



SCENIC RIM
FLYING-FOX
MANAGEMENT STRATEGY 2023-2028



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1. Introduction

Flying-foxes are an important part of the Scenic Rim landscape making a great contribution to ecosystem health through pollen and seed dispersal. The Scenic Rim region is home to three species of flying-fox, the black headed flying-fox, grey headed flying-fox and little red flying-fox. All three species are highly nomadic moving across the east coast in response to seasons, food availability and breeding requirements.

Flying-foxes are highly social animals congregating in groups called roosts during the day and feeding at night. Flying-fox roosts can be occupied on a permanent, seasonal or temporary basis with the number and species mix often changing on a regular basis.

With continued habitat loss and urban growth, flying-foxes are increasingly coming under pressure to find food and shelter, often residing in urbanised areas (Timmiss et al., 2014). As a result, interaction between the Scenic Rim community and flying-foxes has increased throughout history with several roosts residing in towns within the region including

Canungra and Beaudesert. In many instances flying-foxes can cohabitate with the community, but roosting can impact the community through noise and odour.

Due to the nomadic nature of flying-foxes and their ability to move vast distances across the landscape, flying-fox management is often challenging and unpredictable. For this reason, flying-fox management requires a wholistic approach considering all available options to ensure flying-foxes and people can coexist.

Scenic Rim Regional Council has developed this Flying-fox Management Strategy as a framework to support communities living with flying-foxes while ensuring the conservation of the species and the important services they provide.



2. Purpose of Flying-fox Management Strategy

The purpose of this plan is to provide direction in the delivery of Councils SoMI (refer to section 4) for the management of flying-foxes within the Scenic Rim.

The plan will achieve the following key objectives:

- **Increase community understanding and awareness** through providing accurate information concerning flying-fox ecology, behaviour and options available to reduce impacts from roosting and foraging flying-foxes;
- **Respond and manage the concerns** of residents and/or community members experiencing impacts associated with flying-foxes;
- **Develop flying-fox management strategies and actions** consistent with legislative requirements;
- **Identify and prevent**, where possible, future community/flying-fox conflict, whilst conserving and co-existing with flying-fox populations;
- **Develop achievable flying-fox conservation strategies** to protect flying-foxes;
- **Improve understanding** of flying-fox behaviour through monitoring and research and ensure management practices align with current knowledge and research;
- **Participate in research and knowledge** sharing opportunities to strengthen understanding and address knowledge gaps in flying-fox ecology and management; and
- **Monitor flying-fox roosts** occurring on or partially on Council-controlled land in contributing to regional and national monitoring.

2.1 REVIEW

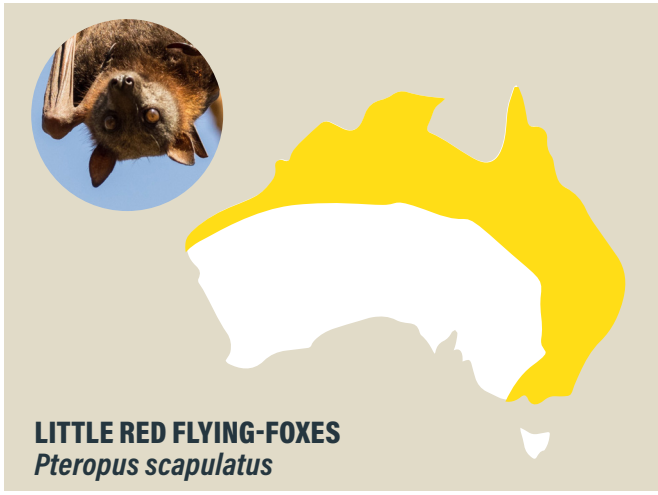
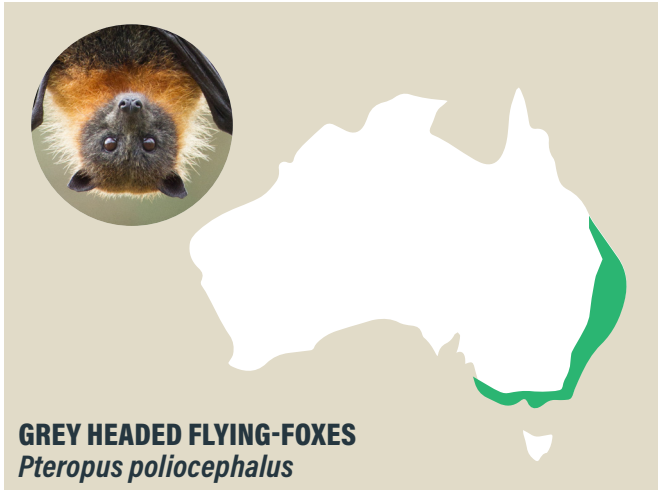
The plan will be reviewed every five years or as required.

3. Flying-fox Biology and Ecology

The Australian mainland is home to four species of flying-fox (*Pteropus* species), three of which inhabit Southeast Queensland. Flying-foxes (often incorrectly referred to as fruit bats) are complex, highly social and mobile native bats. They make a significant contribution to environmental health and the economy through their roles as essential pollinators and seed dispersers of native forests. In turn, these forests provide valuable timber, act as carbon sinks and stabilise our river systems and water catchments.



INDICATIVE SPECIES DISTRIBUTION



3.1 DIET

Australian native trees have evolved with flying-foxes as the main pollinators. Flying-foxes carry seeds and pollinate plants across thousands of kilometres playing a major role in ensuring the ongoing survival of Australian rainforests and eucalypt forests. Due to their ability to carry large fruit and move it over considerable distances, flying-foxes are also responsible for maintaining genetic diversity amongst remnant patches of forest.

The nocturnal feeding habits and extensive feeding ranges of flying-foxes enables them to pollinate tree species which produce most of their nectar at night, and are thus less easily serviced by day-feeding birds and bees. A misconception surrounding the pollination of native trees is that honey bees are primarily responsible; however the honey bee was only introduced into Australia with European settlement.

Flying-foxes will preferentially feed on pollen, nectar, flowers and fruit of native plants but will feed on introduced plant species when native resources are scarce. Native flowering trees which flying-foxes will forage on include eucalypts, bloodwoods, ironbarks, paperbarks, grevilleas, bottlebrushes and banksias. Native fruit trees which flying-foxes will feed on

include figs, palms, lillypillies and quandongs; introduced fruit trees include cocos palms, mangoes, lychees, pawpaw, banana, guava and mulberry trees.

Flying-foxes visiting backyards during the night to feed will leave once the food source (e.g. flowering/ fruiting trees) has been exhausted; this is considered normal foraging behaviour. Single flying-foxes remaining in backyards during the day may indicate an injured animal or a dropped baby incapable of flight and as such a wildlife carer experienced in bat handling may need to be contacted.

3.2 FLYING-FOX ROOSTS

Flying-foxes forage at night and congregate during the day in large groups (often numbering in the thousands or tens of thousands) commonly called roosts or camps. A flying-fox roost is a tree or other place where flying-foxes congregate during the daytime to rest, breed and rear young. Roosts can often consist of a mix of flying-fox species and change over time based on food availability, season and breeding cycles.

The specific factors influencing why flying-foxes establish roosts in certain places rather than others is still poorly understood but research suggests relationships with proximity to water, canopy



structure are key attributes (Roberts,2005). Some of the general characteristics (SEQ Catchments, 2012) that can attract flying-foxes include;

- Vegetation structure and density
- Proximity to a permanent water course
- Topography and aspect.

More recently, research has identified preference for particular arrangements of tree species including eucalyptus, melaleuca and corymbia species (Macdonald et al., 2021). In addition to the direct features of a roost site, the distribution and abundance of resources, as well as historical site use by flying-foxes can influence site selection (Macdonald et al., 2021).


There are four broad types of roosts:

- **Permanent Roost (Continuously occupied)** - indicates that the site is permanently, or almost permanently, occupied by flying-foxes.
- **Permanent Roost (Seasonally occupied)** - indicates that a site is occupied by flying-foxes during certain periods as a result of the availability of nearby food sources, such as nectar/flowers, or due to climatic changes such as seasonal temperature variations.
- **New Congregation/Roost** - A site where flying-foxes have not been known to congregate previously. This can include 'splinter colonies' or overflow from existing roost sites into trees that have not previously been occupied by flying-foxes.
- **Historical Roost** - A site that has previously met the roost definition requirements but hasn't been occupied by flying-foxes for a period of five consecutive years.

Roosts are vital to the conservation of flying-foxes as they provide access to food, sites for mating, sites for raising young, as well as stopover sites for nomadic/ migratory animals. It is critical that the network of roosts used by flying-foxes is maintained across the landscape, allowing the animals to move throughout their range in response to food availability.

Flying-foxes are only considered to be territorial during the mating season and territory is generally only a branch or two within a roost. Therefore, individual flying-foxes may have a large home range and frequent multiple roosts over several days with limited or no territorial concerns. Individual roosts must therefore be managed from the perspective that they are an integral part of a larger network of roosts.





Flying-foxes are known to have strong fidelity to roost sites and are known to regularly return to the same roost site annually (and in some cases the same tree branch) when food resources are locally available. The high roost fidelity of flying-foxes can create difficulties in the management of roost sites and dispersal efforts may prove challenging and resource intensive. This is typically due to the fact that whilst the number of flying-foxes utilising a particular roost on a day-to-day basis may be the same, the actual individuals making up those numbers can significantly change. Additionally, while the average number of flying-foxes within a roost is 10,000 (for example) the actual number of individuals who utilise the roost on a regular basis could be 20-50,000.

Therefore, any roost dispersal attempts need to be conducted until such time as all individuals have been 'notified'. In much the same way that humans travel around the country staying at hotels and eating at favourite restaurants, flying-foxes will travel across the landscape stopping at 'favourite' roost and foraging locations. Individuals who have just flown hundreds of kilometres to reach a roost location will not disperse easily and consideration needs to be given to recovery times.

A complete list of known roost locations *within the Scenic Rim Regional region* is provided in Appendix A.

3.3 MOVEMENT

Flying-foxes can easily fly 50km from a roost each night searching for food and can travel hundreds of kilometres over several nights, moving between roosts depending upon the availability of food resources. Individual flying-foxes have been tracked moving >1,000km in 7-10 days. While each species of flying-fox is capable of large movements, little red flying-foxes are the most nomadic (followed by grey-headed flying-foxes) and can arrive in large numbers overnight in response to local flowering. Current research data indicates that black flying-foxes tend to move more locally, than little red and grey-headed flying-foxes do.

Their high mobility and frequency of roost changes means that each night flying-foxes leave their respective roosts and spread out across the landscape in a weblike effect. This means that even if a roost location is not in an urban area, flying-foxes are highly likely to visit urban areas during the night to feed if suitable food resources are available. Furthermore, flying-foxes may travel great distances from roosts returning to the same food tree each night until flowering/fruiting finishes.

3.4 LIFE CYCLE

Flying-foxes have a low reproduction rate and become sexually mature at 2-3 years. They have a six month pregnancy, females give birth to a single young (pup) per year and suckle that pup for up to six months (Figure 1). Unlike many other mammalian species, flying-foxes do not have a period of lactational anoestrous and females can become pregnant whilst still suckling their current pup.

Females will carry their young while foraging until the pup becomes too heavy (typically around 4-5 weeks of age), at which time the pup is left in the roost overnight. The female may return throughout the night to suckle her young. Older pups are placed in crèches overnight where they interact with each other, learning valuable social skills. Young are cared for over a period of four to six months after which they are considered independent. In urban environments, life-threatening hazards to flying-foxes include goannas, snakes, crows, powerful owls and eagles, as well as introduced hazards such as humans, dogs, cats, powerlines, barbed-wire fences and backyard fruit tree netting. Provided these can be avoided successfully, a flying-fox may reach 8-10 years of age; captive animals have been known to live for 25-30 years.



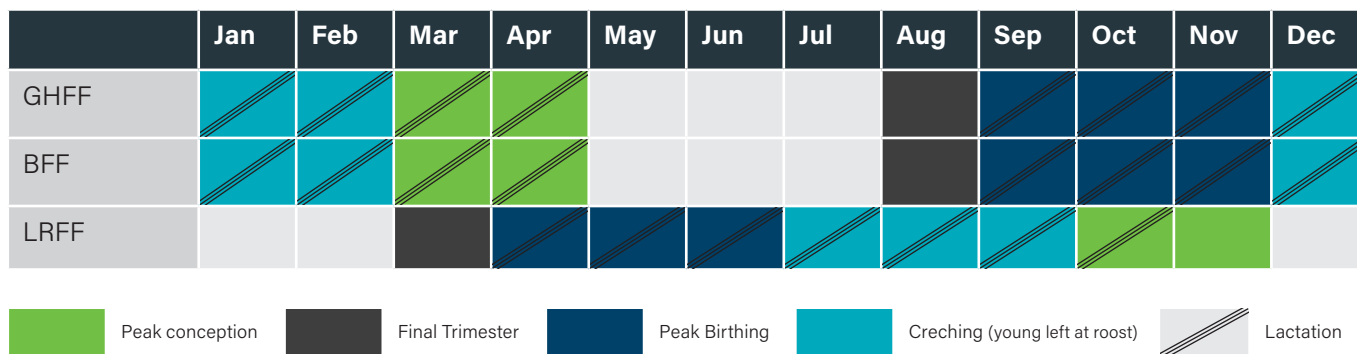


Figure 1: Approximate reproductive cycle of flying-foxes in Southeast Queensland.
Note: BFF = Black Flying-fox, GHFF = Grey-headed Flying-fox, LRFF = Little Red Flying-fox.

In order to safely manage a flying-fox roost, roost management activities need to consider the ecology and biology of flying-foxes and the important time periods in the breeding cycles of the black flying-fox, grey-headed flying-fox and little red flying-fox. Restricting management actions in the periods of final trimester are considered paramount due to the high risk of abortion associated with stress from dispersal efforts. Additionally, management actions should also be restricted during the creching period when young pups are incapable of flight.

3.5 THREATS TO FLYING-FOXES

3.5.1 Vegetation loss and fragmentation

Flying-foxes rely on a variety of ecosystems across Australia for foraging and roosting. These areas have historically been threatened through clearing for agriculture and development leading to reduced food availability. This loss of foraging habitat increases the severity of food shortages and can lead to starvation, abortion of young and high infant mortality (Department of Environment and Climate Change NSW, 2008).

Vegetation loss and fragmentation can often cause the animals to establish roosts in urban areas. This can create conflict between humans and flying-foxes and may give the false impression that flying-fox numbers are increasing. In many instances flying-foxes are adapting to and using human modified landscapes but the reasons behind this are still poorly understood (Timmiss et al., 2021).

3.5.2 Heatwaves

Higher than normal daytime temperatures can expose flying-fox colonies to heat stress, resulting in large numbers of distressed and/or dead/dying animals. Past observations of heat stress events indicate that flying-foxes suffer from heat stress when the ambient temperatures exceeds 38°C with fatalities potentially occurring when the temperature exceeds 42°C (Department of Environment and Science, 2022). As temperature increases through a heat stress event, flying-foxes will respond through different actions including, wing fanning, wrist licking and clumping. The critical stages of heat stress are identified below.

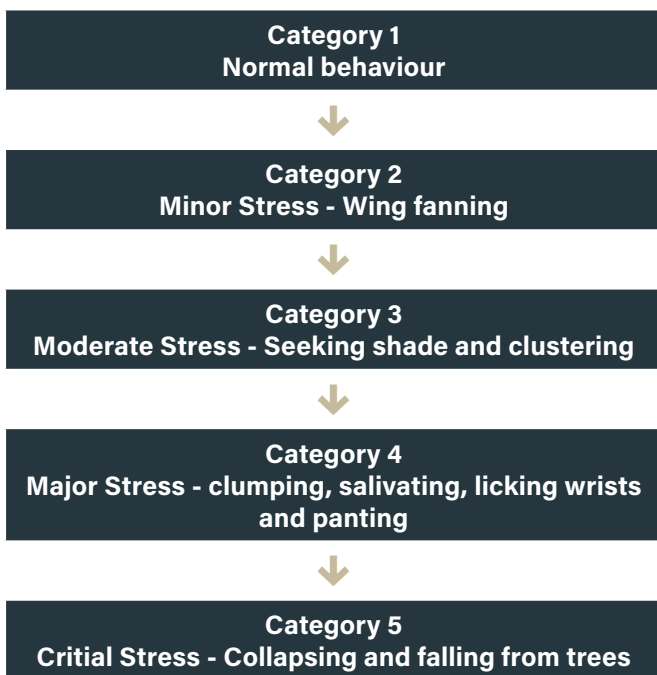


Figure 2: Stages of Heat Stress

The presence and smell of these dead animals can cause considerable distress within the local community. Additionally, hundreds of flying-foxes, primarily orphaned young, may need to be taken into care placing enormous financial and emotional stress of local wildlife carers. Early intervention through the application of light water spraying may alleviate symptoms of heat stress and prevent a similar situation.

3.5.3 Severe Thunderstorms

Severe thunderstorms, especially those with high winds and hail, can damage trees and injure flying-foxes. When previous severe storm cells have passed over flying-fox roosts many of the animals were injured by hail rendering them incapable of flight. Injured flying-foxes were found in residential properties neighbouring roost sites, increasing the potential for human/pet interaction with flying-foxes.

Females incapable of flight are often either unable to return to their young and/or forage for themselves which subsequently causes them to stop lactating; in such cases both the young and the mother die of starvation. Many animals may require euthanasia and orphaned young need to be brought into care as many can suffer pneumonia. This influx of injured and/or orphaned flying-foxes can cause extreme financial and emotional stress for local wildlife carers.

Early monitoring of flying-fox roosts following a severe thunderstorm will alert wildlife care groups to the need for urgent medical intervention and potentially reduce the number of dead animals in the vicinity of the roost and the number of sick and/or orphaned young brought into care. Vegetation removal/maintenance may also be required post-storm depending upon the extent and severity of the storm.



3.6 FLYING-FOXES AND PUBLIC HEALTH

Several viruses capable of causing diseases in humans and animals have been linked to flying-foxes in recent years. Of these, Australian bat lyssavirus and Hendra virus are the most notable. Research by Biosecurity Queensland and others have shown that some species of bats act as a natural reservoir of infection for these viruses. Therefore, only people who are trained and protected by rabies vaccination (for Australian bat lyssavirus) and using suitable equipment should handle bats including flying-foxes.

3.6.1 Australian Bat Lyssavirus

Australian bat lyssavirus (ABLV) is a virus that can be transmitted via the saliva of infected bats (including flying-foxes) when they bite or scratch humans. Infection with ABLV causes a rabies-like disease in humans that is usually fatal. However, since discovery in 1996 there have only been three documented cases of ABLV infection in humans. In May 2013, two horses were confirmed as being infected with ABLV. These were the first known cases of ABLV in an animal other than a bat.

Experience with other closely related viruses, including classical rabies virus, suggests that contact or exposure to bat faeces, urine or blood does not pose a risk of exposure to ABLV, nor does living, playing or walking near flying-fox roosting areas.

There are three simple steps to avoid ABLV disease:

- Only people trained and vaccinated against rabies should handle bats.
- Bat bites or scratches should be washed thoroughly with soapy water for at least five (5) minutes and an antiseptic with anti-virus action such as povidone-iodine, iodine tincture, aqueous iodine solution or alcohol (ethanol) applied after washing.
- Medical advice should be sought as soon as possible following a bite or scratch to discuss the possibility of post-exposure vaccine injections to protect against the potential on-set of infection.


The rabies vaccine is used to protect against ABLV infection. However, even if you have been previously vaccinated, you should seek medical advice immediately after any potential exposure to ABLV (bite, scratch or mucous membrane exposure) as further vaccinations will be required.

3.6.2 Hendra Virus

Australian flying-foxes are considered to be the natural reservoir of Hendra virus which is transmitted to humans via close contact with the body fluids of infected horses. Only seven people have been confirmed to have contracted Hendra virus following high levels of exposure to infected horses. Four of these people died, the most recent in 2009. The seven confirmed human cases all became infected following high level exposures to respiratory secretions and/or blood of an infected horse without the use of appropriate personal protective equipment (PPE). Other people have reported similar contact with infected horses but have remained well and their blood tests have shown no evidence of infection.

While the exact route of infection is unknown, it is believed that horses contract Hendra virus from flying-fox urine, saliva or birth products. Two dogs are confirmed as having been infected with Hendra virus, transmission is believed to have occurred following exposure to body fluids of deceased Hendra infected horses. There is no evidence that the virus can be passed directly from flying-foxes to humans, from dogs to humans, from the environment to humans, from humans to horses or that the virus is airborne. Testing of flying-fox carers who have had frequent close contact with flying-foxes has shown no evidence of exposure to the virus. There is also no evidence of human-to-human transmission. People who have had contact with a person with Hendra virus infection, including health care workers and family members, have been tested and shown no evidence of the virus.

There is no known specific treatment for Hendra virus infection. Three people have recovered from infections with general medical support.



Experimental treatment with a type of antibody that may prevent infection may be offered to people who have had high level exposure to the body fluids of an infected horse.

A vaccine for horses against Hendra virus is available and is currently the best way to prevent disease transmission to humans. Unwell horses should be isolated and children, dogs, cats and other horses should be kept away from the sick horse(s) to prevent further disease spread. Appropriate personal protective equipment which prevents contamination of the skin, eyes, nose and mouth of people by the horse's body fluids should be worn if close contact with the sick horse is considered essential.

Hendra virus is a notifiable disease and as such suspected cases of infection in horses should be notified urgently to Biosecurity Queensland.

3.6.3 Other Pathogens

Other zoonotic pathogens which may be of concern to the community are histoplasmosis, leptospirosis and salmonella. However, to date there have been no documented cases of these diseases infecting humans as a direct result of contact with flying-foxes and/or their biological excretions such as faeces and urine. Many other wildlife and domesticated animals including household pets are considered a greater potential source of human infection.

Histoplasmosis is a very rare lung infection. Bats, dogs, cats, cattle, horses, rats and other animals can be infected and can excrete the organism in their faeces. People who have contact with bat caves and/or bats, for work or recreation, should avoid exposure to dust in environments likely to be contaminated with bat faeces. It is advisable to wet down potentially contaminated areas with water before cleaning. People working in these areas should also use protective equipment such as face masks, gloves and overalls.

Leptospirosis is a bacterial disease transmitted via the urine of infected animals. In very rare cases, leptospirosis can be fatal to humans. Although rodents and cattle are the main carriers

of this disease, flying-foxes may also be infected. Leptospirosis occurs most commonly in people who are exposed to the bacteria during their work, for example farmers, veterinarians and meat workers. The most effective way to avoid getting leptospirosis from bats is to prevent bat urine from coming into contact with broken skin or your eyes, nose or mouth.

Salmonella and other bacteria that cause gastroenteritis may be found in animal faeces. Most cases of salmonella infection in Queensland are caused by eating undercooked or raw food (typically chicken) contaminated with salmonella bacteria. The infection may also be acquired from close physical contact with animals such as dogs, poultry and cattle. It is assumed that some native animals including flying-foxes may also carry the bacteria.

Flying-foxes can defecate whilst flying, splattering objects beneath their flight path with faeces which are typically easily removed with water and do not pose a serious health hazard. Faecal contamination of rainwater tanks may occur from a range of animals including possums, rats, birds, reptiles (geckos) and flying-foxes. It is advisable that a 'first flush' device be installed on all drinking water tanks. It is also a good hygiene practice to keep rainwater tanks covered, and at regular intervals chlorinate the tank and, drain and clean both the tank and the roof area used for rainwater collection. Normal swimming pool maintenance practices (cleaning, filtration and chlorination) should remove any contamination associated with animal faeces. It is important to note that the potential health risks posed by flying-fox faeces are no greater than any other animal, such as possums, rats, birds and reptiles.

3.7 IMPACTS OF FLYING-FOX ROOSTS

The occurrence of a flying-fox roost can result in many different impacts on the local community. These impacts range from direct nuisance including noise and odour, through to stress from the perceived health impacts of misleading information (Table 1).

Table 1: Potential Impacts of Flying-foxes

Potential Impact	Description
Business Patronage	The noise, odour and perceived health risks of a roost may deter some patrons from visiting nearby businesses.
Fruit Crop Damage	Flying-foxes can cause damage to commercial fruit crops, especially in drought situations when eucalypt blossoms are scarce. Damage isn't considered directly associated with an individual roost as multiple roosts may be within flying distance. Rats, possums and birds are also known to damage fruit crops.
Health Risks	Although the health risks are surprisingly low, a perception of health risks associated with flying-foxes can increase stress levels creating potential health concerns.
Noise	Nearby residents may suffer disturbed sleep due to roost noise which may (at times) be in excess of the recommended background levels for daytime noise as specified in Australian Standards AS 1055.2-1997.
Odour	The odour associated with roosts is typically that of the flying-foxes and not their faeces. Many Scenic Rim homes are "Queenslander" styles that rely on passive cooling to ventilate the home. Most residents gain relief by shutting up their homes and running the air conditioner.
Property Damage	Flying-fox faecal material can frequently land on houses and cars of nearby residents and may damage paint work if not removed in a timely manner.
Reduced Amenity	Flying-fox roosting can reduce the overall amenity through reducing the ability to use backyards for recreation.
Public Usage of Parks	When flying-fox roosts occur in public parks these areas may no longer be accessible by the public due to health and safety concerns. Some people may choose not to visit parks due to the noise, odour and/or perceived health risks of the roost.
Vegetation Damage at Roost Sites	Continual heavy use of roosts can result in damage to trees and reduce the opportunity for vegetation to recover from the effects of roosting flying-foxes.
Vegetation Management by Council	Flying-fox roosts may increase the maintenance requirements of roost vegetation in areas where damaged vegetation may need to be removed for public safety.
Vegetation Management by Residents	Some residents may incur additional costs by undertaking vegetation management to limit roosting ability on private properties.
Veterinary Costs	Horse owners may feel the need to vaccinate horses against Hendra virus due to increased risk of disease with exposed water points near roost sites.
Water Tank Contamination	Contamination of water tanks is not exclusive to flying-foxes. Water tanks should have filters to eliminate faecal contamination by mammals, birds, reptiles (geckos) and frogs. In extreme situations, community members might feel the need to purchase water to reduce contamination risk.

3.8 FLYING-FOXES AND THE SCENIC RIM COMMUNITY

A region-wide community survey was conducted in 2022 as part of the development of Council’s revised Flying-fox Management Strategy. The survey aimed to better understand the nature of flying-fox/human conflict in the region, as well as identify potential strategies for assistance to properties affected by flying-foxes. During the consultation, Council received 78 submissions.

Residents were provided with the opportunity to provide a specific submission based on the roost that they held a relationship with.

When asked what flying-fox species people were most affected by (multiple selections allowed accounting for >100% total), 37.1% were unsure of the species affecting them.

Of the 62.9% of respondents who were able to identify species:

- 77.6% reported being affected by Black Flying Fox (BFF),
- 55.1% reported affects from Grey Headed Flying Fox (GHFF), and
- 20.06% reported affects from Little Red Flying Fox (LRFF).

The majority of respondents who lived less than 500m from a roost (62.8%) reported noticing or being affected by flying-foxes daily.

Of the respondents who lived within 500m of a roost:

- the period of highest interaction was evening (6:00 pm onwards) during which 77.1% reported being affected during this time on a daily basis.
- Morning to midday and afternoon to evening also represented relatively high rates of daily affects with 62.9% of respondents reporting affects during that time. 17.1% reported affects sporadically, and
- 11.4% reported monthly, seasonal or yearly affects.

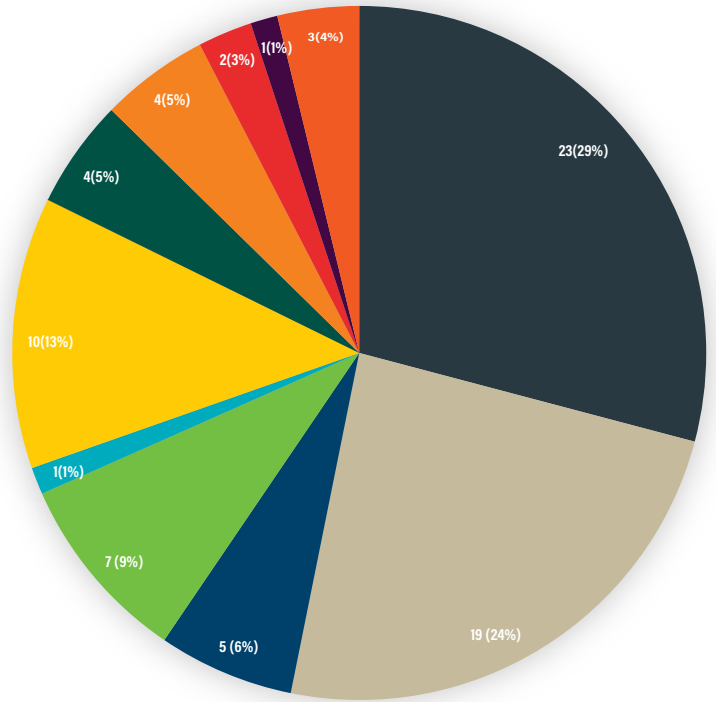


Figure 3: Responses based on known Roosts of the Scenic Rim Region, 2022

Question options

- Beaudesert, Lions Bicentennial Park Roost
- Boonah, Mount French National Park Roost
- Boonah, Bicentennial Park Roost
- Witheren, Beechmont Road Roost
- Canungra, Lions Park Roost
- Hillview, Hillview Station Road Roost
- Kooralbyn, Routley Drive Roost
- Rathdowney, John Street Roost
- Tamborine Mountain National Park, Dapsang Drive Roost
- Tamborine Village, Kilmore Drive Roost
- Other (please specify location)
- Beechmont, Gwingana Court Roost - 0 (0%)
- Peak Crossing, Peak Mountain View Park Roost - 0 (0%)



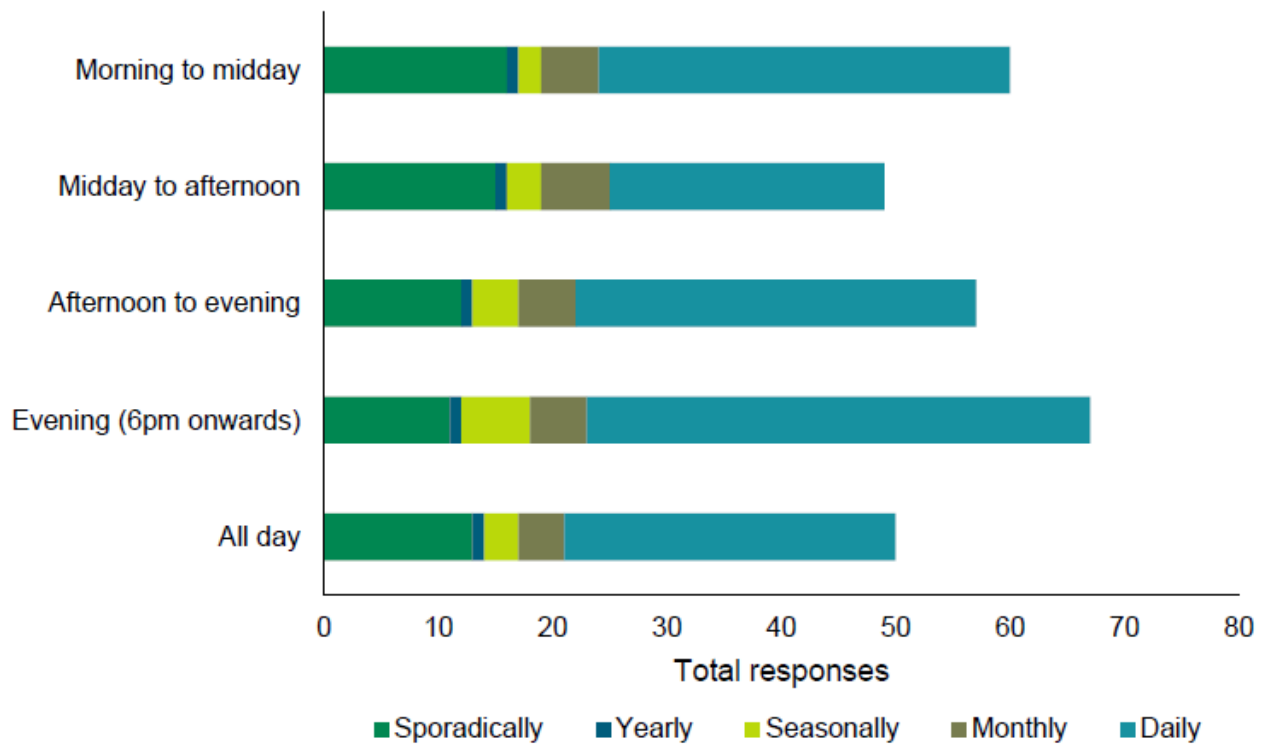



Figure 4: Time and Frequency of human-flying-fox interactions (n=78)



When asked to describe their relationship with flying-foxes, 46.3% reported a positive or very positive relationship and 45% a negative or very negative relationship, while 8.8% reported neutral feelings.

When asked what the respondent's relationship was with flying-foxes in their everyday life, 48.1% of respondents identified as being a resident directly affected by flying-foxes, 37.9% identified as a person who 'enjoys observing nature', 16.4% identified as being a Scenic Rim resident not directly affected, and 10% identified as being a wildlife carer. Respondents were able to select multiple answers.

When respondents were asked to describe their relationship with flying-foxes, 47.4% of all respondents reported having a positive or very positive relationship, whereas 43.5% reported a negative or very negative relationship. 7.7% of respondents were neither positive nor negative in their relationship with flying-foxes. Of all respondents, 60.2% identified the ecosystem services provided by flying-foxes as the most important positive factor. 34.6% identified that they 'love living with the natural environment' 23.4% identified that their 'lifestyle means I need to accept

local wildlife'. 30.8% responded 'other' where they outlined that there were no positives aspects of living near a roost, and were concerned about flying-fox welfare and the importance of conserving flying-foxes.

When asked what the negative impacts of living near flying-foxes are:

- 43.5% of all respondents identified public health concerns as the most important negative factor,
- 25.6% identified that flying-foxes 'prevent me from participating in my regular activities',
- 16.6% reported they cause financial loss, and
- 29.5% reporting no negative impacts.

25.6% of respondents answered 'other' where they reiterated negative impacts from noise, smell, faecal droppings, concerns about disease transmission and being unable to utilise their backyards or public spaces.

Of the 33 respondents who were concerned about public health issues:

- 100% were concerned about the presence of faecal matter,
- 87.9% were concerned about smell and the potential for viral transmission to people/animals,
- 33.3% were concerned with ticks and lice, while
- 3% were concerned with damage to trees (Figure 5)

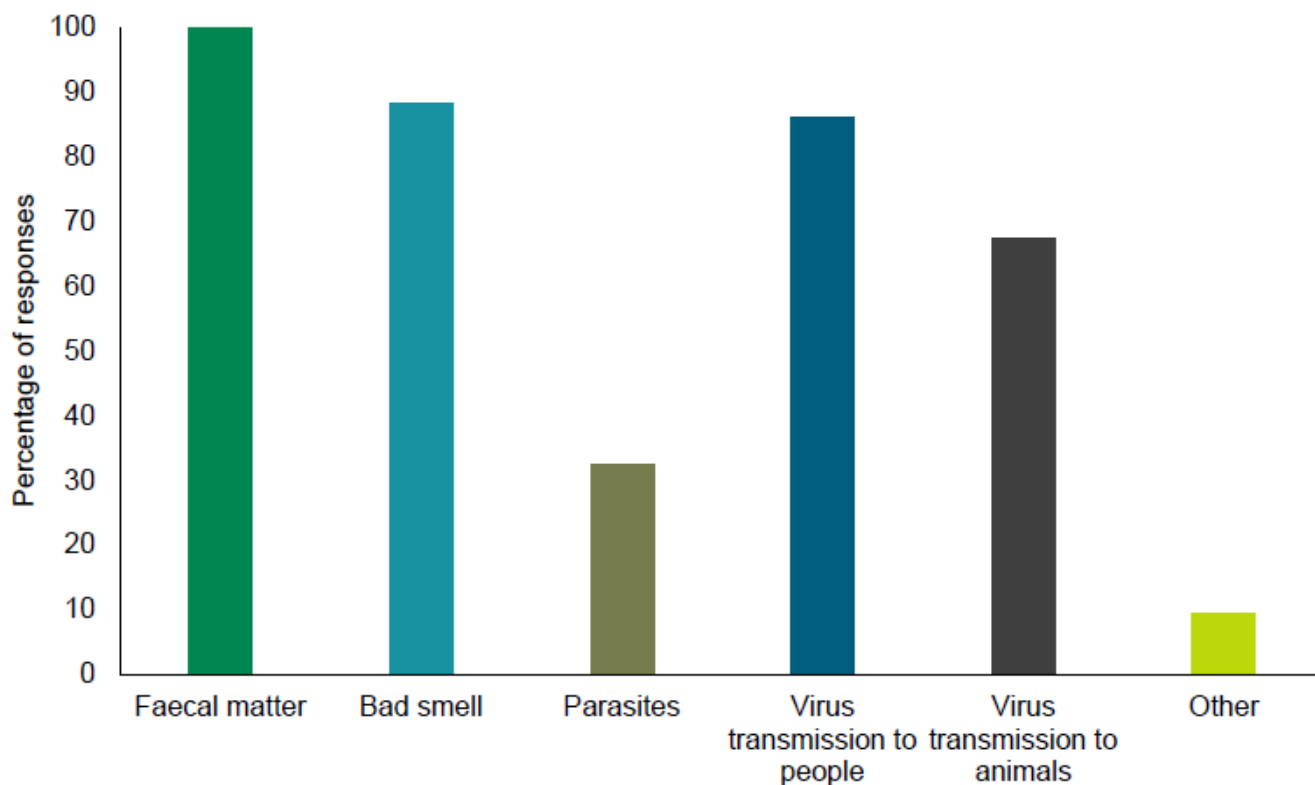


Figure 5: Identified areas of public health concerns. This was calculated from the 33 respondents who indicated their concern for public health issues related to flying-foxes.

18% of total participants reported financial impacts due to flying-foxes. Of these respondents the primary source of reported financial loss was 'additional maintenance and cleaning' (92.8%), damage to vegetation (78.5%) and damage to property (78.5%), while veterinary requirements were experienced by 21.4% of these respondents. 20.5% of all respondents reported flying-foxes prevented them from participating in regular activities. These activities include, being unable to use their own yard, public parks or public footpaths, being unable to drink their own rainwater, and disruptions to sleep. 28% of all respondents answered that there were

not prevented from participating in regular activities. Many of the 28% conveyed that the roost had positive impacts on their emotional wellbeing and were concerned with flying-foxes being excluded from Scenic Rim, reducing the natural values of the region.

Responses provided for short response questions were broadly consistent with the results discussed above, identifying factors such as increased maintenance in response to droppings, risk of disease, as well as the ecological importance of flying-foxes locally. The following topics were commonly discussed in short responses:

- A feeling of unacceptable burden of increased cleaning or damage to property, particularly damage to paint, clogged gutters and garden plants by droppings.
- Impacts to outdoor lifestyle e.g. entertaining, gardening or using public spaces.
- Concerns flying-foxes pose a threat to children, particularly while unsupervised or playing in gardens.
- Perceived impacts to biodiversity around roosts, particularly the perceived reduction of birdlife and damage caused to roost vegetation.
- A desire to see flying-foxes relocated to another site away from dwellings or human infrastructure.
- Concerns that the local flying-fox population has increased to an unacceptable / unbearable size over the last five years.
- The smell and noise produced by nearby roosts becoming unbearable and interrupting dwelling use and appreciation, sleep and daily activities such as walking children to school.
- Feeling unfairly restricted from activities such as fires and trimming garden vegetation due to flying-fox protection.
- The need for flying-fox protection to encourage ecosystem services provided by flying-foxes.
- The positive response to education experienced by several respondents that changed their opinion of regarding flying-foxes as pests.
- The potential for flying-foxes as an ecotourism resource.
- The importance of conserving flying-foxes in the region and moving away from dispersals.
- The need for education and a change in the media's negative bias towards flying-foxes.

Despite the majority of the above points referring to negative impacts, a substantial proportion of respondents cited the ecological importance and the positive impacts to public amenity and emotional wellbeing. Overall, respondents appear highly polarized, as indicated by the very high proportion (78.8%) of responses with 'very positive' or 'very

negative' relationships with flying-foxes, with only seven respondents remaining neutral.

3.9 LEGISLATIVE CONSIDERATIONS

All species of flying-fox in Queensland are protected under the State *Nature Conservation Act 1992* (NCA). Under section 88C of the Act a person cannot take (kill) or drive away flying-foxes or modify their roosts unless they are an authorised person or are authorised to do so under the Act.

Under the Nature Conservation (Wildlife Management) Regulation 2006, local governments in Queensland have an as-of-right authority to manage flying-fox roosts in a defined Urban Flying-Fox Management Area (UFFMA). This authority is restricted to actions within the Code of Practice Ecologically sustainable management of flying-fox roosts *Nature Conservation Act 1992*. The code sets out particular non-lethal actions that Council may undertake in dispersing flying-fox roosts or managing vegetation to reduce roost impacts.

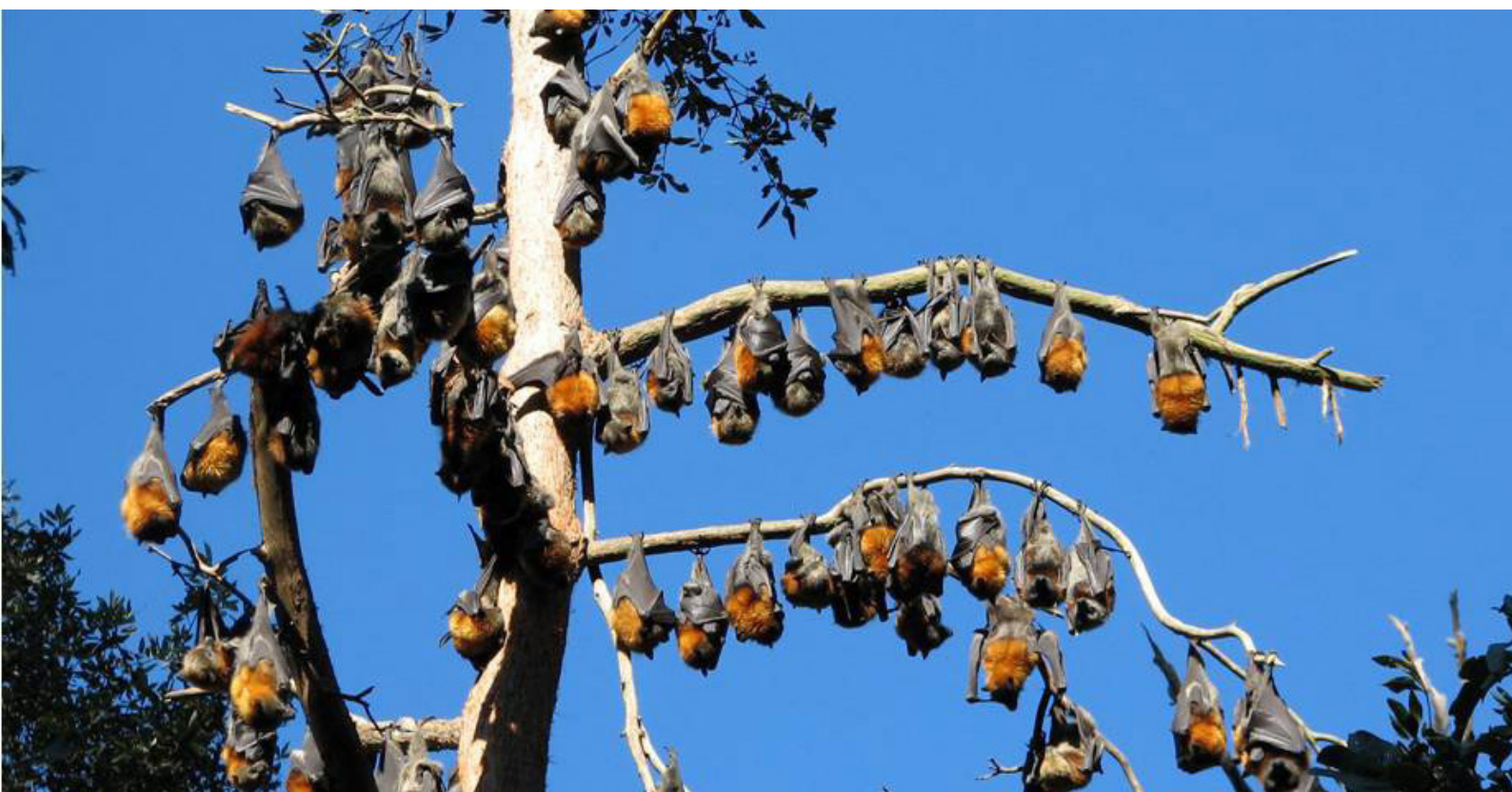
In addition, the grey-headed flying-fox is listed as a Vulnerable species under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is an offence to undertake an action that is likely to have a significant impact on this species.

All persons are authorised to undertake low impact activities at roosts in accordance with the Code of Practice: Low impact activities affecting flying-fox roosts. Low impact activities include weeding, mulching, mowing and minor tree trimming. Management of roosts by private landholders outside of this code require a Flying-fox Roost Management Permit.

Depending upon the individual circumstances concerning each roost, various Federal and/or State Government approvals and considerations may be required prior to undertaking roost management activities (Table 2).

Table 2: Legislative requirements for flying-fox management.

Legislation	Description
<i>Environmental Protection and Biodiversity Act 1999</i>	Provides the legislative basis for protection of the grey-headed flying-fox as a vulnerable species as well as approval requirements regarding interference.
<i>Nature Conservation Act 1992</i>	Provides the legislative basis for protection of all three species of flying-foxes occurring in the Scenic Rim region.
Interim policy for determining when a flying-fox congregation is regarded as a flying-fox roost	This policy provide context regarding the requirements when determining whether a congregation meets the definition of a roost under the Nature Conservation Act 1992.
Code of practice - Low impact activities affecting flying-fox roosts	Provides context regarding authorised activities that create low impacts around flying-fox roosts
Code of practice - Ecologically sustainable management of flying-fox roosts	Provides context regarding as-of-right management abilities afforded to Local Government to manage flying-fox roosts.
<i>Vegetation Management Act 1999</i>	Vegetation mapping for each roost may need to be reviewed prior to any actions.
<i>Environmental Protection Act 1994 - Environmental nuisance (noise)</i>	Some actions may generate high levels of noise in an urban area.





4. Statement of Management Intent

The purpose of this Statement of Management Intent (SoMI) is to outline the approach Council intends to take with respect to roost management across the Scenic Rim Local Government Area (LGA) Urban Flying-Fox Management Areas (UFFMA).

4.1 AUTHORITY

Under the Nature Conservation Act 1992, local governments in Queensland have an as-of-right authority to undertake roost management at flying-fox roosts in designated Urban Flying-Fox Management Areas (UFFMAs) provided they comply with the 'Code of Practice – Ecologically sustainable management of flying-fox roosts'. An UFFMA for a local government area is defined by the Queensland Government.

Outside an UFFMA, a local government requires a flying-fox roost management permit (FFRMP), available from department. A local government also has the option to apply for a FFRMP should it wish to trial roost management techniques that are outside the Code of Practice. A non-local government applicant requires a FFRMP irrespective of the location of the roost.

The UFFMA for the Scenic Rim region is outlined in Appendix B.

4.2 PURPOSE

The purpose of this SoMI is to articulate the approach that Scenic Rim Regional Council will take towards the management of flying-fox roosts in Scenic Rim region.

4.3 COUNCIL INTENTIONS AND CONSIDERATIONS

Scenic Rim Regional Council recognises flying-foxes are ecologically important and contribute significantly to sustaining the region's unique biodiversity. Council aims to address and manage the concerns of the community whilst conserving and co-existing with flying-foxes by increasing community understanding and appreciation of the essential ecological role and the need for conservation efforts.

Council is authorised under the Nature Conservation Act 1992, to manage flying-fox roosts in the Urban Flying-fox Management Area (Refer Appendix B).



Flying-fox Management (Generally)

- Council will be responsive to health concerns and the social and economic needs of the community, while balancing environmental due diligence for the protection of flying-foxes and the essential ecosystem services they provide.
- Due to the high risk of transferring flying-fox roost impacts to urban areas, **Council will not support** the management of flying-fox roosts outside the Urban Flying-fox Management Area.
- Council will only use non-lethal management actions to minimise adverse impacts of flying-fox roosts on residents and the broader community.
- All management actions will comply with legislative requirements including Council policy and objectives, and the Queensland Government's Flying-fox Roost Management Guideline and their Code of Practice: Ecologically sustainable management of flying-fox roosts or approved flying-fox roost management plan.
- Council will apply a hierarchical approach to flying-fox management action. Interventions will firstly consider Low intervention "in situ" management options with consideration of medium and high intervention options as a last resort.
- Council will ensure that response actions are considerate of and occur outside of and peak birthing and creching times.

Flying-fox Roost Management (Council Lands)

- Council will apply a consistent approach to flying-fox management on Council lands, assessing each roost on an individual basis with consideration for the type and level of human-flying-fox conflict observed, and the risk to conservation and welfare of flying-foxes.
- Council will assess individual flying-fox roosts to evaluate whether a Council roost management response is required based on the likelihood of management success and the risk of transferring the roost impacts to a more problematic site.
- Council acknowledges the high risk of transferring flying-fox roost impacts during management actions. Therefore where there is conflict between **sensitive receptors** and flying-foxes within an UFFMA, Council will undertake detailed roost management planning prior to management action. An assessment will consider **sensitive receptors** that are affected and have the potential to be affected through management actions.
- Council will develop a **site specific Roost Management Plan** prior to the commencement of roost intervention or **management action** (excluding routine maintenance and operations). These site specific plans will provide the details, technical information and actions on how to manage each individual roost.

Flying-fox Roost Management (Other lands)

- The primary responsibility for the management of flying-fox roosts on private property both within and outside the Urban Flying-fox Management Area remains that of the landholder. Private landholders may seek appropriate permission from the Queensland Government to implement measures to reduce the impact of flying-foxes on their land.
- Council **will work** with private landholders to develop an appropriate roost management response including providing advice, data and information to a landowner to develop a Flying-Fox Management Plan for asset protection, and/or buffer management purposes, and apply for a Flying-Fox Roost Management Permit.
- Council **will assist** private landholders/residents severely impacted by flying-fox roosts in mitigating the impacts of noise, odour and mess

from flying-foxes through the provision of grants and support.

- Council **does not carry out management actions for roosts located solely on private land**. However, Council may provide advice and assistance to residents about flying-fox behavior and ecology, appropriate management options and approval processes.
- Where a flying-fox roost **is located within a combination of Council lands and private lands**, Council will work with private landholders to develop a Roost Management Plan that identifies the appropriate management actions for the roost. Council will engage relevant landholder/s to negotiate the implementation of roost management actions where necessary in achieving overall management outcomes.



5. Management Approach

5.1 CATEGORISING ROOSTS FOR MANAGEMENT

Under section 88C of the *Nature Conservation Act* a flying-fox roost means a tree or other place where flying-foxes congregate from time to time for breeding or rearing their young. Flying-fox roosts can vary greatly in species numbers and type, seasonality and density. In order to determine when a flying-fox congregation is considered as a roost, four key criteria are considered under Department of Environment and Science's Operational Policy Interim policy for determining a flying-fox roost:

1. The number/density element (i.e. size of congregation required to represent a roost);
2. The temporal element (i.e. 'from time to time');
3. The behavioural (breeding/lifecycle) element (i.e. 'congregate...for breeding, gestating or rearing their young'); and,
4. The spatial element (i.e. a 'tree or other place').

There are four broad categories of roost identified in Table 3.

Table 3: Roost/Congregation Type - Interim policy for determining a flying-fox roost

Congregation Type	Congregation Characteristics
Permanent roost	The site has previously met the requirements to satisfy the roost definition under this policy. <ul style="list-style-type: none"> ▪ Includes Continuous Use sites* ▪ Includes Seasonal Use sites** ▪ Includes New Congregations which satisfy the requirements of the roost definition under this policy.
New congregation	<ul style="list-style-type: none"> ▪ A site where flying-foxes have not been known to congregate previously, or where occupation has not yet met the criterion for 'from time to time'. ▪ Includes splinter colonies ▪ May include overflow from existing roost sites into trees that have previously not been occupied by flying-foxes.
Historical Site	A site that has previously met the 'roost definition' requirements but hasn't been occupied by flying-foxes for a period of five consecutive years. If flying-foxes resume occupancy of an Historical Site, the site should be classified as a New Congregation until it has once more met the density, temporal, behavioural and spatial aspects that allow it to once again be classified as a Permanent Roost.
Destroyed Roost	A site that has been destroyed either legally/illegally or destroyed through natural events (e.g. cyclone, fires etc.) and is no longer being occupied by flying-foxes, and not capable of being occupied by flying-foxes.

*Continuous Use – indicates that the site is permanently, or almost permanently, occupied by flying-foxes.

**Seasonal Use – indicates that a site is occupied by flying-foxes during certain periods as a result of the availability of nearby food sources such as nectar/flowers or due to climactic changes such as seasonal temperature variations.

5.1.1 Land Tenure

Council is responsible for management of flying-fox roosts on Council owned and managed lands. This can include lands such as parks reserves, roads reserves and trustee lands. It does not include other public lands subject to the operations of the Queensland Government, such as National Parks, State-controlled roads, and water reservoirs.

Flying-fox roosts on Council owned or managed land that are determined to not result in human-flying-fox conflict, will be encouraged as flying-fox habitat. This may involve works to enhance native vegetation, remove exotic (weed) vegetation and manage fire.

Council will avoid management actions and works believed likely to cause flying-foxes roosting on Council land to spill over onto private property. In particular, techniques such as creating buffers and

nudging will be used to encourage fling-fox roosts to remain within Council property. Where a roost occurs on a combination of Council land and private lands, Council will work with landholders to achieve an agreed outcome for management.

5.2 CATEGORISING CONFLICT

Flying-foxes are highly nomadic resulting in roosts that can be occupied continuously, irregularly or rarely (Roberts, 2005). This can often result in changes to the level of conflict experienced by the community. In addition, conflict can change due to the nature of the human landscape. Changes to location and density of residential areas, sensitive receptors and vegetation within conflict areas can change where and how flying-foxes roost. The tool below provides a general method for consideration when determining the level of conflict of a roost within the region.

Table 4: Roost Conflict Categorisation

	Conflict	Description	Category
Permanent, Seasonally Occupied Roost	Low	Seasonally/intermittently occupied. Low proximity to residential properties. Low number of residents impacted.	Category 3
	Moderate	Continuously occupied. Medium proximity to residential properties. Medium number of residents impacted.	Category 2
	High	Continuously occupied. High proximity to residential properties. High number of residents impacted. Sensitive Receivers in proximity of roost.	Category 1
New Congregation/ Roost	Low	Seasonally/intermittently occupied Low proximity to residential properties. Low number of residents impacted.	Category 3a
	Moderate	Continuously occupied. Proximity to residential properties. Number of residents impacted.	Category 2a
	High	Continuously occupied. Proximity to residential properties. Significant number of residents impacted. Sensitive Receivers in proximity of roost.	Category 1a

6. Assessment and Management Action

When considering whether or not to undertake flying-fox roost management actions, Council will take into consideration previous management actions which have been unsuccessful. It is important to note that many flying-foxes will spend time roosting and foraging within urban environments where the loud noises, bright lights and pungent smells (such as vehicle exhaust) of human habitation are frequently present. They readily adapt to their surrounding environment and easily become habituated especially when food resources are limited. This can provide challenges for the management of flying-foxes.

Cost-effective, reliable techniques for relocating flying-fox roosts have not been developed. The result of relocation attempts such as the use of loud noises, lights or hosing with water have generally been unsuccessful, or, if forced to desert the roost,

have not relocated to the pre-selected “new” location(s). Instead, they have relocated to less desirable locations; for example, they have scattered throughout a town or joined nearby roosts in other towns, compounding problems at those sites. The stress caused to the animals has sometimes resulted in fatalities, with pregnant females and dependent young being particularly vulnerable.

6.1 ALTERNATIVE ROOSTING LOCATIONS

Council will investigate potential alternate roost sites prior to determining the course of management actions to be undertaken. It is impossible to predict where dispersed flying-foxes will relocate to, but it is hoped the flying-foxes will join existing colonies in more suitable locations. Understanding where dispersed flying-foxes may relocate will greatly impact management options as displaced animals



may choose to roost in less suitable locations such as the grounds of nearby schools, hospitals or aged care facilities. Council may choose to manage the roost in its current location instead of risking flying-foxes roosting in a more problematic location.

Key criteria for assessing possible alternative roost locations include:

- Vegetation type, height and patch size.
- Canopy cover of a similar density to current roost.
- Proximity to water, food resources and < 2km from original site,
- Ideally the site would be located away from sensitive receivers such as schools, hospitals and aged care facilities.
- Extent to which vegetation may impede views or visual amenity.
- Willingness for landholder to allow vegetation rehabilitation, or to sell.
- Opportunities for multiple uses for the site such as recreation/education.
- Responding to New Congregations and Roost changes.

Newly and/or temporarily established flying-fox roosts within the Urban Flying-fox Management Area and on Council lands will be assessed and categorised by designated Council staff to determine the level of conflict observed at a congregation/roost site.

Existing roosts will be re-categorised every 12 months to ensure the determination of conflict considers any changes that may occur. The process for determination is outlined in Figure 5.

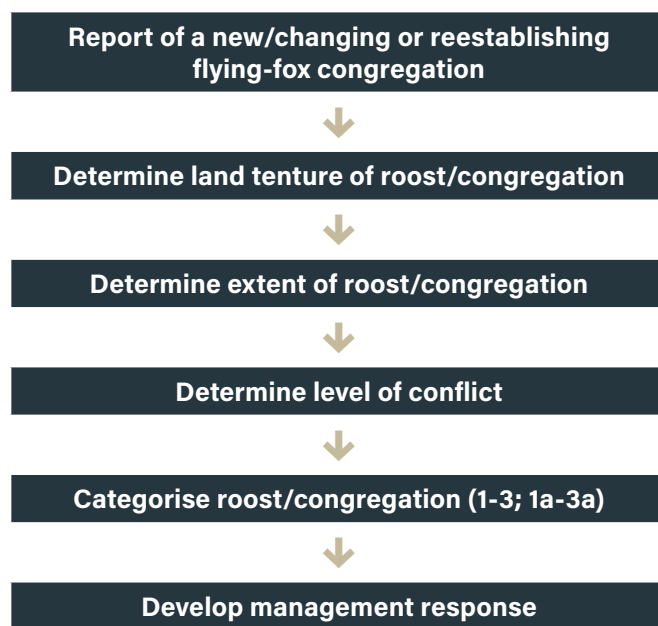


Figure 6: Conflict determination for new, changing or re-establishing historical flying-fox roosts.

6.2 ROOST RESPONSE FRAMEWORK

Table 5: Roost Response Framework

Land Tenure	Response Action	Permanent or Seasonally Occupied			New Congregation/Roost		
		Category 3	Category 2	Category 1	Category 3a	Category 2a	Category 1a
All Land Tenures	Land Use Planning						
	Education and awareness						
	Customer request response						
	Heat Stress Response						
	Roost monitoring***						
Council Managed Lands and Co-tenure Roosts	Roost Management Plan development						
	Heat Stress Response						
	Habitat Improvement*						
	Routine Maintenance and operations						
	Subsidies/Support**						
	Vegetation Buffers						
	Artificial Buffers						
	Nudging						
	Passive Dispersal						
	Early Intervention****						
Non-Council lands	Complaints response and handling						
	Subsidies/Support**						
	Habitat Improvement*						

Habitat Improvement* means improving vegetation where supporting flying-fox movement into lower conflict areas. Note: Habitat improvement on private property will need to be assessed on an as needs basis and may include the provision of plants through existing programs.

Subsidies/Support** Indicates subsidies provided in support of residents impacted by flying-fox roosts.

Roost monitoring*** on private lands will only be undertaken with agreement of the private landholder.

Early Intervention**** Early intervention may include a variety of management actions based on the nature of a new flying-fox congregation.

7. Management Options

The following section outlines management actions available to Council in responding to community concerns regarding flying-fox roosts. Actions are presented in order of least to most invasive. There is a strong relationship between the level of intervention and associated cost and risk.

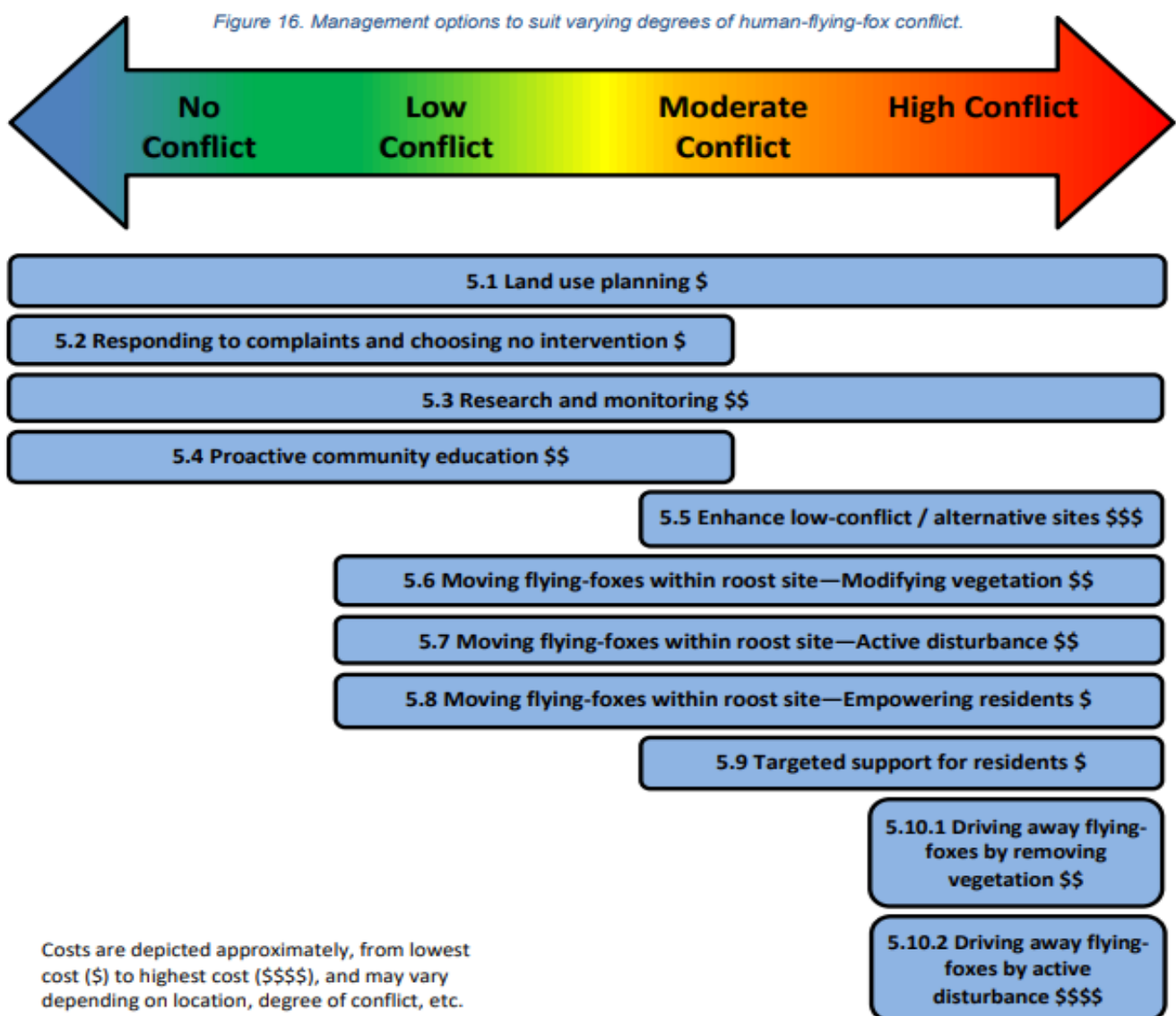



Figure 7: Except from Flying-fox Management Guidelines (QLD Government 2023).



Council will encourage passive management actions such as education and minimal intervention over more intrusive actions. Intrusive actions will only be considered within high conflict sites where significant community conflict is occurring. Roost management planning will need to identify recommendations and ensure the risk of transference of impacts is limited. This approach is intended to balance community needs, while ensuring management actions achieve cost effective and successful outcomes.

7.1 EDUCATION AND AWARENESS

Council will conduct community education and/or consultation where community/flying-fox conflicts occur or are likely to occur with the intention of reducing many of the community's concerns about the proximity of flying-foxes. The activities of both humans and flying-foxes can sometimes cause conflict between both groups. Primary concerns include roost noise, odour, flying-fox faeces, flying-foxes feeding in backyard trees and orchards, human health and disease concerns.

Council aims to provide important information to the community about flying-fox ecology and biology. Education will enable members of the community to make informed decisions to limit their own potential sources of flying-fox conflict, such as deciding whether or not to purchase a new property in the proximity of a known roost and which trees to plant in their backyards to restrict flying-fox visitation. Key education and awareness actions may include:

- Providing educational materials to residents and interested groups regarding flying-fox ecology, behaviour, health and disease risks and general property management.
- Providing information about seasonal changes that relate to local flying-fox colonies through social media, media releases and webpage.
- Responding to existing roosts and new congregations through community information days, or customer request responses.

7.2 PLANNING AND DESIGN

Council may consider the proximity of a flying-fox roost when considering development applications in order to discourage development that will cause or increase community/flying-fox conflict. Council is continually investigating new and improved data to determine the potential location of new conflict areas.

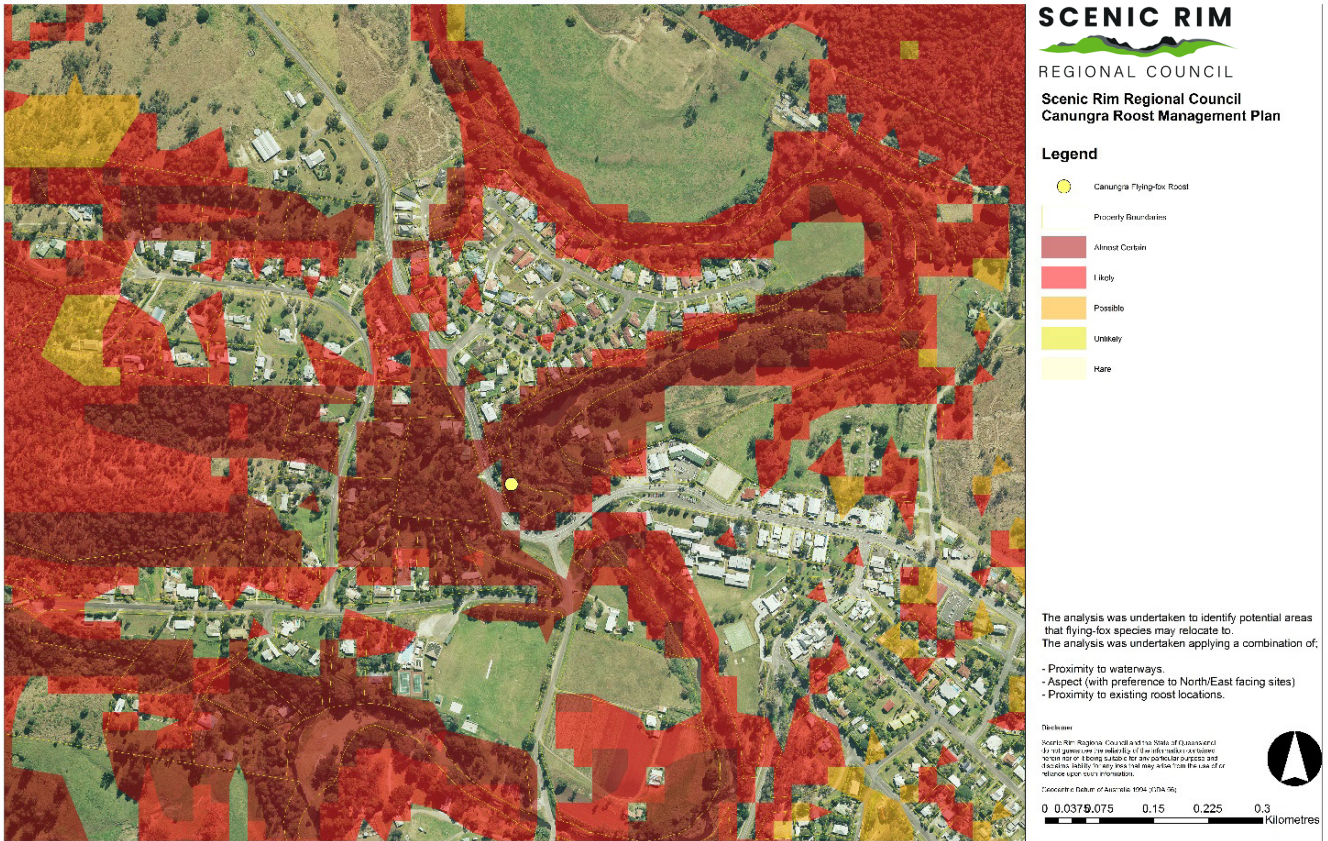


Figure 8: Example of early habitat suitability assessment.



7.3 ROUTINE MAINTENANCE AND OPERATIONS

Council will undertake routine maintenance of roost sites in accordance with the Code of practice - Low impact activities affecting flying-fox roosts. Protocols will consider the risk of disturbance to flying-fox roosts as well as any risks associated with the continued operation of facilities (e.g. increased cleaning requirements of park equipment or footpaths). Council will continually monitor roost sites for dangerous trees or limbs and respond accordingly under the Code of practice.

Key management actions as part of Routine Maintenance Include:

- Collecting and appropriately disposing of dead flying-foxes located on Council lands.
- Installation of temporary signage and restriction of access to pathways or facilities where flying-fox roosts have temporarily increased.

7.4 GRANTS AND SUPPORT

Within the UFFMA, individual roosts will be assessed to determine whether roost management is appropriate, with the likelihood of success and risk of translocating impacts considered. Where the likelihood of management success is low or the roost is located on private property, Council will **provide support** for eligible residents in the **immediate vicinity** of the roost. In many instances, offering financial or in-kind support for residents living in the immediate vicinity of a roost is a relative low cost action in comparison to the cost of driving flying-foxes away (Department of Environment and Science, 2020). Council will consider providing for the provision of items and services that assist owners and residents in managing impacts associated with flying-fox roosts.

Residents applying for funding will be assessed against a set criteria giving consideration to the level of conflict, available funding and the likelihood of success of the proposed intervention.

Further details will be made available upon development of a guideline for flying-fox support.

Funding and support may be provided for the following items:

- Pressure cleaner (hire or purchase)
- Car washing costs
- Vehicle covers
- Clothesline covers
- Pool/spa covers
- Window double glazing
- Door and window seals
- External cleaning
- Tank screening, first flush system
- Wildlife safe tree netting
- Mulching/mowing services
- Screen planting (e.g. non-fruiting and flowering native hedges)
- Privacy screens
- Fragrance dispensers/Dehumidifiers or air purifiers to remove VOC's
- Minor vegetation management to buffer homes
- Air conditioning units

In certain situations, Council may consider support of property owners through provision a of rate rebate where in accordance with Council's **Habitat Protection Program Guideline**. These circumstances will be assessed on a case by case basis in accordance with the Habitat Protection Program.

7.5 VEGETATION BUFFERS AND HABITAT CREATION

Modifying vegetation is one technique to create a buffer between flying-foxes and impacted communities. Modifying vegetation can include:

- Trimming or removing roost trees nearest to residents to create buffers to impacted residents



- Encouraging vegetation into lower conflict areas of the roost
- Planting and maintaining low shrubs and screening vegetation for as visual/noise buffers
- Creating grassy areas or mulched garden beds to reduce human interaction with flying-foxes
- Creating new habitat in low-conflict areas that could potentially support a roost
- Creating artificial roosting habitat.

In some situations, residents have reported increased noise impacts from the flying-fox roost after vegetation removal was completed.

Where vegetation is trimmed or removed, Council will consider undertaking replacement plantings in suitable locations within Council's reserve network, in order to ensure that canopy cover is not reduced.

7.6 BUFFERS WITHOUT VEGETATION REMOVAL

In certain situations, deterrents can be used to create a buffer between a roost and receptors. For example, tree mounted sprinklers and flood lighting can be installed to deter flying-foxes from use of high conflict areas within roost sites. The use of buffers such as canopy mounted sprinklers can reduce the need for vegetation removal and sometimes provide an effective form of control while reducing the risk of splintering a roost. In certain

instances, these management actions can provide the opportunity for residents to directly control the buffer to self-manage the issue. Council will consider the installation of artificial buffers as part of roost management planning for permanent and seasonal **High conflict sites**. Some of the buffering devices available include:

- **Visual deterrents** - balloons, fluorescent devices, strobe lighting and general lighting. These devices can have limited effectiveness and often result in habituation of flying-foxes.
- **Noise emitting devices** - Noise devices are devices that provide varied and unexpected noises on a randomised program. These devices can be effective although can result in movement of flying-foxes into more problematic locations. In addition, these devices need to be managed with other deterrent options to reduce the risk of habituation.
- **Smell deterrents** - Predator excrement has been trialled as a deterrent for flying-foxes. This option can be locally effective but also has limited effectiveness over time.

7.7 DISPERSAL AND DISTURBANCE

Dispersion is the driving away of flying-foxes from a high-conflict site. Actions can be either passive or active and can include actively disturbing a roost through the use of non-lethal actions including



creating light and noise to make the habitat less suitable for flying-foxes, or passively by removal of roost habitat.

Passive Dispersal

Passive dispersal involves the staged removal of vegetation to disperse a flying-fox roost. Generally, the majority of the roost footprint must be modified in order to disperse a colony. In many instances this management action will result in the formation of splinter colonies and can result in loss of control with the inability to encourage flying-foxes back to the original roost site. This management action needs to be carefully considered as it has the potential to result in significant negative community impacts.

Active Dispersal

Active dispersal involves the direct disturbance of flying-foxes through the application of noise, light and other disturbances to drive flying-foxes away. Active dispersal of a flying-fox roost is uncertain, cost intensive and often results in a poor or worse outcome for the community. Dispersal attempts are often very short-term, with flying-foxes recolonising the site as soon as management actions have

ceased. In the majority of dispersal attempts, actions didn't result in a reduced number of flying-foxes and in many instances resulted in dispersed animals moving less than 600 metres from the site (Roberts and Eby, 2013). Active dispersal is considered largely ineffective and will not be considered.

Nudging

In certain instances small scale dispersal actions referred to as nudging can move animals within a roost site to a lower conflict area. This technique requires a coordinated approach of low-level disturbance from a specific direction, for example, through using light/motion devices approaching a roost from a particular direction. If disturbance levels and techniques are appropriate, flying-foxes will move away from the disturbance without being driven away from the roost.

Prior to considering any form of dispersal actions, roost management planning will need to consider the likelihood of success, a risk assessment, including identification of sensitive receptors, and an assessment of lower conflict sites for nudging.

8. Management Principles

When undertaking any of the management actions described in Table 5, Council will consider the following principles to ensure management considers risk, timing, cost and likelihood of success.

8.1 IN SITU MANAGEMENT AND MONITORING

Council's main objective when undertaking flying-fox roost management is to ensure that roost impacts are not worsened and/or transferred to a more problematic location, such as closer to **sensitive receptors**. Where there is a high risk of transferring roost impacts to a more problematic site, Council may decide that the best management option is to ensure the flying-fox roost in question remains in its current location. In such cases, Council may undertake management actions to help mitigate roost impacts on neighbouring residents whilst ensuring Council maintains control over the roost site and reduces the risk of impact transference to other parts of the community.

In situ management can include a combination of actions such as:

- General maintenance in accordance with the Code of practice: Low impact activities affecting flying-fox roosts (Department of Environment and Science, 2013).
- Undertaking minor vegetation removal to create buffer zones between the roost and nearby residences.
- Planting and promoting the growth of native, non-roost tree/shrub species as vegetation buffers to reduce activities that conflict with roosting (e.g. mowing).
- Re-generating vegetation communities to extend known roost sites away from conflict areas.
- Nudging flying-foxes into other parts of the roost and away from **sensitive receptors**.
- Periodical monitoring of the roost, its impacts and a review of management options as required.
- Providing some financial assistance to affected residents and community groups dealing with the impacts of flying-foxes.
- Relocation or retrofitting of public infrastructure where cost effective and likely to reduce conflict.



8.2 TIMING AND INTERVENTION

When considering any flying-fox management activity, timing is paramount to success. As new congregations emerge, early intervention will only be considered where the site is identified as **high conflict** and risks can be managed to an acceptable level. In addition, consideration will be given to the following criteria when deciding to intervene in a new congregation (Table 6).

Table 6: Early Intervention Considerations

Consideration	Description	Management
Type of species	Little red flying-foxes are highly nomadic and may stay for short periods during flowering events. Black flying-foxes and grey-headed flying-foxes build strong connection to a site.	Respond based on species make up of new congregation.
The number of species that make up the congregation	Intervention becomes logistically difficult. Intervention can only be considered where risks are controllable.	Intervention in new congregations that are controllable.
The breeding season of the species	Flying-foxes in late stages of pregnancy are at risk or aborting young. Dependent young are not capable of leaving site.	Consider timing of season.
External factors including heatwaves, climate extremes or food shortage	External factors can result in increased stress on animals.	Consider timing of intervention to reduce risk of harming animals.



8.3 RISK BASED MANAGEMENT

Managing flying-foxes and their roosts is challenging with management intervention having the potential to adversely impact nearby residents, the broader community and flying-foxes. Management actions will consider flying-fox ecology and biology to ensure actions are conducted at appropriate times of the year, otherwise these impacts could be exacerbated and/or transfer to more problematic locations and potentially cause flying-fox fatalities.

Table 7: Management Risks

Risk	Description	Management
Health Risks	Operational staff may be required to work in close proximity to flying-foxes when undertaking management actions.	All operational staff working in close proximity to flying-foxes are to be vaccinated and trained in roost management.
	The general public and their pets could be at risk of flying-fox exposure. Stressed and/or exhausted flying-foxes may come to ground and/or females may abort or drop young, thus increasing the potential for human/pet exposure to flying-foxes.	Adjacent areas will be closed to the public during operations, where possible and signage erected. Vegetation modification will primarily occur at night after flyout greatly reducing any human/flying-fox interactions. Suitably qualified flying-fox carers will be appointed for any roost dispersal actions.
Managing Outcomes	There is a significant risk that the outcomes of any dispersal or vegetation modification could result in increased impacts upon the wider community.	Prior to roost dispersal, it may be necessary to undertake vegetation modification at alternate locations to reduce vegetation attractiveness to the flying-foxes currently being dispersed. Follow up dispersals may need to be undertaken.
Liability	Actions undertaken by Council in dealing with a flying-fox roost may expose Council to an increased risk of litigation.	All required State and Federal Government approvals will be obtained prior to undertaking any management actions.
Increased Impacts	Rushed or poor management responses could exacerbate flying-fox problems and cause increased levels of conflict between flying-foxes and the community.	Dispersal actions will be planned including staff training, equipment and vaccinations. Vegetation modification will be staged to ensure no operations are rushed.
Transference of Impacts	Rarely have flying-foxes relocated more than 2km from the original roost. There is a real risk of transferring the problem to another area which may be more problematic than the original roost.	Ongoing monitoring of the roost and surrounding potential roost sites will be undertaken. Vegetation modification of the likely new roost sites may need to occur prior to the commencement of dispersal actions.
Loss of Control	The current location may enable control over the impacts of the flying-foxes. Certain management actions may lead to the roost dispersing and losing all ability to mitigate the impacts.	Ongoing monitoring of the roost and in-situ management observing any changes in roost shape or intensity.
Risk of Mortality	Flying-fox mortality may potentially occur when undertaking roost management. Other animals may also be affected, such as possums, gliders, birds and reptiles.	Vegetation modification will occur outside of key flying-fox breeding events and at night (after flyout) and only in trees where no animals are present. Personnel capable of rescuing flying-foxes will be on site during activities. If mortality is observed, operations will cease immediately with notification to the Department.

8.4 UNAUTHORISED FLYING-FOX MANAGEMENT

Unauthorised attempts to disturb flying-fox colonies are not only illegal but also ineffective. Queensland's native wildlife, including flying-foxes, are protected by the Nature Conservation Act 1992. Examples of ineffective means of controlling flying-foxes include the use of shooting, noise deterrents, bright or flashing lights and pungent odours.

The installation of high-frequency emitting bat-repellents has repeatedly been trialled without of success. Flying-foxes do not use echolocation or ultrasound. Their hearing range is similar to that of humans, making high-frequency sound inaudible to them. Therefore, sounds that can potentially disturb flying-foxes have an equally offensive effect on humans and meet with very limited popularity in the community.

Strobe, bright or flashing light sources installed in trees are unsuccessful as deterrents. While flying-foxes may be disturbed initially, hunger and desensitisation to the light causes the effect to be short lived and may eventually serve to attract the bats. Driven by desperation, flying-foxes will become accustomed to most novel stimuli in a matter of days or weeks.

Due to flying-foxes' highly developed sense of smell, strong and unpleasant odours would seem the most likely detractor of flying-foxes. Pungent kerosene, fish paste and snake faeces have been placed in fruit trees with limited success. Wild animals are accustomed to the smell of predator faeces (such as python faeces) and are able to quickly determine the freshness and therefore the likely proximity of the predator. This means that to deter flying-foxes from roosting or foraging in specific trees the predator

faeces (such as python faeces) must be re-applied on an almost daily basis. While odour detraction may warrant further investigation, hungry bats are likely to habituate to it if no food/roost alternatives exist.

Past reductions of local flying-fox numbers by means of shooting or poisoning (illegal) have historically been used across Australia. While a small number of flying-foxes can be removed by shooting, this does not deter other bats from returning later. Orchards are most affected by bats when native food resources are extremely scarce, and cultivated fruit provides the only alternative to starvation.

Furthermore, findings of the Animal Welfare Advisory Committee concluded that shooting flying-foxes was inhumane.

8.5 ADAPTIVE MANAGEMENT

Adaptive management involving monitoring of roosts to determine some measure of species presence, abundance and breeding status may be undertaken pre- and post-implementation of management actions, for a minimum of 12 months to allow for potential seasonality changes. Monitoring frequency and intensity may be increased pre- and post-management action at roost sites.

When flying-foxes return to a dispersed roost to find it is no longer suitable, displaced flying-foxes may temporarily relocate to nearby trees including those in neighbouring backyards. If this occurs, residents should be urged to leave the animals alone as they require rest to be able to fly off again in the evening. It is anticipated that the flying-foxes will move on to more suitable locations within a day or two. A council officer will assess the situation if the same individual flying-fox remains in a backyard for more than two days following management activities.

9. Flying-fox Monitoring

9.1 ROOST MONITORING

Council officers will undertake quarterly assessments of roosts within the region to record presence/absence, species, breeding activity and seasonal changes. Regular monitoring provides Council with the ability to understand how roosts evolve and change over time and provides an opportunity for impacted residents to discuss observations with officers. Council will continue to support regional monitoring and national monitoring programs, including the national Grey-headed flying-fox monitoring program, to better understand changes in flying-fox ecology.

9.2 HEAT STRESS MONITORING AND RESPONSE

Flying-fox roosts can be severely impacted by extreme weather events. Animals may require urgent medical intervention to potentially reduce the number of dead animals in the vicinity of the roost and the number of sick and/or orphaned young needing to be brought into care. Early monitoring of flying-fox roosts following severe thunderstorms and when maximum daytime temperatures are predicted to meet or exceed 38°C will alert government agencies and wildlife care groups to the need to provide immediate assistance to injured

and/or debilitated animals in order to prevent mass fatalities.

Trained Council staff will monitor flying-fox roosts, in response to extreme weather events, for signs of injured and/or heat stressed flying-foxes such as clustering or clumping of animals along tree trunks and in the understorey. When deemed appropriate, Council will immediately implement response measures including:

- Contacting the Department of Environment and Science.
- Contacting the RSPCA and/or local wildlife care groups.
- Arranging for devices to undertake misting where appropriate in accordance with heat stress guidelines.
- Assisting the Department of Environment and Science, the RSPCA and/or local wildlife carers with the recovery of animals requiring more intense re-hydration and/or with the removal of carcasses.





10. Evaluation and Review

An informal review of the Strategy will be scheduled annually to ensure the strategy remains current with:

- changes to relevant policy or legislation
- outcomes of research that may influence flying-fox management
- new management techniques becoming available
- incidents associated with new or existing roosts that require policy refinement.

Council will monitor and evaluate the effectiveness of management actions and maintain internal records to inform future strategic development and roost management planning. A post-implementation review will occur at conclusion of the strategy to inform future policy development.



11. Reference/Bibliography

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12. Appendices

APPENDIX A - DEFINITIONS/GLOSSARY

Council Land - Land owned or managed in trustee by Council. This can include lands such as parks reserves, roads reserves and trustee lands. It does not include other public lands subject to the operations of the Queensland Government, such as National Parks, State-controlled roads, and water reservoirs.

Sensitive Receptor - receptor that can include vulnerable cohorts of people and/or animals where managing risk may be more complex (i.e. schools, hospitals, playgrounds or aged care facilities).

Splinter colony - Separate group(s) of flying-foxes formed in close proximity to an existing roost site. This can occur through active intervention or naturally through changes to the local environment.

Flying-fox Roost - A flying-fox roost means a tree or other place where flying-foxes congregate from time to time for breeding or rearing their young under section 88C of the *Nature Conservation Act*.

Permanent Roost - A site that has previously met the requirements to satisfy the roost definition under the Interim policy for determining when a flying-fox congregation is regarded as flying-fox roost under section 88C of the *Nature Conservation Act 1992*. A Permanent roost can either be classified as a continuous use roost or seasonal use roost.

- Continuous Use - indicates that the site is permanently, or almost permanently, occupied by flying-foxes.
- Seasonal Use - indicates that a site is occupied by flying-foxes during certain periods as a result of the availability of nearby food sources such as nectar/flowers or due to climactic changes such as seasonal temperature variations.

Historical Roost - A site that has previously met the 'roost definition' requirements but hasn't been occupied by flying-foxes for a period of five consecutive years.

New Congregation - A site where flying-foxes have not been known to congregate previously, or where occupation has not yet met the criteria of a roost under the *Nature Conservation Act 1992*. This may also include splinter colonies from an existing roost as well as overflow from existing roost sites

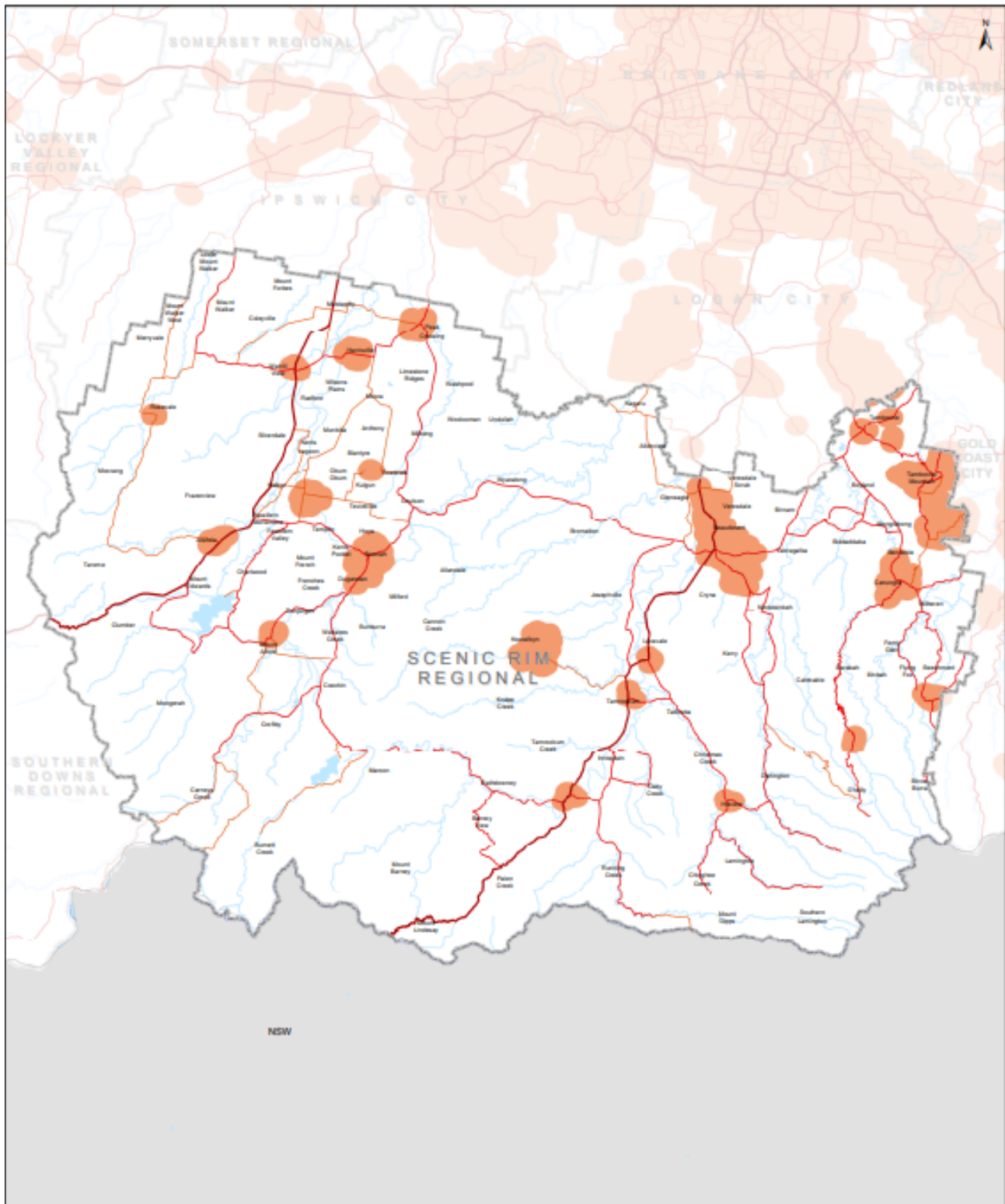
APPENDIX B - KNOWN FLYING-FOX ROOSTS/CONGREGATION - 2023

Name	National Program ID	Location	Congregation/roost type	First Established
Spring Creek Roost	(787)	Beaudesert	Continuous	2014
Salt Gully Roost	(289)	Boonah	Historical	2010
Teviot Brook Roost	(Nil)	Dugandan	New congregation	2023
Coomera River Roost	(141)	Witheren (Beechmont Rd)	Continuously occupied	2010
Canungra Creek Roost	(803)	Canungra (Township)	Continuously occupied	2010
Flinders Peak Roost	(158)	Flinders Peak	Seasonally occupied	Unknown
Widgee Creek Roost	(358)	Hillview	Continuously occupied	Unknown
Cannon Creek Roost	(551)	Kooralbyn	Continuously occupied	Unknown
Sandy Creek Roost	(Nil)	Peak Crossing	Seasonally occupied	Unknown
Mount French Roost	(288)	Mount French	Seasonally occupied	Unknown
Logan River Rathdowney Roost	(568)	Rathdowney	Seasonally occupied	Unknown
Cedar Creek Roost	(455)	Tamborine National Park	Seasonally occupied	Unknown



Description	UFFMA	Tenure	Conflict
Continuous roost consisting of black and grey-headed flying-foxes within Lions Bicentennial Park. The roost has moved across several locations in Jubilee Park.	Yes	Combination – Council controlled + private property	High
Contentious roost in Boonah Bicentennial park. The roost was regularly occupied by black and grey headed flying-foxes. The site had significant influxes of little red flying-foxes during 2013.	Yes	Council controlled land	High
New congregation of grey headed flying-foxes that established for approximately four weeks during October 2023. The congregation has since left the site.	Yes	Combination – Council land + private property	Medium
Nationally significant flying-fox roost containing grey headed and black flying-foxes. The roost has continually reduced in size from 2015.	No	Combination – Council land+ private property	Medium
Congregation of grey headed and black flying-foxes. The colony has maintained a core area within the Lions Park but has expanded into private property.	Yes	Combination – Council land+ private property	High
Small discreet roost site located near Flinders Peak in bushland.	No	Private land	Low
A contentious roost located within private property. The roost has expanded in recent years to the west following Widgee Creek.	Yes	Private land	High
Relatively small roost site containing grey headed and black flying-foxes. The site has sporadically moved across into private property.	Yes	Council land	Medium
Small roost site located in parkland along Sandy Creek.	Yes	Combination – Council land+ private property	Low
Site located at the headwaters of Frenches Creek. The site is located in heavily vegetated areas in National Park	No	State Controlled land	Low
Irregular roost that has seasonally located in various areas of Rathdowney township.	Yes	Private land	High
Small discreet roost located in National Park along Cedar Creek.	Yes	State Controlled land	Low

APPENDIX B - URBAN FLYING-FOX MANAGEMENT AREA



SCENIC RIM REGIONAL

Legend

- Urban Flying Fox Management Area
- Local Government Area
- Road

COORDINATE SYSTEM: GDA 1984
HORIZONTAL DATUM: GDA 1984

MAP PRODUCTION
28 July 2010
Nature Conservation Services
Department of Environment and Heritage Protection

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Department of Environment and Heritage Protection 2010

Urban Flying-Fox Management Area





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SCENIC RIM

REGIONAL COUNCIL