Whitsunday Regional Council

Flying-fox Roost Management Plan: Collinsville 2025-2030

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Prepared for Whitsunday Regional Council

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Flying-fox Roost Management Plan

Collinsville

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Terms and Abbreviations

BAAM	Biodiversity Assessment and Management Pty Ltd
DES	Queensland Department of Environment and Science (superseded)
DETSI	Queensland Department of Environment, Science and Innovation (current)

1.0 Introduction

1.1 Background and Context

Flying-foxes are vital to Australia's environment as key pollinators and seed dispersers of a range of native plants, particularly eucalypts, melaleucas and other Myrtaceae species. By transporting pollen and seeds over large distances, they help maintain genetic diversity in native forests, supporting species resilience and ecosystem health. Their actions drive forest regeneration, benefiting biodiversity, carbon storage, and water quality. Without flying-foxes, many ecosystems would lose essential ecological balance, impacting both wildlife and human communities.

Despite their ecological importance, flying-foxes can cause conflict with humans, particularly when they gather in large numbers at urban roosts. Commonly reported issues include noise, odour, droppings, vegetation damage, and concerns over potential disease risks. The Whitsunday Regional Council takes these concerns seriously, assessing the impacts and considering management strategies for problematic flying-fox roosts.

The Whitsunday Regional Council has developed a Flying-fox Policy, Flying-fox Management Plan and Flying-fox Roost Management Plan - Collinsville. These documents include a summary of flying-fox importance and biology, legislation and guidelines, management options and the framework for evaluating flying-fox impacts to the community. It is recommended to read this roost management plan in conjunction with other related Council and Queensland Government documents, which are listed in **Section 6.0**.

1.2 Roost Management Plan Review

This flying-fox roost management plan uses an adaptive management approach, ensuring that new data and knowledge on the best ways to manage human-wildlife conflict are implemented where possible. As such, a review of this roost management plan should be undertaken annually, to ensure it is still suitable and in line with the Whitsunday Regional Council policies and procedures, as well as contemporary government legislation, policies and codes of practice.

2.0 Collinsville Roost

2.1 Roost Description

Flying-foxes have been recorded in low numbers at various locations in and around Collinsville for over twenty years. In March 2021, a more substantial roost established at Pelican Park, with subsequent complaints to the Whitsunday Regional Council initiating the consideration of management activities. Since then, flying-foxes have continued to roost in trees on both Council and private residential land, with different management activities undertaken with varied success.

Two species of flying-fox have been recorded in Collinsville: Black Flying-fox (*Pteropus alecto*) and Little Red Flying-fox (*Pteropus scapulatus*). While neither is a declared threatened species under Queensland or Commonwealth legislation, as a native animal they are protected under the Queensland *Nature Conservation Act 1992*. Additionally, there are various codes of practice and guidelines that must be followed when considering and actioning management activities on flying-foxes and their roosts. These are detailed further in the Whitsunday Regional Council Flying-fox Policy 2025-2030 and Flying-fox Management Plan 2025-2030.

2.2 Flying-fox Monitoring Data

The Whitsunday Regional Council has been undertaking weekly, fortnightly or monthly monitoring counts of flying-foxes in Collinsville for several years to understand the ongoing situation of roost impacts to the town. Such data collection is highly valuable for determining seasonal trends, which can provide an insight into the planning and operation of management activities.

Of the two species that roost in Collinsville, Black Flying-foxes are typically more permanent, being present for most of the year in low to moderate numbers (**Figure 1**). Little Red Flying-foxes are more nomadic, often dispersing within the wider region following changes in food resources. Little Red Flying-foxes are typically within Collinsville between mid-late winter to early summer and often at very high numbers (**Figure 2**).

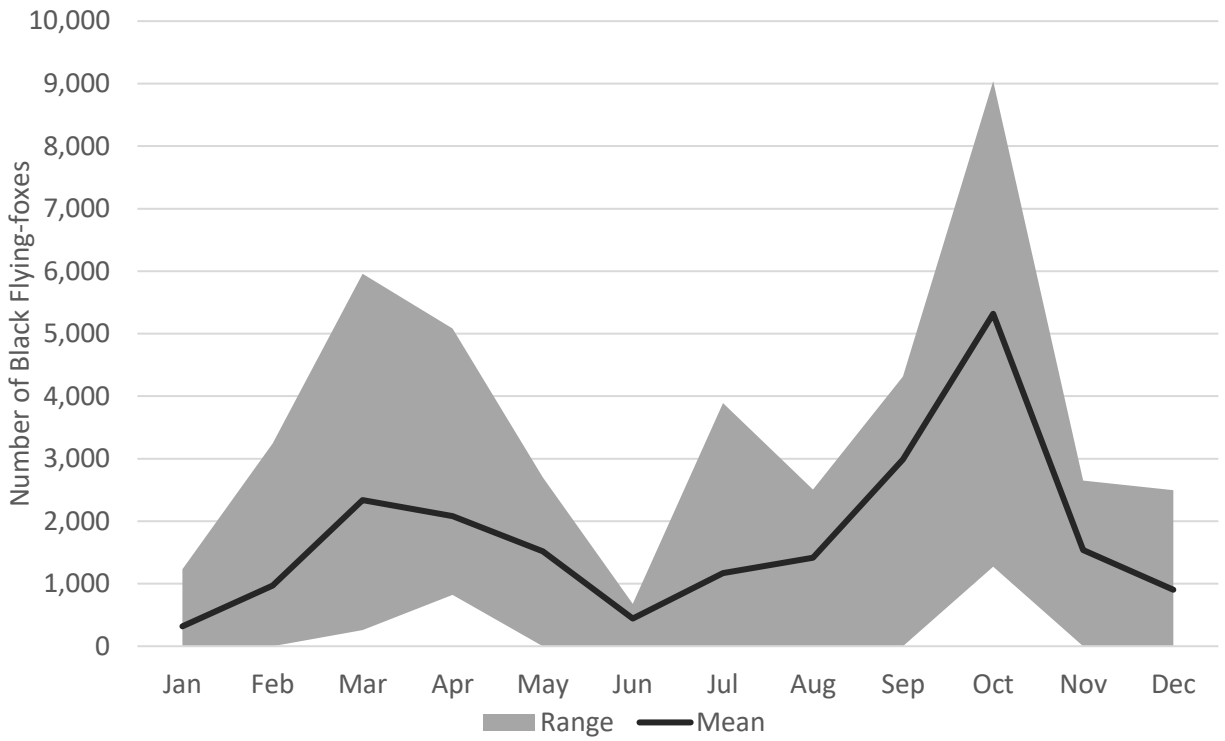


Figure 1. Average number and range of Black Flying-foxes in Collinsville from Whitsunday Regional Council monitoring data between April 2021 to July 2024.

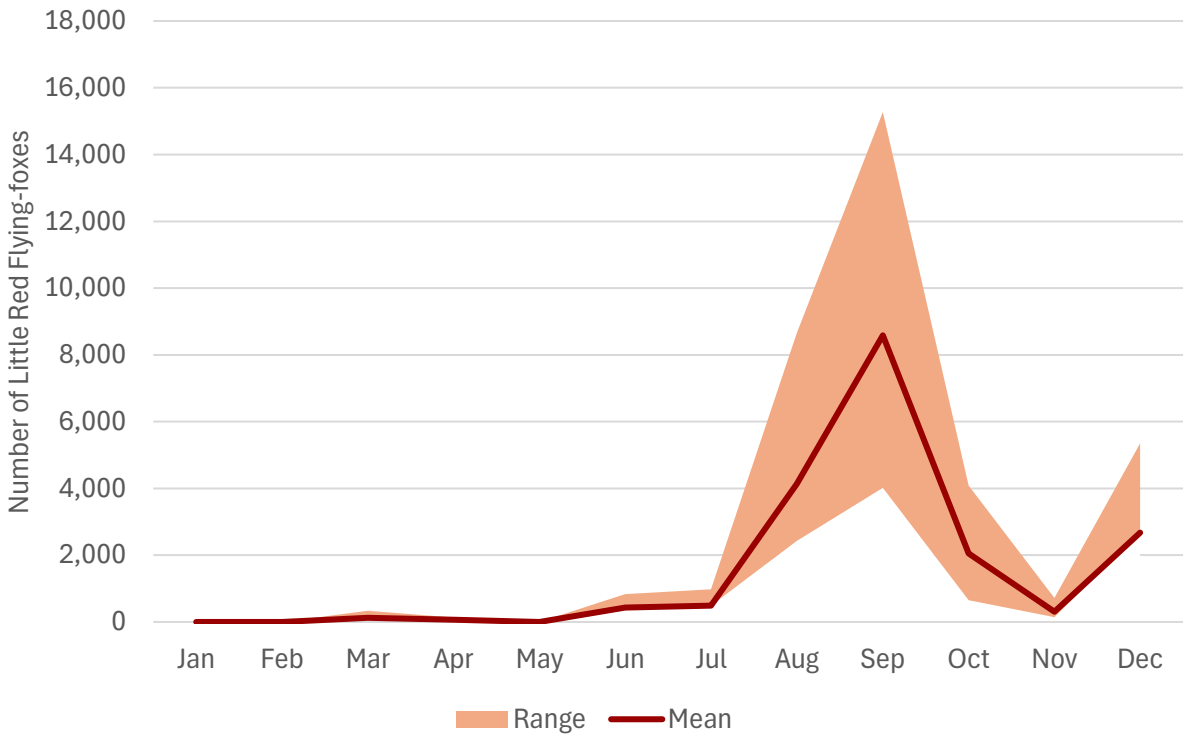


Figure 2. Average number and range of Little Red Flying-foxes in Collinsville from Whitsunday Regional Council monitoring data between April 2021 to July 2024.

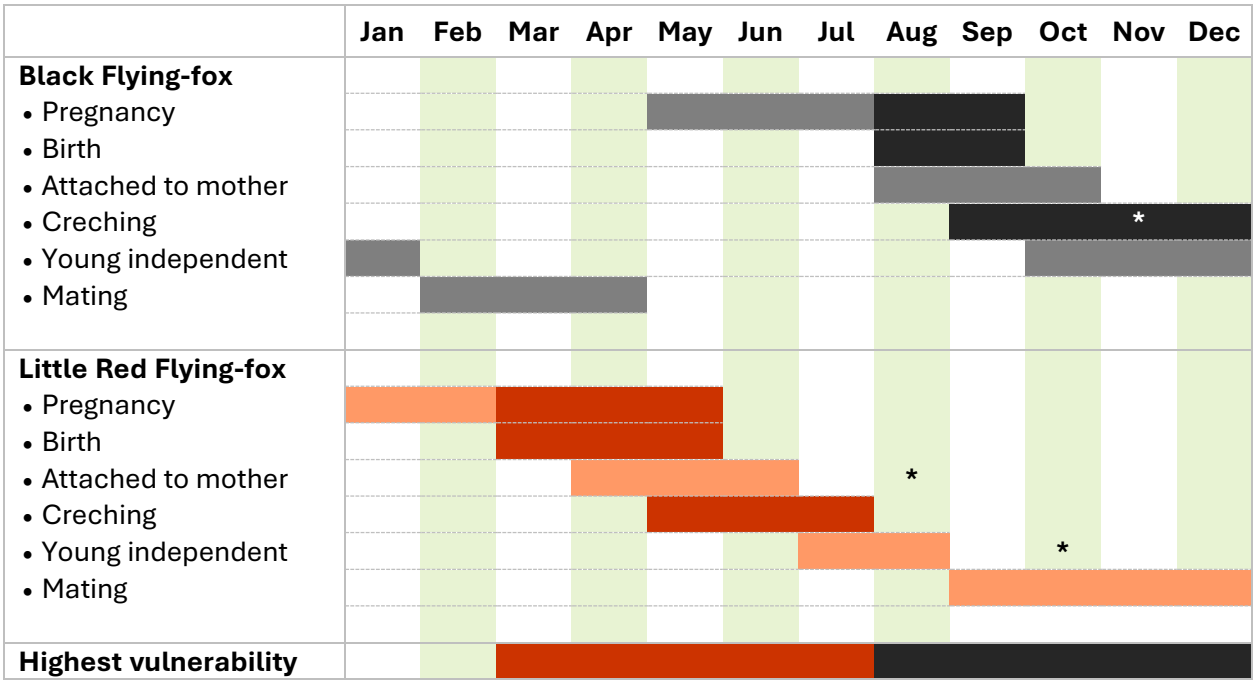
2.3 Breeding Cycle

Flying-fox breeding cycles differ by species and region. The breeding timelines below (**Table 1**) for the two species currently found in the Whitsunday region are general and require site-specific observations to verify breeding status.

For instance, Little Red Flying-foxes at the Collinsville roost often diverge from the typical breeding cycle as stated in the Queensland Government *Flying-fox Roost Management Guideline* (DES, 2020). Black Flying-foxes may also breed outside the usual season, especially after recent loss of young or when food resources are abundant (Vardon and Tidemann, 1998).

For this reason, it is important to inspect the flying-foxes within the Collinsville roost prior to undertaking any management actions. This is to determine if any of the life stages are present that are particularly vulnerable to injury or death, namely pregnancy, birthing and creching (when young are left alone in the roost).

Table 1. Indicative timing of the breeding cycle for Black Flying-fox and Little Red Flying-fox (as per DES, 2020).
Darker shading for each species indicates the periods of increased vulnerability to disturbance (late pregnancy, birthing and creching).



*Records from Collinsville roost

2.4 Historical Management Activities

Since 2021, various interventions have been conducted in Collinsville to nudge or disperse flying-foxes roosting in Council or private properties. These are summarised below in **Table 2**.

Table 2. Management actions undertaken at flying-fox roosts in Collinsville since 2021.

Management Action	Effectiveness at Collinsville
Tree trimming (Removing major branches used for roosting)	Effective at moving flying-foxes from that individual tree, but most moved to nearby trees
Noise (brush cutter, leaf blower, hitting metal bucket/steel tools, horns, loud radio/music)	Variable effectiveness; often reduced flying-fox numbers in vicinity, but only during noise generation, with animals returning when noise was stopped or the following day
Light (bright torches, spotlights or flashing lights)	Low effectiveness; some reduction in numbers was observed on occasion at the individual tree/property. Animals often returned after lights were turned off or the following day
Wavy man (inflatable, tubular 'wavy man' positioned near roost trees)	Low effectiveness; some reduction in numbers was observed on occasion at the individual tree/property, but flying-foxes quickly became habituated to the movement
Smoke (from drums, piles of smoke-producing material below roost trees)	Variable effectiveness; often reduced flying-fox numbers in vicinity, but only during noise generation, with animals returning when noise was stopped or the following day. Ineffective on windy days
Water sprayed into trees	Generally not effective
Pyrotechnics	Effective at moving flying-foxes from the immediate area, but most moved to trees in nearby streets and/or returned after pyrotechnics were finished for the day
Peppermint oil	Not effective

3.0 Legislation and Policy

The Commonwealth and Queensland legislative framework outlines protections and management options for flying-foxes. These are detailed further in the Whitsunday Regional Council Flying-fox Policy and Whitsunday Regional Council Flying-fox Management Plan.

All flying-fox species are protected under the Queensland *Nature Conservation Act 1992*, requiring management actions to comply with legislation and best-practice guidelines. Additionally, the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* protects two species—Spectacled Flying-fox (*Pteropus conspicillatus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*)—found near but not within the Whitsunday region. These two species likely require specific approvals for their roost management.

There are two Queensland Government Codes of Practice that must be adhered to when managing flying-fox roosts:

- *Code of Practice: Low impact activities affecting flying-fox roosts;* and
- *Code of Practice: Ecologically sustainable management of flying-fox roosts*.

The Queensland Government has also developed a *Flying-fox Roost Management Guideline*, which provides further information and case studies on how to implement these Codes and associated legislation. Notably, some roost management actions require advance notification to the Queensland Department of Environment, Tourism, Science and Innovation (DETSI).

4.0 Community Consultation

In July 2024, the Whitsunday Regional Council held a public meeting in Collinsville relating to the flying-fox roost that has persisted in recent years within the town. The meeting was attended by 16 residents, many of whom had flying-foxes roosting on their property. A summary of the meeting is provided below.

- The meeting discussed the on-going concerns with the flying-foxes roosting in Collinsville, the history and impacts of management activities, as well as potential management actions moving forward.
- The majority of attendees agreed that the Whitsunday Regional Council should continue to co-ordinate flying-fox roost management activities, as opposed to being left to individuals to handle.
- There was support for a range of deterrents to be used, providing no harm was caused to the flying-foxes.
- There was general support for the use of pyrotechnic deterrents in a co-ordinated manner for the roosts on private properties, in an attempt to move the flying-foxes out of town. However, this should be done via a low-cost model (e.g., co-ordinated and conducted by Council as opposed to external providers).
- There was some support for a form of financial subsidies for affected properties (e.g., rate relief) or the provision of Council equipment for cleaning.

5.0 Management Actions

5.1 Evaluation of Management Actions

Potential flying-fox roost management activities undertaken in Queensland are detailed and assessed in **Table 3**.

Table 3. Evaluation of the management actions for flying-fox roosts in the context of Collinsville.

Management action	Description	Indicative cost	Effectiveness
Education and awareness	Includes the provision of information to the public relating to flying-foxes, as well as providing opportunities for discussion and feedback. Most effective if undertaken in a co-ordinated manner and lead by staff with stakeholder engagement skills. + May reduce fears around disease and health + Increases understanding of environmental contribution of flying-foxes - Often does not alleviate most of the human-flying-fox conflict	Low cost ($100s to $1,000s)	Low: can reduce some human-flying-fox conflict and complaints
Suitability for Collinsville:	**Suitable:** Education and awareness should form one of the methods for all human-wildlife conflict situations. Ongoing engagement and public feedback is important for Collinsville, especially as new management activities are attempted.		
Financial assistance and/or services	Includes the provision of financial assistance and/or services for residents impacted by flying-fox roosts. This has not been considered as yet by the Whitsunday Regional Council, but can options and delivery are variable. Other Council programs include: rate subsidies, purchase of protective items (e.g., car covers, air-conditioners, double-glazing), payment of external service providers (high-pressure cleaning, tree removal/lopping) or purchase/loan of cleaning items (e.g., high-pressure cleaner). + Can require limited physical or staffing resources from Council - Residents need to be pro-active in applying for assistance - Rate subsidies do not alleviate the actual human-flying-fox conflict - Framework and definitions for eligibility are required and reviewed	Moderate cost ($10,000s)	Low: can reduce some human-flying-fox conflict and complaints
Suitability for Collinsville:	**Likely suitable:** The low number of residents likely to be impacted and/or take up the assistance/service is low compared to larger urban areas so this may be a viable option. The deliver model needs to be carefully considered for the residents; for example, post-expense reimbursement models may be cost-prohibitive for some residents.		

Management action	Description	Indicative cost	Effectiveness
Removal of vegetation at roost edges (creating a buffer)	Discourages bats from roosting close to residents by removing vegetation at the edge of roosts. + Can be low cost and moderately effective - Residents may resent reduced amenity (i.e., loss of vegetation) - May contribute to habitat loss if cumulative with other vegetation removal/clearing - Roosts may move into other residential properties	Low-moderate cost ($1,000s to $10,000s)	Moderate: can shift the impact away from residents adjacent to roost, but may move the issue to other residents
Suitability for Collinsville:	**Generally unsuitable:** The majority of roosts are in individual trees/properties and therefore no buffer is achievable. Many of the current roosts are on private land; therefore, it would depend on the landowner's predisposition on whether this action is viable. Vegetation around roosts on Council land could be suitable.		
Passive dispersal: Removal of roost vegetation	Involves removing vegetation at the roost while the flying-foxes are not present, to stop them from returning or re-establishing. + Effectiveness at property level is high - Can result in the roost establishing in next closest suitable vegetation. - Residents may resent reduced amenity (i.e., loss of vegetation) - May contribute to habitat loss for flying-foxes or other wildlife if cumulative with other vegetation removal/clearing	Low-moderate cost ($1,000s to $10,000s)	Moderate-high: can shift the impact away from current area, but may move to other areas/properties nearby
Suitability for Collinsville:	**Likely suitable:** Many of the current roosts are on private land; therefore, it would depend on the landowner's predilection on whether this action is viable. Roosts on Council land could be suitable; however, there is a history of flying-foxes moving from Council parks to private residents in previous dispersal attempts, which needs consideration.		
Active dispersal: Wavy man	Involves erecting an inflatable 'wavy man' at a tree roost prior to dawn to prevent flying-foxes returning to roost in the tree. + Council owns a number of wavy men, thus no on-going hire costs - Spatial and temporal effectiveness is low - Effectiveness inconsistent	Low cost ($100s to $1,000s)	Low-moderate: often only effective short-term and at the individual tree/property
Suitability for Collinsville:	**Potentially suitable:** Attempts to deter flying-foxes from roosting in trees on private land using wavy men has been inconsistent. Considering the low cost and labour required, this action could be attempted in the early stages of new roosts.		

Management action	Description	Indicative cost	Effectiveness
Active dispersal: Sprinklers	The use of high-powered sprinklers for short bursts to mimic predator movement in the canopy to nudge them away from resident boundaries + No significant change in vegetation or hydrology - Flying-foxes may move to nearby trees/properties, causing conflict - Can have animal welfare risk during heat events - Requires considerable administration/logistics	Moderate cost ($10,000s)	Moderate: some Councils have had some success with this method
Suitability for Collinsville:	**Generally unsuitable:** This method is most effective for roosts in large groups of trees, not roosting individually as in Collinsville.		
Active dispersal: Light	Shining high powered lights (e.g., roadworks light towers) into roost trees, particularly during early morning to prevent flying-foxes returning. + Light can be directed to not disturb residents below - Flying-foxes may move to nearby trees/properties, causing conflict - Requires high luminosity lights, which are typically not found in residential homes	Low cost ($1,000s to $10,000s)	Low-moderate: often only effective short-term and at the individual tree/property
Suitability for Collinsville:	**Potentially suitable:** This method has shown inconsistent effectiveness at Collinsville, although it can be a relatively low cost option. This action could be attempted in the early stages of new roosts, particularly with trialling roadworks spotlights.		
Active dispersal: Sound	Creating noise as a disturbance mechanism to discourage flying-foxes returning to roost trees. + Resident participation can promote feeling of involvement and pro-activity to concerns - Can cause disturbance to nearby residents - Spatial and temporal effectiveness is low	Low cost ($100s to $10,000s)	Low-moderate: often only effective short-term and at the individual tree/property
Suitability for Collinsville:	**Potentially suitable:** Attempts to deter flying-foxes from roosting in trees on private land using sound has been inconsistent. Considering the low cost and labour required, this action could be attempted in the early stages of new roosts.		

Management action	Description	Indicative cost	Effectiveness
Active dispersal: Smoking	Fires, particularly with elements to increase smoke (e.g., green vegetation), are positioned below trees that flying-foxes typically roost in and lit prior to flying-foxes returning to roost at dawn. + Can be low cost and moderately successful - Ineffective when breeze/winds are present - Needs consistent (daily) action until roost remains dispersed - Can be problematic for people with asthma or respiratory illnesses in vicinity	Generally low cost, although depends on time-frame required	Moderate: often only at a tree/property basis, but can be successful. Can be undertaken at multiple locations to affect wider area.
Suitability for Collinsville:	**Potentially suitable:** Some residents have indicated that they have successfully deterred flying-foxes from roosting in trees on their properties, while others have found it requires long-term commitment and/or results are temporary. This action could be attempted in the early stages of new roosts.		
Active dispersal: Pyrotechnics/Air cannons	The use of pyrotechnical or gas guns to produce loud noises and lights near roosts as flying-foxes are returning at dawn. + Can be effective, particularly in a large area if co-ordinated correctly - Requires personnel with fire-arms/pyrotechnics (fireworks) licence - Can be very expensive, particularly if required over a prolonged period - Flying-foxes may return as soon as dispersal activities cease for the day	High cost, although depends on time-frame required	Moderate-high: some Councils have had success but typically only after a long campaign and/or results are temporary
Suitability for Collinsville:	**Potentially suitable:** More effective when undertaken in a co-ordinated manner over a larger area, which has not been undertaken as yet at Collinsville.		

5.2 Roost Management Strategy

5.2.1 Approach to Roost Management at Collinsville

The evaluation of typical management actions undertaken at flying-fox roosts in Queensland and suitability to the roosts at Collinsville (as per **Table 3**) is summarised in **Figure 3** and forms the basis for the approach and possible actions for managing flying-fox roosts at Collinsville.

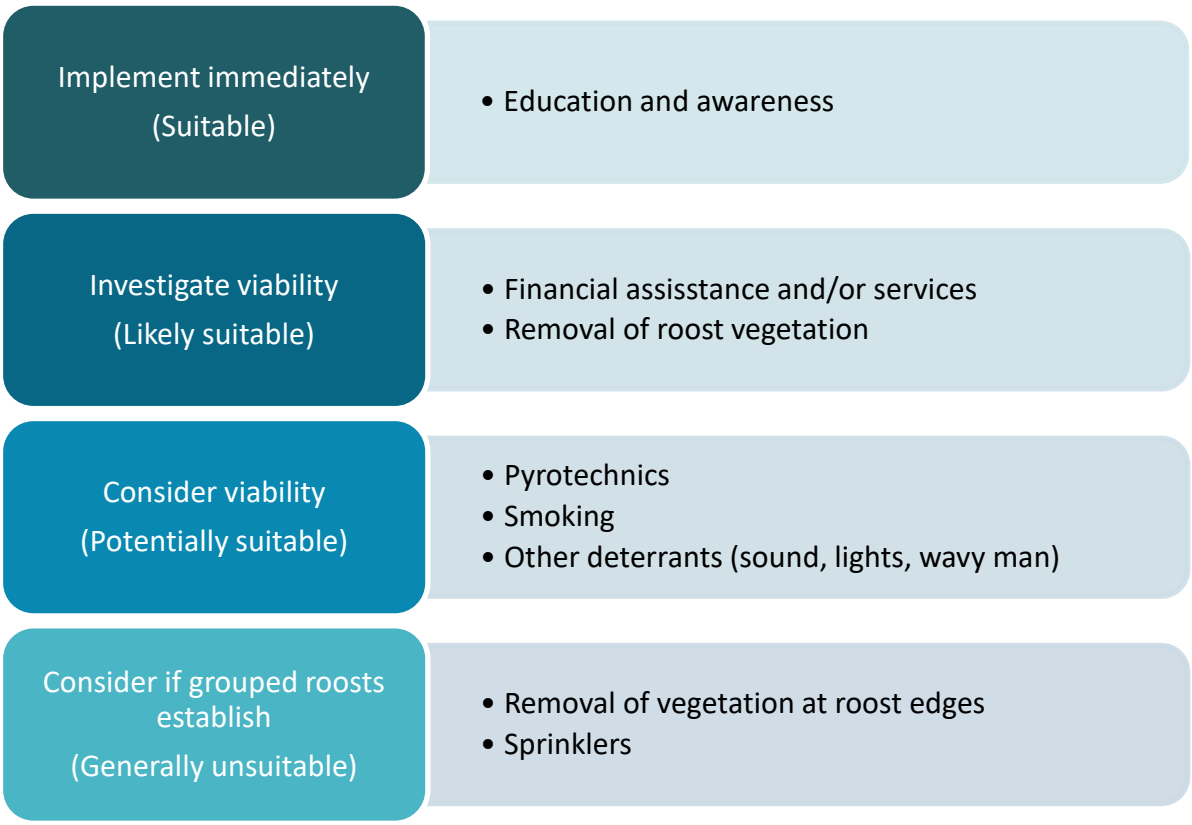


Figure 3. Summary of management activities suitable for Collinsville.

Table 4. Goals and on-going actions for managing flying-fox roosts at Collinsville.

Goals	Objectives/Actions	Due date/Timing
Theme 1. Education and awareness		
1.1. Ensure Collinsville residents are informed about roost management	1.1.a. Engage with Collinsville residents that are affected by flying-fox roosts	Ongoing
	1.1.b. Develop a communication plan on the timing and details for roost management activities	February 2025
Theme 2. Human safety and amenity		
2.1. Provide a safe environment for the Collinsville community where risks associated with flying-fox roosts are managed	2.1.a. Monitor the flying-fox species present, location and numbers present at Collinsville	Twice monthly
	2.1.b. Investigate pyrotechnics, tree trimming and smoking as short-term options for flying-foxes roosting in Collinsville	February 2025
	2.1.c. Investigate with Council and residents the appetite and feasibility of financial assistance and/or services for impacted residents	June 2025
Theme 3. Flying-fox animal welfare		
3.1. To undertake roost management activities in Collinsville in a manner that does not harm the flying-fox	3.1.a. During monitoring activities, record breeding status (e.g., late pregnancy) and life stages present (creched young)	Twice month, and daily during all management activities
	3.1.b. Immediately cease any management activities if vulnerable life-cycle stages are present (e.g., late pregnancy, birthing, creching)	Daily during all management activities
	3.1.c. Immediately cease any management activities if the triggers identified in the relevant Codes of Practice (e.g., mortality, pro-longed disturbance, etc.) are observed	During and immediately after all management activities

Goals	Objectives/Actions	Due date/Timing
Theme 4. Roost management		
4.1. Where a roost in Collinsville becomes a problem, roost management is undertaken in an efficient and cost-effective manner	4.1.a. Conduct reviews of management issues and dispersal options, consider potential roost locations and evaluate likelihood of a successful dispersal	As required
	4.1.b. Roost management actions are documented	Within 1 month of completion of actions
4.2. Remain up-to-date on suitable methods for managing the flying-fox roosts at Collinsville	4.2.a. Update evaluation of potential methods for managing flying-fox roosts for Collinsville in relation to new methods revealed during networking and literature review activities	Annually (minimum)
Theme 5. Policy and administration		
5.1. To ensure the management of flying-fox roosts in Collinsville comply with legislation, policy and best practice	5.1.a. Ensure key Council staff have read and understand the relevant Code of Practice and Guidelines (see **Section 6.0**) for determining suitable management activities and requirements	Ongoing
	5.1.b. Notify DETSI on management activities at least two business days prior to management activities	Ongoing
	5.1.c. Submit a DETSI evaluation form on the outcomes of the management actions within six weeks	Ongoing
5.2. To ensure this roost management plan – Collinsville is appropriate and practical	5.2.a. Review and amend (if required) the Flying-fox Roost Management Plan - Collinsville	Annually
5.3 Allocate budget for flying-fox management at Collinsville	5.3.a. Identify and annually review budget requirements for the management of flying-fox roosts in Collinsville	Annually

5.2.2 Success of Roost Dispersal in Australia

It should be noted that previous efforts to disperse flying-fox roosts with a range of methods from urban areas in Australia have largely proven ineffective. Key findings of assessments of dispersal attempts (as per Roberts and Eby, 2013; Roberts et al., 2021), include:

1. **Limited reduction in local numbers:** In 94% of cases, dispersals failed to reduce flying-fox numbers locally, with animals remaining nearby.
2. **Minimal roost relocation distance:** Approximately 63% of relocations were within 600 m, with 88% establishing replacement roosts within 1 km, often leading to new conflict sites.
3. **Unpredictable replacement roosts:** New roost locations couldn't be reliably predicted.
4. **Persistent conflict:** Up to 77% of dispersals saw ongoing conflict at the original or nearby sites, even years later.
5. **Need for repeat actions:** Repeat dispersals were usually necessary unless vegetation was extensively removed.
6. **High costs:** Dispersal costs ranged from tens to hundreds of thousands of dollars, with limited success for efforts under $250,000, although less expensive dispersals have already occurred in the Whitsunday area (e.g., Proserpine).
7. **Long-term impact unclear:** Outcomes are often unknown for several years post-dispersal.

The limited success of dispersal efforts may stem from the long lifespan and migratory habits of flying-foxes, particularly as they typically return to established sites. Relocations often require extensive vegetation removal and ongoing interventions, with relocations typically occurring only within 200 m to 2 km of the original site.

5.2.3 Success of Roost Dispersal in Whitsunday Regional Council

Two attempts of dispersing flying-fox have been undertaken in the Whitsunday region.

A flying-fox roost in Faust Street, Proserpine was successfully dispersed in 2016. The roost contained both Little Red Flying-fox and Black Flying-fox, with monitoring activities recording up to 1,700 individuals in March 2016. Flying-foxes were roosting in mango trees on a residential property and adjacent Council parkland. Active dispersal by removing roost vegetation was undertaken in late March, with further vegetation removal and sprinklers used in trees when flying-foxes attempted to return to nearby trees. There has been minimal return of individuals in the preceding eight years, with these dispersing naturally following food resources in the region. Total cost for the dispersal activities was less than $100,000.

Various attempts to disperse flying-fox at Collinsville have occurred since 2021, including tree trimming, smoking, water spraying, peppermint oil and pyrotechnics. Many of these methods moved the flying-foxes to adjacent trees and properties, but no method has been successful in moving the roosts out of town. Costs for deterrents and dispersals between March 2021 to September 2024 was approximately $420,000.

5.3 Avoiding Impacts to Flying-foxes

As per Queensland Government legislation, codes of practice and guidelines, management activities must be undertaken in a manner that minimises impacts to flying-foxes, particularly relating to distress and/or harm.

This includes avoiding management activities during times of high vulnerability, such as late pregnancy, birthing and when young are crèched at the roost while the mother is away foraging.

At other times of the year, a person knowledgeable about flying-fox behaviour is required to be present during the early days of dispersal attempts, and is recommended to be present during other less active management activities, to monitor distress levels in the flying-fox colony. In particular, indicators of distress in flying-foxes includes:

- panting and/or wing fanning,
- spreading saliva on their body by licking,
- moving within two metres of the ground,
- laboured flight or flying close to the ground,
- remaining within the roost despite continuing causes of distress (e.g. too weak to move or protecting crèched young,
- more than 30% of the flying-foxes taking flight at one time during the day, and/or
- flying-foxes flying in circles above a flying-fox roost.

More information on requirements under legislation or codes of practice to minimise impacts and harm to flying-foxes during management activities are summarised in the Whitsunday Regional Council Flying-fox Management Plan, and detailed fully in:

- *Code of Practice: Low impact activities affecting flying-fox roosts;*
- *Code of Practice: Ecologically sustainable management of flying-fox roosts; and*
- *Flying-fox Roost Management Guideline*.

Links to these documents are provided in **Section 6.0**.

6.0 Related Documents

Code of Practice: Ecologically sustainable management of flying-fox roosts, Nature Conservation Act 1992. Queensland Department of Environment and Science, 2020. https://www.des.qld.gov.au/policies?a=272936:policy_registry/cp-wl-ff-roost-management.pdf

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