

Spectacled Flying-fox conflicts – tucker, totem, taunt and threat

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Abstract

Flying-foxes worldwide have suffered population declines and some extinctions, and due to negative attitudes to bats, achieving population recovery is challenging. The Spectacled Flying-fox of north-east Australia, a species vital to the wet tropics region, experienced a population crash of over 75% in <15 years. Despite this decline, little action has been taken over the last two decades to help the species recover. The scientific evidence of the continuing population decline of the Spectacled Flying-fox has been presented to multiple levels of government, but detrimental decisions have been made despite the evidence. Scientific evidence and arguments by themselves are clearly not sufficient to change attitudes. The approach and narrative have to change to persuade people that the species is important for the rainforests and other forests that people love. Better engagement, narrative and story-telling are required. Bringing together communication specialists, social scientists and wildlife scientists are necessary to create narratives that people understand and accept, and that persuades them that the Spectacled Flying-fox is worth protecting. Actions to reduce impacts on the human community are essential but need to be done in tandem with changing hearts and minds. Otherwise, the Spectacled Flying-fox will continue its decline.

KEYWORDS

conflict species, decision-makers, endangered species, narrative, storytelling

Plain language summary

Spectacled Flying-foxes are an integral part of the wet tropics of north Queensland, Australia. They are now endangered and yet face continued harassment and threats. Negative attitudes have hampered recovery actions, including reluctance to protect them and taking necessary action to help them recover to former safe population levels. Changing attitudes takes more than sound scientific evidence, it takes multidisciplinary approaches from communication specialists, social scientists and wildlife scientists.

1 | INTRODUCTION

In many ways, the endangered Spectacled Flying-fox (*Pteropus conspicillatus*: Gould 1850) is a classic Human-Wildlife Conflict and Coexistence species (König et al., 2020; Nyhus, 2016; Soulsbury & White, 2015) as identified in the Kunming-Montreal

Global Biodiversity Framework, Target 4 (CBD, 2023). The Spectacled Flying-fox is one of the most important tree pollinators and distributors of fruits of rainforest trees across the wet tropics of Australia (Dennis & Westcott, 2006; Richards, 1990), often travelling over 100 km per night (Westcott et al., 2015) despite roosting mostly in disturbed urban and

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agricultural areas. Over 86% of the remaining roosting habitats of the species occur in modified urban and rural landscapes in small isolated patches of remnant forest outside the Wet Tropics World Heritage and other conservation areas, even though the bats feed in these areas (Timmiss et al., 2020). The proximity of the Spectacled Flying-fox camps (also called roosts) to humans creates conflicts which need to be resolved.

The Spectacled Flying-fox population has experienced a substantial decline (>75%) over the past two decades, dropping in number from over 320,000 to just 78,000 in 2017 (Roberts et al., 2020; Westcott et al., 2018). In late November 2018, a further 23,000 individuals—a third of the remaining population—died during a heat stress event in Far North Queensland. Its population continues to decline (mean = -0.12 yr^{-1} , 95% confidence interval -0.39 to 0.11) (Westcott et al., 2018). Factors in the declines include cyclones, persecution, disease, habitat loss (Westcott et al., 2018) and recently, extreme heat waves (Bureau of Meteorology, 2018). Flying-foxes die in numbers when temperatures climb above 42°C (Welbergen et al., 2008) as were experienced in 2018, and possibly at lower temperatures (Ratnayake et al., 2019). The Spectacled Flying-fox was listed as endangered in 2019, after the mass deaths, a negative change from its prior listing as vulnerable.

Despite the declining status of the Spectacled Flying-fox, a recovery plan (2010–2020), and the scientific evidence presented to the federal, state and local governments, persecution persists. Since 2014, 85% of the roost trees (or roosting habitat) within the Cairns city nationally important camp (Department of the Environment, 2015) were allowed to be destroyed and the roosting animals 'dispersed' to enable the development of commercial businesses, with the Government's approval (DCCEEW, 2020). Dispersal continues during the roosting seasons, and according to council sources have cost more than AUD\$3M over the last few years. These approvals are contrary to the intentions of and protections under the *Federal Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland Nature Conservation Act 1992 and mirror detrimental decisions two decades ago (McGrath, 2001; Thiriet, 2005). Mostly dispersals don't succeed because the bats return, dispersals have to be repeated over months or years, costs are high and replacement camps form within short distances of the dispersal sites, transferring the conflicts to other locations (Roberts et al., 2021). Each of these consequences has occurred in Cairns as a result of the recent dispersals.

The objective of this article is to (1) raise awareness of the complexities of dealing with endangered species that also cause problems for humans and (2) present some ideas to help overcome the challenge of resolving conflictual issues that the scientific evidence alone is insufficient to resolve.

Practitioner points

- Spectacled Flying-foxes and other endangered species which cause human-wildlife conflicts have suffered serious population declines, but despite the scientific evidence, lack community support for their conservation.
- Conservation scientists need to reconsider how they approach the community, policymakers and politicians so that their messages gain traction.
- Working with social scientists and science communicators is necessary to achieve positive conservation outcomes.

2 | CLOSE PROXIMITY CAN CAUSE PROBLEMS FOR PEOPLE AND BATS

Spectacled Flying-foxes, like many Flying-foxes, trigger mixed responses from people (Anthony et al., 2018; Aziz et al., 2017; Cousins & Compton, 2005; Kung et al., 2015; Tait et al., 2014). Traditionally, they are food, kin and totems for the more than 30 First Nations peoples of northern Queensland, Australia. At a recent meeting in Cairns, some First Nations people who are custodians of the Spectacled Flying-fox expressed their views that the species is not considered by them to be contentious, views reflective of studies of the Black Flying-fox (*Pteropus alecto*) and Indigenous perspectives in northern Australia (Rose, 2010).

In contrast with First Nations people's views, since the first days of European colonization of the region (Ratcliffe, 1953; Westcott, 2013), Spectacled Flying-fox have caused consternation for fruit growers and were the subject of a national enquiry in the 1930s established to resolve the 'problem' of Flying-foxes (Ratcliffe, 1931) as they can cause significant damage to commercial fruit crops, public gardens and native vegetation (Aziz et al., 2016). Commercial fruits such as mango and lychee are found in Spectacled Flying-fox faeces (Parsons et al., 2006; Richards, 1990) and they feed at fruit orchards when commercial crops are in season (Aziz et al., 2016; Queensland Government, 2009). Changes to native food availability as a result of habitat loss or other factors such as seasonal weather events may increase Flying-fox impacts on crops (House of Representatives Standing Committee on the Environment and Energy, 2017; Westcott, 2016).

Flying-foxes often create problems for residents in urban and rural settings in Australia (Mo et al., 2023a). Camps in urban areas, which can hold from tens to tens of thousands of individuals (Tait et al., 2014), can have localized negative impacts on amenity when they are located near

centres of human activity such as schools or in areas of special cultural significance such as botanic gardens (Roberts et al., 2021). Some people living adjacent to Flying-fox camps complain about the noise and smell associated with camps (Roberts et al., 2021), faeces dropped by bats (Mo et al., 2020) and the perceived risk from infectious diseases including SARS-like coronavirus, Ebola, Hendra and Nipah viruses (Ng & Baker, 2013).

The issues are complex (Dickman, 2010) and made more difficult by politicians hostile to Flying-foxes who advocate for their culling (KAP, 2023). Flying-foxes are arguably at greater risk of extinction because they are perceived poorly by the community, aggravated by limited knowledge of their importance and the ecosystem services they provide (Aziz et al., 2017), so it is important to consider ways of changing attitudes (Toomey, 2023). These problems can be resolved by taking a number of actions which are outlined below.

3 | OVERCOMING CONFLICTS REQUIRES MULTIDISCIPLINARY APPROACHES

Reducing human-wildlife conflicts has been a goal of many people trying to conserve and manage Flying-foxes. Approaches to resolving these issues have evolved over the past few decades, especially for camp management actions where some jurisdictions have introduced a hierarchy of three levels of action: routine camp management; buffer creation and lastly dispersal (Mo et al., 2023a). These actions have been accompanied by subsidized equipment and services to mitigate negative impacts on the community, including subsidies for vehicle and clothes-line covers, high-pressure water-cleaners, swimming-pool covers and exotic tree removal (Mo et al., 2020), an approach followed to some degree in Queensland (DSILGP, 2023). These practical actions address matters that affect individuals and communities and are instrumental in changing attitudes (Mo et al., 2020).

Caution needs to be exerted, however, in taking actions that affect Flying-foxes and their ability to cause nuisance or threats to people, as some management and restoration activities, and dispersal activities can cause detrimental effects on the species (Lunn et al., 2021). Even some recent guidelines (Department of Environment and Science, 2020a, 2020b, 2020c) are out of date and do not reflect the current knowledge of the potential negative impacts on the Spectacled Flying-fox. Actions that have been considered previously as 'routine' camp management activities designed to reduce conflicts, such as the removal of tree branches or whole trees, weed and vine removal, trimming of understory vegetation and minor habitat augmentation, often termed 'low impact activities' (Department of Environment and Science, 2020a), may considerably alter the structure of roost vegetation and decrease the suitability of

roosts as habitat (Lunn et al., 2021). Altering the structure of roosts can have short and long-term implications for the ability of Flying-foxes to survive extreme heat events (Lunn et al., 2021) and for their mating, breeding, socializing, resting and foraging (Hall & Richards, 2000; Parsons et al., 2006, 2010, 2011). In a slow-breeding species like the Spectacled Flying-fox, disruptions to these behaviours can be of great consequence.

Another of the main conflicts with people is fruit crop raiding which affects both commercial livelihoods and household growers. Efforts to mitigate these threats have been successful in many cases where governments have made concerted efforts to help the community, including subsidized wildlife-friendly fruit crop netting and individual fruit tree netting (Mo et al., 2023b; Mo, Gregory, et al., 2023).

A further matter of community concern is potential disease transmission. Before 2009, a number of veterinarians suffered, and four died, from the Hendra virus when they treated horses, as the virus was transmitted from bats to horses to humans (transmission is not directly from bats to humans) (Field, 2016; Tulsiani et al., 2011). Since 2015, a vaccine has been available to inoculate horses against Hendra virus (Yuen et al., 2021), and this appears to have been effective in preventing the disease from affecting humans. Other diseases such as the Australian Bat Lyssavirus can be transmitted directly to humans who handle the bats, but this is easily prevented by inoculating handlers against Rabies (a Lyssavirus) (CDNA, 2013), and all licensed wildlife carers and bat handlers are required to be vaccinated. The Australian Bat Lyssavirus also affects Spectacled Flying-foxes and other Flying-foxes, sometimes quite severely, leading to death (Barrett et al., 2020).

Finding solutions to human-wildlife conflicts is not easy (Baruch-Mordo et al., 2009; König et al., 2020; Nyhus, 2016) and has been the subject of recent major initiatives aimed at resolving them (IUCN, 2023). Some of the practical solutions such as those mentioned can help at changing attitudes at individual levels (which may spread through the community) (Toomey, 2023), but to change attitudes and perceptions across the community takes more than simply providing evidence and education as these alone are often ineffective at generating desired change in policies and practices (Oliver & Cairney, 2019; Toomey, 2023). Aziz et al. (2017) argue that changing attitudes to benefit the conservation of Flying-foxes requires a combination of awareness, mitigation of impacts and promotion of Flying-foxes as a tourist asset and ecosystems service provider. Conservation scientists need to learn that facts don't change people's minds, and that human behaviour and ways of processing information need to be better understood (Toomey, 2023). Conservation scientists have generally not been very successful at understanding human behaviour and cognition (Toomey, 2023).

While this article cannot provide answers to the issues we face, two examples of better approaches



FIGURE 1 Two image stories that might trigger different responses in people, depending on their prior experiences (left, Spectacled Flying-fox babies in care, courtesy of Tolga Bat Hospital; right, Little Red Flying-fox caught in barbed wire, photo: N. Preece).

might help understand more effective ways of influencing the community. The first is from an innovative survey in southern Australia of people's attitudes to Flying-foxes showed that stories with characters, what the authors termed narratives, have been shown to be effective if they target specific audiences because different types of messages trigger different responses among those with warm feelings toward bats and those who start with cool feelings (Guenther & Shanahan, 2020). Narratives can also trigger perplexing alternative responses, either ones of increased trust in communicators through perceived authenticity and accessibility, or decreased trust from perceived intention to manipulate (Dahlstrom, 2014; Dahlstrom & Rosenthal, 2018; Guenther & Shanahan, 2020; Toomey, 2023), so narratives need to be nuanced and targeted. Narratives are related to how our brains process knowledge and make decisions based on knowledge, from the field of cognitive science (Toomey, 2023). Four solutions have been suggested: engaging the social mind for optimal decision-making through workshops and meetings that avoid groupthink; understanding the power of values, emotions and experience in swaying minds through story-telling (Figure 1); changing collective behaviour through actions and participation; and thinking strategically for biggest impact such as through targeting networks of interest (Toomey, 2023).

The second is an example of actions taken by conservation communicators that had a significant and positive effect on bat conservation after the onset of the Covid-19 crisis (Nanni et al., 2022). The review of 2600 social media reports demonstrated that people's perceptions of risk can be shaped by targeted, solution-driven messages delivered promptly (Nanni et al., 2022).

It is often perplexing to us as conservation scientists that, having presented sound evidence in support of specific conservation actions for the species or the likely consequences of certain actions, decisions are made contrary to the evidence. To us,

research is relatively straight-forward, evidence-based and conclusions often unambiguous (I am not denying research challenges but recognize that research outputs are only part of the process of conservation) and when a species is threatened with extinction, our focus tends to sharpen and concerns rise. It has been argued that the scientific evidence speaks for itself and that scientists should be 'honest brokers' providing 'freedom of choice by (a) decision-maker(s)' (Pielke, 2007, p. 3) who will in turn make the right decisions, whatever they might be. Investigations of this approach, however, demonstrate that it often fails to achieve the desired results (Toomey, 2023) and that, in contrast to Pielke's suggestion of having to make a choice between being 'issue advocate' and 'honest broker', the distinction is not clear and policymakers often value 'candid judgements and opinions from people they trust' (Oliver & Cairney, 2019), including experts in the field.

It has become clear that we need to think outside our biological, ecological and physiological boxes. Working with practitioners from other disciplines can provide perspectives different from our own and can lead to solutions (Nyhus, 2016) beyond what we are capable of from within our disciplines alone (Toomey, 2023). In this regard, it is my opinion that conservation scientists with appropriate skills and aptitude and tailored narratives need to better engage with social scientists (Toomey, 2023), the community (Russell-Smith et al., 2015), and decision-makers in persuasive and adaptable ways that influence outcomes (Oliver & Cairney, 2019; Toomey, 2023; Warin & Moore, 2020).

4 | CONCLUSION

For the Spectacled Flying-fox and other Flying-foxes, measures such as practical solutions to very human problems and understanding social science approaches to resolving so-called wicked problems

(for discourse, see Peters & Tarpey, 2019) can result in better outcomes for both the animals of interest and the affected community. Legislated protection is essential to prevent persecution, but for effective long-term outcomes, an education and awareness programme needs to focus on positive aspects of the Spectacled Flying-fox, address community perceptions, and implement realistic solutions to perceived problems.

The issues are complex and require open minds, adaptability, willingness to compromise and negotiation skills. The Spectacled Flying-fox is after all a significant pollinator and fruit distributor across the wet tropics (Westcott et al., 2001) and a beautiful and special animal in its own right. Disciplines including communications experts, social scientists and Flying-fox specialists need to work together to develop strategies and programmes to influence community attitudes and thereby improve outcomes. We may even need to enter the political arena (Toomey, 2023).

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Noel Preece: Conceptualization; investigation; methodology; project administration; resources; validation; visualization; writing—original draft; writing—review and editing.

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No data were used for this article.

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