

The effectiveness of approaches to urban flying-fox roost management

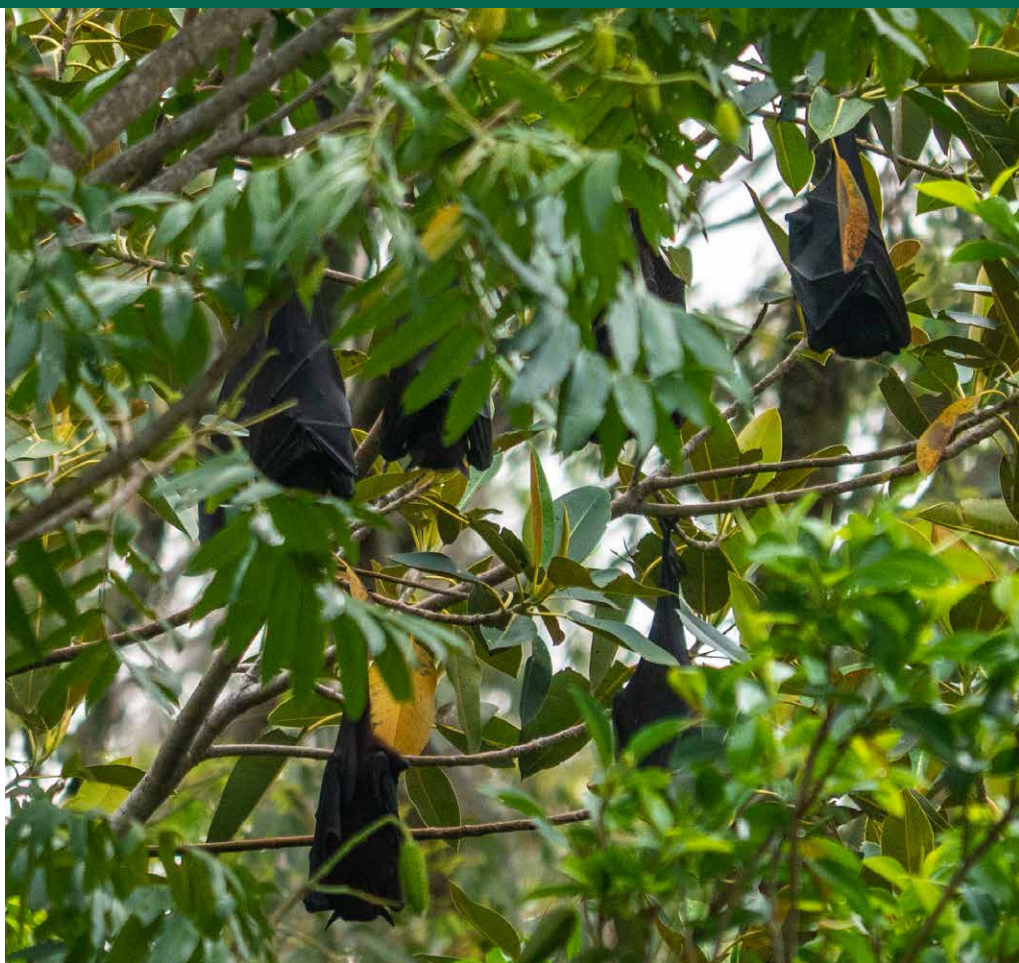
In brief

Managing urban flying-fox roosts can be challenging, and is an issue in many cities and towns of eastern Australia. Four species of flying-foxes (*Pteropodidae*) occur in mainland Australia, two of them threatened. Due to habitat loss, flying-foxes have increasingly been congregating in urban areas over recent decades, with these urban roosts or “camps” hosting very large numbers of individuals, from hundreds to many thousands. This has led to conflict with human communities due to noise, smell, loss of amenity and perceived risk of disease.

Land managers required to balance the impact of these roosts on human communities with the conservation needs of the species have been working with limited resources and without a means to share information and knowledge about their experiences of various management options.

This study aimed to gather, consolidate and compare information across states about manager experiences with various actions.

We found that no single approach for managing urban roosts emerged as “best” in minimising human–wildlife conflict, but rather that local context and concerns of the community need to be considered. In other words, all approaches were effective in some places but not others.



Black flying foxes. Image: John Robert McPherson CC BY-SA 4.0 Wikimedia Commons

We also found a mismatch between resident concerns and management responses; for example, the most common approach used was “education and raising awareness”, which does not address the most common resident concerns, which were about noise, smell and loss

of amenity. The information collated in this study provides managers with a better understanding about community expectations and triggers, and how to select the most appropriate management options for their local communities.

Background

Mainland Australia is home to four species of flying-foxes (*Pteropodidae*; see Figure 1). Flying-foxes, or “fruit bats”, travel up to 50 km by night to forage on fruit and nectar, and roost by day in large numbers. Over recent decades such roosts, also referred to as camps, have been increasingly found in urban areas, likely due to habitat loss coupled with an increase in the diversity and reliability of foraging resources available in many cities and towns. The size of these roosts can vary dynamically from hundreds to tens or even hundreds of thousands of individuals depending on changes in resource availability.

In some cases, the large urban camps lead to community conflict and negative human–wildlife interactions, including calls for the flying-foxes to be moved or culled, due to noise, smell, loss of amenity, and perceived risks of disease transmission.

This poses challenging dilemmas for managers, who must take into account the conservation needs of the species – two of Australia’s four flying-fox species are listed as threatened due to population declines. Land managers trying to balance the conservation of federally listed species with the concerns of their local community have faced difficulties including little or no access to information about how communities respond to flying-fox roosts or which management actions are most effective in addressing community concerns.

The problem is compounded by many managers tackling this task in isolation, without a way of sharing lessons and experiences across local and state government lines. This has meant that the prevalence and success (or otherwise) of management actions for urban flying-fox roosts has so far been largely undocumented.

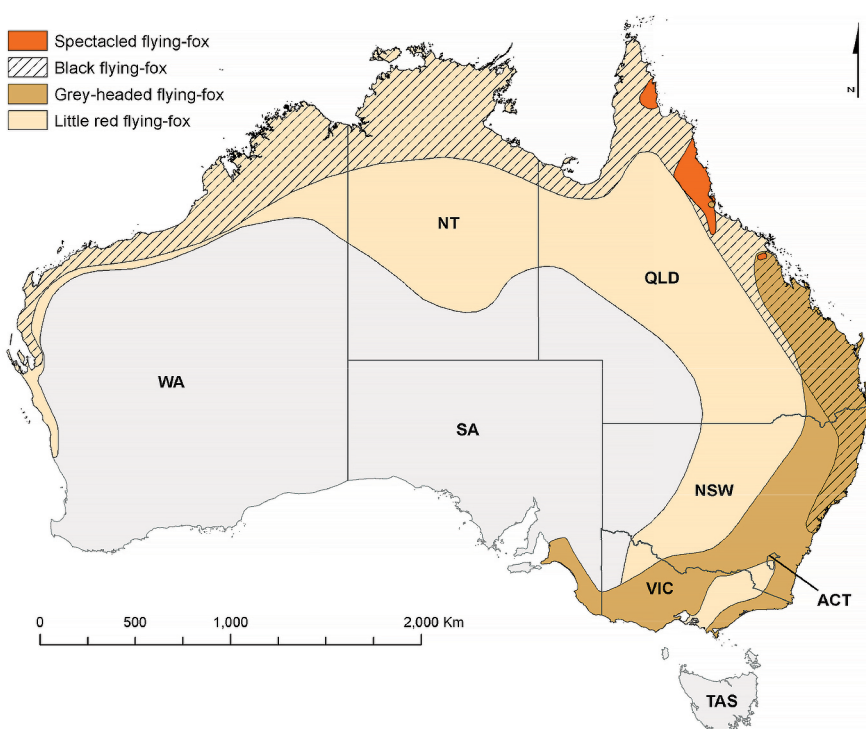


Figure 1. Distribution of Australia's four mainland flying-fox species.

Main aim of research

We aimed to determine:

1. the range of activities managers around Australia are undertaking to alleviate human–wildlife conflict at urban flying-fox roosts, and information about the costs and relative effectiveness of those activities
2. how communities respond to flying-fox camps and to the various management actions.

By documenting and consolidating this information, we aimed to offer the first national-level guidance to land managers to increase the effectiveness of their approaches to flying-fox roost management in urban areas.

What we did

We conducted interviews and surveys in 2016 to gather the perspectives of more than 50 camp managers and 60 community members from Queensland, New South Wales, Victoria and South Australia. Obtaining the dual perspectives was intended to help understand both sides of the issue of urban flying-fox management. Our research included findings from more than 47 flying-fox camps, including Bateman's Bay (New South Wales), Bairnsdale (Victoria) and Coolool (Queensland).

We asked camp managers about the triggers that led them to actively manage a flying-fox camp, the types of approaches they had used, and the cost and effectiveness of those approaches. To investigate local community attitudes, we asked community members how they felt about flying-foxes, what the impacts of the local camp were, whether they were satisfied with the management of the camp to date, and how acceptable alternative management options might be. We focused our community interviews on people living within 250 m of a flying-fox camp to capture the views of those most likely to be directly affected by issues associated with camps.

Key findings

Our first key finding was that no “one-size-fits-all” approach emerged as the most effective way to manage community conflict with flying-foxes in urban areas – what worked well at one location did not necessarily work at another. A further key finding was that mismatches were common between the concerns of residents and management actions undertaken. For example, the most common management activity undertaken was education and raising awareness; however, this does not address the most common concerns of residents – noise, smell and loss of amenity.

We classified the range of actions that may be taken to mitigate human–wildlife conflict into community-focused or camp-based approaches.

The main community-focused approach was **education and engagement** aimed at reducing conflict by changing community perceptions of flying-foxes towards increasing tolerance for them, typically by providing information to the public about flying-foxes and collecting feedback from the community.

Camp-based approaches focus on the flying-foxes or the vegetation they roost in.

We identified three types of camp-based approaches:

- **Buffers:** discouraging roosting in the areas bordering the camps by (a) removing or modifying vegetation along the borders of camps or (b) deploying deterrents such as sprinklers.
- **Indirect dispersal:** removing or modifying the roost site vegetation when the flying-foxes are absent to stop them from re-establishing the camp.
- **Direct dispersal:** using various forms of disturbance such as smoke, lights and noise as the flying-foxes return from foraging to deter them from roosting.

We summarise our findings about each of these four approaches in the table below.

	Education and engagement	Buffers	Indirect dispersal	Direct dispersal
No of camps	30	26	12	12
Cost	Range \$150–\$40,000, median \$3250.	Range for vegetation buffers \$2000–\$80,000, median \$38,000; range for deterrent buffers \$12,000–\$33,000, median \$17,000.	Range \$5000–\$56,000, median \$30,000	Range \$10,000–\$2 million, median \$23,000
Effectiveness	Low	Moderate	Moderate	Moderate
Pros	Can be effective at alleviating concerns about disease transmission.	Shifts impacts away from residents; managers seen as proactive	Shifts impacts away from residents; managers seen as proactive. Lower risk of bats returning to site (compared with direct dispersal).	Managers seen as proactive; reduced complaints; improved amenity; shifted the location of the camp.
Cons	Received the lowest investment of all actions; was done in an ad hoc or reactive way; managers appeared to have little training in stakeholder engagement.	For vegetation buffers, some residents may resent any impacts on amenity caused by loss of trees and other vegetation. Also, the cumulative impacts of buffers may contribute to ongoing habitat loss for flying-foxes.	Residents may resent the impacts on amenity caused by loss of trees and other vegetation. The cumulative impacts of vegetation removal may contribute to ongoing habitat loss for flying-foxes.	Potential for formation of “splinter camps” in new locations that create even greater conflict, or movement to camps in other problematic locations. In 83% of cases, flying-foxes returned to site after dispersal. The most successful dispersals required substantial resources and sustained time investments.

Cited material

Currey, KC, Kendal, D, van der Ree, R, and Lentini, PE (2018) Manager perspectives on strategies used at flying-fox camps. National Environmental Research Program Threatened Species Recovery (TSR) and Clean Air and Urban Landscapes (CAUL) Hubs, Melbourne.

Currey, KC, Kendal, D, van der Ree, R, and Lentini, PE (2018) Land manager perspectives on conflict mitigation strategies for urban flying-fox camps. *Diversity* 10, 39.

Key findings (continued)

Managers cited complaints from residents as the primary reason for intervening in flying-fox camps. The next most frequently cited reasons were vocal stakeholders, some of whom lived close to the camp; the media highlighting camp issues; and requests from elected representatives. Other factors considered important by camp managers were the camp expanding onto council land, public risk from tree damage, and assessments of costs versus potential benefits of actions. Almost half the managers said that they had given serious consideration to management actions additional to those they

had tried, but could not implement them because of: limited funding or resources; community opposition; concerns about the welfare of flying-foxes, site condition, disease and/or the legality of the actions; or concerns about possible negative consequences (such as dispersing the flying-foxes onto private property).

Community members who lived close to the flying-fox camps gave mixed responses to questions about how they felt about the camps. Positive associations were common, with many residents appreciating the ecological role that flying-foxes play and reporting a sense of awe in the experience of flying-fox

camps. Noise, smell and loss of amenity were the most commonly cited negative impacts. Unexpected changes in the camp size, such as large influxes, were also cited, and led to resentment and conflict. Many felt that while flying-foxes were an important part of nature, they did not belong in urban areas.

Little long-term planning is being done by local governments to address the issues of human–wildlife conflict around urban flying-fox roosts. More than 80% of agencies did not have guidelines or policies relevant to developments near flying-fox camps, and few agencies were creating alternative flying-fox habitat.

Implications and recommendations

The dynamics of flying-fox populations are complicated and community responses to urban roosts even more so. Human–human conflict (between members of the community with opposing views on roosts, and between the managing agency and the community) also needs to be skilfully managed. It is therefore critical that research helps managers navigate this complex space, providing a better understanding of the problems, and offering the information managers need to select and tailor their management actions for the best outcomes in their local community.

This study is the first to collate national information about flying-fox management systematically and present the information in a way that allows for direct comparisons of costs, relative effectiveness and the context in which decisions were made. By sharing the breadth of experiences of both land managers and their community members, we were able to identify important mismatches between community expectation and management action, and reveal that management actions are highly context-specific. Our work can help managers better understand the triggers of conflict with flying-fox roosts in their community and better identify

the most appropriate management actions for their local context.

Management of urban roosts will always require a nuanced approach, and management decisions should be based on an understanding of the context of the camp location and history, and the range of objectives and concerns of the local community. Effective consultation with the community about their concerns will be critical to ensuring that management actions alleviate conflict. Education and awareness-raising activities, while valuable, are unlikely to be effective when the main source of community conflict concerns the sensory impacts of noise and smell.

Further Information

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