the number of bats in roosts is constantly changing, depending on the availability of the surrounding resources, which makes accurate counting particularly challenging.

## Monitoring a threatened species

Australia's national science agency, CSIRO, co-ordinated the National Flying-fox Monitoring Program in partnership with federal and state environmental agencies from 2012 to 2022.

The intention was to monitor the populations of the two nationally listed flying fox species on the mainland. It was specifically designed to understand their population trends. Here we focus on the gray-headed flying foxes.

The program involved quarterly visits by federal, state and local government staff and volunteers to as many flying fox roosts as possible. Over the entire program almost 12,000 counts were conducted at 912 potential roosts. Gray-headed flying foxes were found at 469 of those roosts.

This program would not have been possible without hundreds of hours of work around the clock by staff and volunteers, often in challenging conditions. Their work highlights the importance of long-term monitoring programs.

From 2012 to 2022 we counted an average of 580,000 gray-headed flying foxes in each survey. But total numbers ranged between 330,000 and 990,000, with strong seasonal variation. This variation relates to their reproductive cycle and the availability of food within their range.

Flying foxes pup late in the year. When those pups become independent, they can be counted. This results in a sudden increase in the numbers, typically around February. So while our data show peaks and troughs throughout each year, overall the population remained stable.

We developed a model to allow for this seasonality and examine overall population trends. The model strongly suggests the population hovered around 600,000 adults for the ten years of the survey. We found a 70% chance of a slightly increasing population, versus a 30% chance the population has declined slightly.

This young grey-headed flying fox is big enough to count. Credit: Eric Vanderduys, CSIRO

The population appeared to be stable despite exceptional events such as the 2019–20 megafires and severe heat waves known to have killed thousands of flying foxes.

The flying foxes seem resilient to these threats for two main reasons.

First, they are nomadic and well adapted to traveling long distances. This allows them to evade threats such as fires and droughts.

Second, gray-headed flying-foxes are likely to benefit from a "human-modified landscape". In other words, they may well be urban

"winners", as the urban areas we've created provide diverse foraging opportunities.

Gray-headed flying foxes continually occupied all major cities within their range throughout our monitoring program.

These urban environments offer a smorgasbord of flowering and fruiting species, especially palms and figs. Many of these species are exotics, with flowering and fruiting patterns that flying foxes can readily exploit.

We found continuous occupation of individual roosts was unusual. The few that were continuously occupied were all in urban areas, supporting the view that urban areas are increasingly important for this species.

## Good news, but we need to be cautious

After ten years of monitoring we can safely say the gray-headed flying fox is doing ok, for the time being.

But threats to its survival remain. Climate change is expected to cause more heat waves, bushfires and droughts within their range. This could turn their fate around.

It's also worth noting that while our monitoring continued for two years after the 2019–20 bushfires, the longer-term impacts are still unknown.

Given this uncertainty, continuing monitoring using similar methods and incorporating updated technology would increase certainty about the population trajectory. Unfortunately, monitoring has paused since 2022, pending further funding discussions.

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