Miriam Vale Flying-fox Management Plan

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	Miriam Vale Flying-fox Management Plan		
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1. Executive summary

Gladstone Regional Council has developed the Miriam Vale Flying-fox Management Plan as a framework for managing the community's health, economic and amenity issues associated with flying-foxes; whilst providing for flying-fox conservation.

The flying-fox roosts in Miriam Vale are typically occupied seasonally by black flying-foxes and little red flying-foxes; small numbers of grey-headed flying-foxes have also been observed from time to time. Flying-foxes have roosted in various areas of Miriam Vale since 2013, including a locally significant, heritage listed fig tree in Alf Larson Lions Park between 2016 and 2018, which resulted in a number of human-wildlife conflicts. Other known roost sites include the Tranquillity Walk area also on Blomfield Street, and the Chapman Street area more recently.

Stakeholders in the Miriam Vale community directly or indirectly affected by flying-foxes have been engaged in the development and review of the Miriam Vale Flying-fox Management Plan through various channels, including community surveys and a workshop in August 2017. Participants have been invited to share their experiences and impacts associated with the presence of flying-foxes in Miriam Vale, helping inform the adopted management approach.

Council has adopted a risk-based approach to the management of flying-fox roosts in Miriam Vale based on potential health, safety, wellbeing and economic implications for the community, the likelihood of management success, the risk of splintering the roost to equally or more problematic locations and cost. Council will apply a number of management options where appropriate to mitigate the impacts of flying-fox roosts in Miriam Vale, including dispersal from Alf Larson Lions Park, which was recognised as a priority for the community.

2. Acronyms

ABLV	Australian Bat Lyssavirus
BFF	Black flying-fox (*Pteropus alecto*)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Code of practice
CWA	Country Women's Association
DES	Department of Environment and Science (Queensland)
DMP	Damage Mitigation Permit
DoEE	Department of the Environment and Energy (Commonwealth)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EVNT	Endangered, Vulnerable or Near Threatened
FF	Flying-fox
FFMP	Flying-fox Management Plan
FFRMP	Flying-fox Roost Management Permit
GHFF	Grey headed flying-fox (*P. poliocephalus*)
GRC	Gladstone Regional Council
HeV	Hendra virus
IUCN	International Union for Conservation of Nature and Resources
LGA	Local government area
LRFF	Little red flying-fox (*P. scapulatus*)
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992* (Queensland)
NFFMP	National Flying-fox Monitoring Program
NSW	New South Wales
QLD	Queensland
UFFMA	Urban Flying-fox Management Area
VM Act	*Vegetation Management Act 1999* (Queensland)

3. Introduction

The Miriam Vale Flying-fox Management Plan (FFMP) provides a framework for managing flying-fox roosts in the Miriam Vale area that aims to balance the community's health, economic and amenity values with flying-fox conservation.

The flying-fox roosts in Miriam Vale are typically occupied seasonally by black flying-foxes (BFF; *Pteropus alecto)* and little red flying-foxes (LRFF; *P. scapulatus*); small numbers of grey-headed flying-fox (GHFF; *P. poliocephalus*) have also been observed from time to time.

All three flying-fox species are protected under Queensland legislation (*Nature Conservation Act 1992*; NC Act). The GHFF is also listed as vulnerable under Commonwealth legislation (*Environment Protection and Biodiversity Conservation Act 1999;* EPBC Act), affording it additional protection. Further details of the relevant legislation and policies related to flying-foxes is provided in Appendix 1. A description of flying-fox ecology, species profiles, roost characteristics and disease risk is provided in Appendix 2.

3.1 Scope

This FFMP considers the management of existing and future flying-fox roosts occurring on or partly on Council-managed land within the urban flying-fox roost management area (UFFMA) surrounding the township of Miriam Vale (Appendix 3). The plan sets Council's management approach in managing and responding to flying-fox roosts occurring within these areas only.

This FFMP does not consider the management of roosts occurring solely on private property or State-managed land; roosts occurring in such areas may be managed by the relevant land owner, remaining subject to compliance with legislative requirements and authorisation by the Department of Environment and Science (DES).

3.2 Context

The key objectives of this FFMP are to:

- To increase community understanding and awareness of flying-foxes and the importance of their ecological role in conservation;
- To mitigate risks to public health and amenity by managing flying-fox roosts in-situ and deterring flying-foxes from roosting in fig trees at Alf Larson Lions Park, (Figure 1); and
- To comply with legislative requirements, animal welfare and conservation objectives.

3.2.1 History of the camps

Flying-foxes have been observed roosting within the township of Miriam Vale since September 2013 (R Hendry 2017, pers. comm. 14 September). Typically, BFF and LRFF occupy the roosts seasonally, from mid spring through to autumn.

Figure 1 Fig trees in Alf Larson Lions Park, Blomfield Street

In 2013, DES Wildlife Officers observed between 2,000 and 4,000 flying-foxes roosting in private properties in Roe Street. A community meeting was held in November 2013 after unlawful attempts to remove flying-foxes from this area resulted in the roost splintering to multiple locations including private properties in Messmate Drive.

Up to 5,000 flying-foxes have also been recorded in areas of Blomfield Street between December 2015 and October 2018. This has included a locally significant, heritage listed fig tree in Alf Larson Lions Park utilised as a crèche tree for flying-fox young (Figure 1), and the areas surrounding the Tranquillity Walk. The location of the crèche fig tree next to the playground resulted in a number of human-wildlife conflicts. During the 2016/17 flying-fox season around 20 orphaned flying-fox young were removed from the playground area and equipment and were taken into care by wildlife rehabilitators. To alleviate this conflict, dispersal activities were undertaken in October 2017 to remove flying-fox from the tree at Alf Larson Lions Park and relocate them to join the remaining roost at the Tranquillity Walk area (Figure 2).

Figure 2 Little red flying-fox in the Tranquillity Walk area, Blomfield Street

Approximately 3 months after this dispersal, in January 2018, the flying-fox moved into an area of Council-managed road reserve and private property at Chapman Street. The flying-foxes remained in this area until their seasonal departure in March 2018. Approximately 200 BFF returned to the fig tree in Alf Larson Lions Park in October 2018, again triggering dispersal activities to remove them from this high-conflict area. The dispersal shifted the flying-fox back to the Chapman Street area, where the size of the roost has since increased to over 11,000 flying-fox (Figure 3).

The Miriam Vale Motel have noted that flying-fox are present in low numbers for most of the year in palm trees next to the motel. Flying-foxes have also been observed using the dam at the Miriam Vale Golf Club as a water source, flying frequently between the roost and this area particularly during hot weather.

Figure 3 Black flying-fox in the Chapman Street area (viewed from Bates Street)

Table 1 History of Miriam Vale flying-fox roosts

Date	Roost characteristics
September 2013	2,000 to 4,000 flying-foxes roosting in private properties of Roe Street
November 2013	Community meeting held after unlawful attempts made to disperse flying-foxes resulted in splintering of roost, including to areas of Messmate Drive
December 2015	50 BFF roosting in fig tree in Alf Larson Lions Park
March 2016	2,400 BFF + LRFF roosting in Tranquillity Walk
May 2016	Seasonal departure of flying-foxes
October 2016	BFF return to fig tree in Alf Larson Lions Park & Tranquillity Walk
October 2016 – April 2017	Up to 400 BFF roosting in fig tree in Alf Larson Lions Park Up to 5,800 BFF + LRFF roosting in Tranquillity Walk Total 24 dead or orphaned young removed from Alf Larson Lions Park throughout season

April 2017	Seasonal departure of flying-foxes
August 2017	30 BFF returned to fig tree in Alf Larson Lions Park
Early-October 2017	40 BFF + 1,100 LRFF roosting in multiple trees of Alf Larson Lions Park
Mid-October 2017	8,000 to 10,000 flying-foxes (95% LRFF + 5% BFF) dispersed from Alf Larson Lions Park to Tranquillity Walk and road reserve adjoining rail corridor
January 2018	BFF moved into Council-managed road reserve and private property at Chapman Street
March 2018	Seasonal departure of flying-foxes
October 2018	200 BFF returned to fig tree in Alf Larson Lions Park Rapid response dispersal undertaken; 300 BFF relocated from Alf Larson Lions Park to Chapman Street area.
October 2018 - present	Up to 11,000 BFF roosting in Chapman Street area No seasonal departure of flying-foxes

3.2.2 Camp area and tenure

The area description and tenure of known Miriam Vale roost sites is detailed in Table 2 and identified in Figure 4 below.

Table 2 Known Miriam Vale flying-fox roost sites

Roost	Area	Tenure	Lot and plan
Blomfield Street	Alf Larson Lions Park	Reserve (Lions Park)	70/SP278368
	Tranquillity walk	Council managed road reserve for Blomfield Street	N/A
	Palm trees in Miriam Vale Motel garden	Freehold	1/RP600922
Roe Street	Private residence	Freehold	23/M47510
Chapman Street	Private residence	Freehold	3/SP243221
	Road reserve	Council-managed road reserve for Chapman Street	N/A

Figure 4 Known roost locations in Miriam Vale

3.3 Management intent

In 2013, the Queensland Government provided local government with an 'as-of-right' authority (ie. not an obligation) to manage flying-fox roosts within designated urban areas.

GRC has adopted a Statement of Management Intent (SoMI) for flying-foxes, provided in Appendix 4, which defines Council's position and intentions in managing flying-fox roosts throughout the Gladstone region, which includes:

- Council will coordinate the management of flying-fox roosts on Council owned or State land placed under the control of Council pursuant to the *Land Act 1994* within and outside the UFFMA.
- Where a flying-fox roost is on Council owned or State land placed under the control of Council pursuant to the Land Act 1994 and either State land(s) or private land(s), Council will work with relevant landholder to manage the flying-fox roosts. Costs relating to the management of the flying-fox roost will be the responsibility of both Council and the relevant landholders and will be negotiated prior to the application for or implementation of any permit or action.
- Council's intent is to have no involvement in the management of flying-fox roosts occurring solely on State land(s) or private land(s) or a combination of the two.

This FFMP provides direction for the management of flying-fox roosts occurring on or partly on Council-managed land only. As per Council's SoMI, roosts occurring solely on private property or State land are the responsibility of the relevant land owner. This FFMP does not constitute approval for roost management on land which is not Council-owned or managed. Landholders wishing to manage a flying-fox roost on their land may apply to DES for a flying-fox roost management permit (FFRMP) or a Damage Mitigation Permit (DMP) for crop protection.

4. Community engagement

4.1 Stakeholders

There are a range of stakeholders in the Miriam Vale community who are directly or indirectly affected by flying-foxes or who are interested in their management, identified in Table 3 below.

Table 3 Stakeholders to flying-fox management in Miriam Vale

Stakeholder	Interest/reported impacts
Residents	Residents living near or using areas occupied roosts have identified primarily negative impacts associated with noise, odour, faecal drop caused by roosting and foraging flying-foxes.
Business owners	Business owners in Blomfield Street have identified both positive and negative impacts of flying-fox roosts in nearby areas. Some business owners have reported impacts to customers and are concerned about loss of trade.

Visitors & tourists	Local shopkeepers have had visitors to Miriam Vale complain about faecal drop when flying-fox were roosting in Alf Larson Lions Park.
Gladstone Regional Council	Council holds an as-of-right authority (ie. not an obligation) by the State Government to manage flying-fox roosts within UFFMAs. Council also has a responsibility to manage the risks to community associated with roosts occurring on Council-managed land.
Department of Environment & Science	DES is the State Government department that provide and enforce the regulatory framework for flying-fox roost management. The department's primary role is to ensure the protection of flying-fox welfare by administering the *Nature Conservation Act 1992* and associated codes of practice.
Queensland Health	Queensland Health research and provide information to the community about disease risk associated with flying-foxes.
Wildlife carers	Local wildlife carers receive and rehabilitate injured or orphaned flying-fox from Miriam Vale and other roosts within the Gladstone region. Carers have an interest in protecting flying-fox welfare.
Miriam Vale State School	Opportunities may exist for educational presentations/resources for schools with regards to health risks, flying-fox ecology, management and impacts. Management actions such as dispersal must also carefully manage the risk of relocation to the school as a priority.
Lions Club	The Lions Club clubhouse neighbours Alf Larson Lions Park, faecal drop is reported to affect the building when flying-fox are roosting nearby.
Country Women's Association (CWA)	The CWA Hall also neighbours Alf Larson Lions Park. Reported impacts include smell, noise and faecal drop on the hall.

4.2 Engagement methods

Stakeholders are engaged in the development, implementation and review of this FFMP through various methods. Considered effort is made to engage with stakeholders regarding the management of flying-foxes with the intention of:

- Understanding the impacts, positive and negative, directly and indirectly affecting the community;
- Raising awareness within the community about the ecological importance of flying-foxes;
- Correcting misinformation and allaying fears regarding health risks to people and domestic animals;
- Sharing information and seeking feedback to inform future management; and
- Communicating the status of flying-fox roosts and implementation of management actions.

Table 4 provides the primary stakeholder tools used to communicate or engage with stakeholders in the Miriam Vale community.

Table 4 Stakeholder communication and engagement tools

Communication/engagement method	Application to this plan
Community surveys	Online and hard-copy surveys distributed amongst the community used to gather quantitative data on: • Flying-fox awareness; • Flying-fox issues; • Flying-fox management; and • Resident demographics. Community surveys were completed in 2017 and 2019 to support the development and review of this FFMP, full results are provided in Appendix 5.
Community meetings/workshops	Meeting or workshop with community members to gather and present information about flying-fox roost management. A community workshop was held in 2017 to inform development of this FFMP, see outcomes in Appendix 6. Information sessions were held in 2018 and 2019 to present the plan to the community.
Customer service requests	Queries, requests or complaints relating to flying-foxes can be raised with Council as a customer service request. Requests are investigated and a response provided to the customer.
Mail-out	Distribution of information relating to flying-foxes or notification of roost management actions through letter-box drop to Miriam Vale residents.
Council publications	Articles providing information relating to flying-foxes or notification of roost management actions in Council publications such as Council Connect newsletter.
Digital media	Providing information relating to flying-foxes or notification of roost management actions on Council website and social media pages.
Noticeboards	Display of flyers at community noticeboards presenting information about current or upcoming roost management actions.
Signage	Display of permanent or temporary signage on-site at roost locations providing information about flying-foxes or roost management actions.

4.3 Engagement results

Engagement with stakeholders relevant to flying-fox management in Miriam Vale has contributed to an understanding of community concerns, level of awareness, attitudes and impacts associated with the roosts.

Community surveys were undertaken to support the development of this FFMP in 2017, and review in 2019. The 2017 survey, undertaken while flying-foxes were roosting in Alf Larson Lions Park, received 59 responses; the 2019 survey, undertaken while flying-foxes were roosting within the Chapman Street area received 7 responses. The full results of both community surveys are provided in Appendix 5.

The results of community surveys and feedback received through other engagement have demonstrated that many respondents feel negatively towards flying-foxes (76.8% in 2017 and 71.43% in 2019). The concerns of respondents primarily relate to faecal drop, odour and noise. When surveyed in 2017, the respondents were also concerned about loss of access to Alf Larson Lions Park. Respondents have also expressed concern about disease risk, rainwater tank contamination and economic loss. A smaller portion of the respondents feel neutral or positive about flying-foxes and recognise their important ecological function.

Survey respondents that were negatively impacted by flying-foxes were primarily impacted at Alf Larson Lions Park during 2017, while in 2019 were primarily impacted at their home. Respondents continue to be affected at various times of the day.

Some residents have reported that they have incurred financial expenses directly relating to flying-foxes, including purchasing water to drink, using clothes dryers, paint damage or cleaning of vehicles, loss of business, property value and cleaning up mess.

In 2017, the community felt that ‘reducing the presence of flying-foxes in Alf Larson Lions Park’ was the most important management objective. In 2019, ‘reducing faecal drop impacts at nearby residences and businesses’ was most important, however ‘keeping flying-fox out of Alf Larson Lions Park’ was ranked as next most important.

Respondents to the 2017 survey felt it was extremely important that flying-fox management has a low financial cost to residents living near the camp (49% of respondents), as well as to all Council ratepayers (29% of respondents); whereas in 2019, 43% of respondents felt both these aspects were not at all important. Respondents in 2019 were also concerned to a lesser extent that potential management of flying-foxes does not disrupt residents and businesses during implementation. Respondents continue to feel that it is extremely important that potential management of flying-foxes does not move the camp to other areas that are near residents and businesses.

Community surveys have also demonstrated that respondents feel they have a good understanding of flying-fox ecology, disease risk and access to information. In 2019, the majority of respondents were satisfied with the level of information available about flying-foxes, however would generally like further information on managing disease risk and rainwater tanks. The preferred delivery method for this information was through Council’s website and social media.

5. Management approach

To achieve an effective balance between protecting community wellbeing and flying-fox welfare, Council has adopted a risk-based approach to guide the management of roosts occurring on Council-managed land in Miriam Vale. The actions aligned with this approach is outlined in Table 5 and the sections below.

5.1 Risk-based management

The presence and management of flying-fox roosts in the Miriam Vale area presents a number of social, environmental and economic risks to Council and the community. Council has undertaken a risk assessment, informed by the results of community engagement, to identify and analyse the risks and how they are influenced by various management options. The identified risks include:

- Risk to community health and safety associated with interactions of community with orphaned/injured flying-fox;
- Risk to community amenity and wellbeing associated with noise, odour, faecal drop and visual impacts to residences and businesses;
- Risk to heritage values caused by flying-fox occupying and causing damage to heritage-listed fig trees within Blomfield Street;
- Risk to flying-fox welfare caused by disturbance to flying-foxes potentially resulting in distress, injury or death of flying-foxes;
- Risk of flying-fox shifting to an area in closer proximity to residences, businesses or vulnerable demographics (eg. school);
- Financial risk if management action is not successful in mitigating risks to community health, safety, amenity and wellbeing;
- Risk of management action not aligning with the intentions and considerations of Council's Statement of Management Intent for flying-fox roost management; and
- Risk of management action setting precedence and raising community expectation for management of other flying-fox roosts in the wider local government area.

The state government's Flying-fox Roost Management Guideline (DES 2013) identifies that the risk and costs of flying-fox roost management increases with the level of intervention (Figure 5), particularly the risk of management action resulting in uncertain outcomes and potentially increasing human-wildlife conflict. In consideration of this, Council's approach identifies dispersal as the primary control in managing high-conflict roosts occurring in Alf Larson Lions Park, and is supported by both minimal intervention and in-situ management actions for roosts occurring on other areas of Council-managed land. Figure 6 illustrates the application of this management approach as a decision tree in responding to human-flying-fox conflict in Miriam Vale.

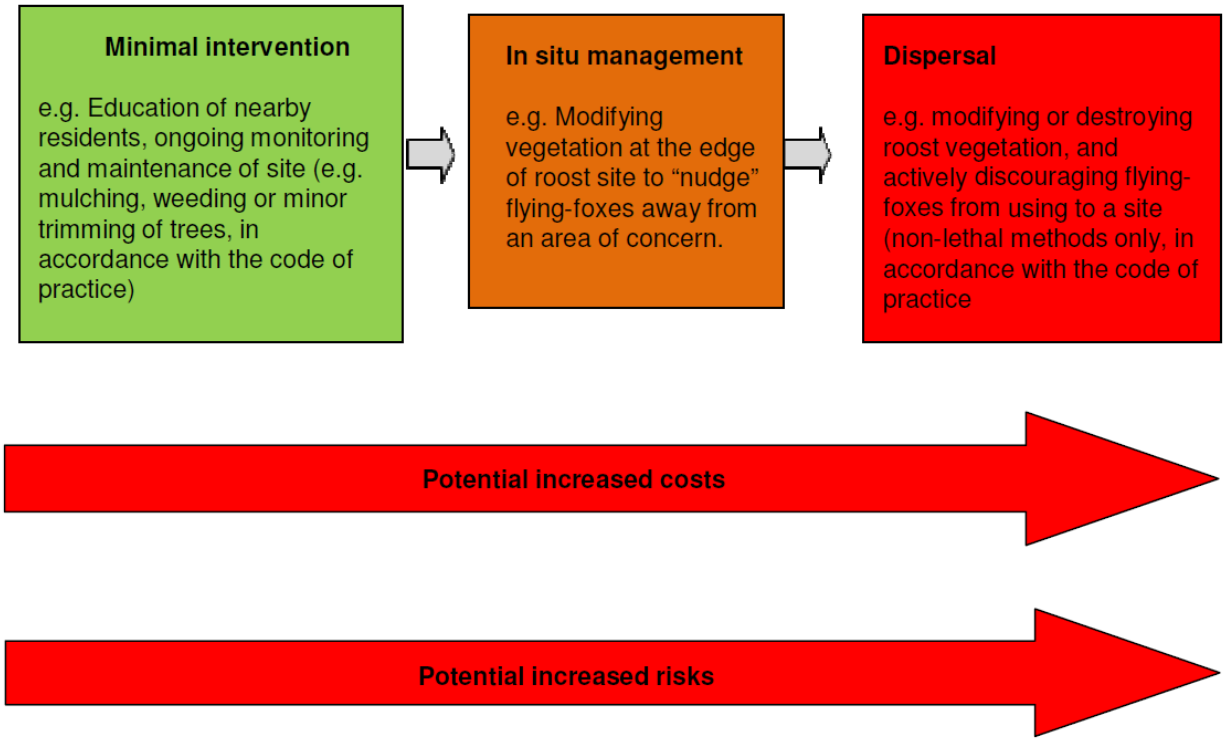

Figure 5 Level of risks and costs in flying-fox roost management

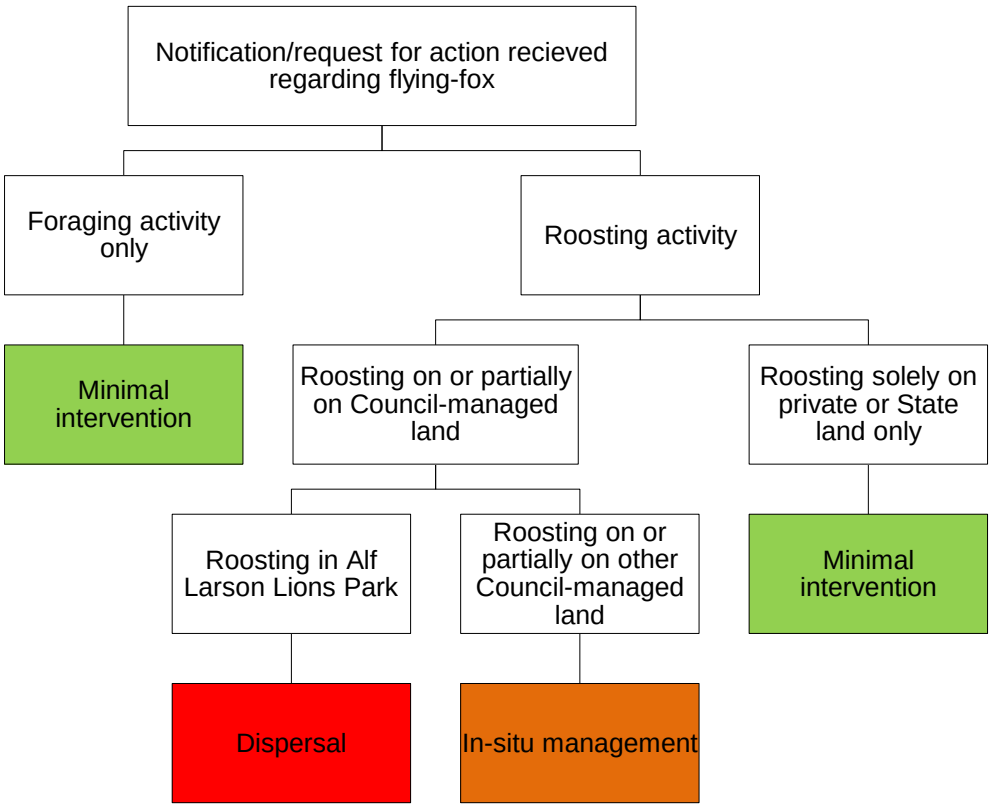

Figure 6 Decision tree for managing human-flying-fox conflict in Miriam Vale

Table 5 Management actions

Management action		Applicable to	Action(s)	Timing	Indicative annual costs
Minimal intervention	Education and awareness	Whole community · Residents · Business · Clubs · School · Tourists	Provide educational material to community; resources to include information about living with flying-foxes, flying-fox ecology and behaviour, public health issues and diseases, tank water management and management of non-native foraging trees. Educational material regularly updated and provided through various communication channels including Council website, publications, social media, signage and mail-outs.	Material reviewed annually	$1,000
			Provide information to explain the management options available to residents who have flying-fox on private property. Information to explain Council's Statement of Management Intent, *Code of Practice (COP): Low impact activities affecting flying-fox roosts* (DES 2013b) and that residents can apply directly to DES for their own flying-fox roost management permits.	When flying-fox are roosting on private property	
		Council internal staff	Maintain and ensure staff awareness of internal procedures and guidance documents for flying-fox management activities, including training where required.	When staff involved in flying-fox management activities	
	Participation in research	Council	Provide information and support to the National Flying-fox Monitoring Program (NFFMP) and research studies investigating flying-fox roost management.	Submit data for NFFMP monitoring quarterly	Staff time only

Management action		Applicable to	Action(s)	Timing	Indicative annual costs
				Support other research as required	
	Flying-fox roost monitoring	Council	Undertake monthly monitoring of flying-fox roosts to identify and record changes in roost characteristics.	Monthly	Staff time only
	Advocate to other levels of government for assistance to manage flying-fox	Council	Advocate on behalf of residents to other levels of government to provide financial assistance to support residents with roost management activities or property modification (eg. rainwater tank devices, car covers and cleaning products) to alleviate impacts.	As required	Staff time only
In-situ management	Relocation or retrofitting of public infrastructure and activities	Public infrastructure and activities occurring on Council-managed land	Where appropriate, modify or relocate infrastructure or activities to alleviate conflict with flying-foxes. Including: • Investigate potential to relocate air-conditioning intake at Council buildings on Blomfield street to reduce odour impacts to Council staff and customers. • Investigate potential to relocate exercise equipment at Tranquillity Walk to allow community access when area occupied by roost and fenced off. • Ensure safe alternative pedestrian access is provided when Tranquillity walk area occupied by roost and fenced off.	When flying-fox are causing conflict and opportunities exist	$25,000+

Management action		Applicable to	Action(s)	Timing	Indicative annual costs
	Manage/restore flying-fox roost site	Roosts on Council-managed land	When flying-fox depart roosts respond in a timely manner to clean-up and restore vegetation damage, weed/grass growth and faecal drop to alleviate visual amenity impacts. If flying-fox impact heritage fig trees, implement strategies to improve tree health.	When flying-fox depart roost	$10,000
	Buffers without vegetation removal	Roosts in Council-managed parks	Install temporary exclusion measures (fencing/barriers) and advisory signage when flying-fox are roosting in Council-managed parks to prevent human-flying-fox interactions and minimise disturbance of flying-fox. Where appropriate, fencing to incorporate mesh banners to screen site and reduce odour issues.	When flying-fox are roosting in Council-managed parks	$3,000
	Buffers through vegetation removal	All Council-managed land	Manage potential non-native foraging trees (eg. Cocos Palms) on Council-managed land	When flying-fox are not present in Miriam Vale or outside breeding season (ie. BFF/GHFF April-August, LRFF November-March).	$2,000
		Roosts on Council-managed land directly adjoining private property	Where appropriate, trim or thin canopy trees of flying-fox roosts to increase distance between flying-fox and affected residents/businesses. Suitability assessed on a case-by-case basis to ensure action does not risk inadvertent dispersal or increase impacts to another neighbour. Any works must be undertaken in line with flying-fox Codes of Practice and consider Flying-fox Roost Management Guidelines (DES 2013).		$5,000
	Nudging	Roosts on Council-managed land directly	Where appropriate, nudge flying-foxes further in away from the boundaries of an area of habitat to increase	Preferably outside breeding season	$8,000

Management action		Applicable to	Action(s)	Timing	Indicative annual costs
		adjoining private property	distance between flying-fox and affected residents/businesses. Suitability assessed on a case-by-case basis to ensure action does not risk inadvertent dispersal or increase impacts to another neighbour. Works will require a FFRMP to disturb flying-foxes during the day, as required for nudging to avoid inadvertent dispersal. Careful monitoring for dependent young is also required if undertaken during breeding season.	(ie. BFF/GHFF April-August, LRFF November-March).	
Dispersal	Rapid-response dispersal	Alf Larson Lions Park only	Maintain a rapid response service for early dispersal of flying-fox from Alf Larson Lions Park. Once initial roost establishment is reported to Council, a small team of specialist consultants will mobilise to site (within 24 hours) to discourage the early stages of roosting and direct flying-fox to the preferred location of Tranquillity Walk, Blomfield Street. Refer to Section 5.4 below for more detail.	When flying-fox establish roost in Alf Larson Lions Park	$10,000

5.2 Minimal intervention

5.2.1 Education and awareness

Education and awareness is a key component in the successful long-term management of human/flying-fox conflict in urban areas. This approach focuses on building understanding and appreciation for flying-foxes by providing comprehensive and accurate information to the community about managing risk and impacts. This may assist in reducing misconceptions and fears surrounding flying-fox, increase community value held for their ecological role and understanding of flying-fox behaviours and roost dynamics.

Educational material will include information about flying-fox ecology and behaviour, health and safety issues associated, options available to reduce impacts from roosting and foraging flying-foxes at private properties and updates on roost numbers, movements and management actions.

This information will be provided through various communication channels to appropriately capture the range of demographics impacted by flying-foxes in Miriam Vale. Such channels will include Council's website and social media (recognised as preferred method in community survey), print publications (eg. Council Connect newsletter, brochures and factsheets), interpretive signage and mail-outs.

Council will also maintain and ensure staff awareness of internal procedures and guidance documents relevant to flying-fox management, including training where required, on aspects such as responding to customer enquiries, injured or orphaned flying-fox handling and roost management activities.

5.2.2 Participation in research

Participation in research and knowledge sharing at local, regional and national levels will assist to address the large gaps in knowledge about flying-fox habits, behaviours and selection of sites for roosting. This will enhance our understanding and management of flying-fox camps to alleviate human-flying-fox conflict.

Council will provide information and support to the National Flying-fox Monitoring Program (NFFMP) and other research studies investigation flying-fox roost management.

5.2.3 Flying-fox roost monitoring

Monitoring of known flying-fox roosts will be undertaken monthly to identify and record changes in roost characteristics, including flying-fox numbers, species present, breeding stage and camp extent, undertaken in accordance with the CSIRO National Monitoring Methodology (Westcott et al. 2011). This data will be used to understand population dynamics and distribution within the local government area, identify potential sources of human-flying-fox conflict and inform and evaluate the success of management strategies. Monitoring data will also be shared with DES on a quarterly basis for incorporation in the NFFMP.

Additional monitoring will be undertaken prior to, during and following management activity undertaken under the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a), to ensure there is no risk or impact to flying-fox welfare, assess management success and identify any unintended outcomes (eg. roost abandonment or splintering).

5.2.4 Advocate to other levels of government for assistance to manage flying-fox

Council will continue to advocate to other levels of government, using relevant forums such as LGAQ conferences, to provide financial assistance to support residents with roost management activities or property modification to alleviate the impacts of flying-fox roosts. Examples of assistance may include actions such as management of foraging trees, covering of vehicles, structures, clothes lines and eating areas, purchasing of rainwater tank filters or first flush devices and cleaning products. Providing funding or subsidies for such actions would primarily assist in alleviating the impact of faecal drop to residents living nearby to flying-fox roosts, identified in recent surveys as the greatest source of community concern in Miriam Vale.

5.3 In-situ management

In-situ management of roosts occurring on Council-managed land may assist to reduce human-flying-fox interactions by separating or increasing the distance between the roost and residences or public buildings. Importantly, these management options focus on managing roosts in their established location and are not intended to disperse the flying-foxes entirely.

5.3.1 Relocation or retrofitting of public infrastructure and activities

Sources of human-flying-fox conflict associated with noise, odour, faecal drop and visual amenity may be alleviated through modification of public infrastructure and activities in areas of Miriam Vale nearby to roosts. This may include retrofitting Council buildings to reduce noise and odour impacts to staff and customers and relocating park infrastructure or public activities (eg. markets, pedestrian access) from areas impacted by flying-fox roosts. In taking such action, consideration will be given to options and alternatives that are most feasible, cost-effective and likely to reduce conflict.

5.3.2 Management/restoration of flying-fox roost site

The occupation of Council-managed areas by flying-fox roosts can result in a number of visual amenity impacts, including faecal drop on park infrastructure and footpaths, limb breakage and defoliation of roost trees and overgrowth of weeds and grasses beneath the roost. While Council is able to undertake minor maintenance while the roost is occupied in accordance with *COP: Low impact activities affecting flying-fox roosts* (DES 2013b), large-scale clean-up and restoration of roost areas will occur following seasonal departure of flying-foxes. If flying-foxes have occupied and impacted the health of heritage fig trees in Blomfield Street, activities may include measures to aid recovery, eg. fertiliser application.

5.3.3 Buffers without vegetation removal

Buffers created through the installation of permanent/semi-permanent structures can reduce the potential for human-flying-fox conflict by making areas of the roost inaccessible or increasing the distance between flying-fox and the public. This will specifically include the installation of temporary fencing or barriers and advisory signage surrounding roosts in Council-managed park. This action will assist to prevent human-flying-fox interactions and associated health and safety risks, and minimise disturbance of flying-fox. Where appropriate (eg. at Tranquillity Walk), fencing will also incorporate mesh banners to screen visual impacts of the site and potentially reduce odour issues.

5.3.4 Buffers through vegetation removal

The pruning or removal of vegetation within parts of the roost aims to alter the area of habitat so it is no longer suitable for roosting. This acts to create a buffer and increase the distance between flying-foxes and neighbouring properties, potentially alleviating concerns relating to noise, odour and faecal drop.

The amount of vegetation required to be removed varies between sites and roosts, ranging from some minor weed removal to removal of most of the canopy vegetation.

The suitability of this action to roosts in Miriam Vale will be assessed on a case by case basis. Consideration will be given to the likelihood of success in alleviating conflict, specifically that flying-fox will not be shifted closer to another neighbouring property or increase visibility into the camp and noise issues for residents. The usefulness of a buffer to mitigate odour and noise impacts generally declines if the camp is within 50 meters of human habitation (SEQ Catchments 2012). Buffers greater than 300 meters are likely to required to fully mitigate amenity impacts (SEQ Catchments 2012).

Any vegetation removal will be undertaken using a staged approach, with the aim of removing as little native vegetation as possible to maintain the ecological and amenity values of roost sites. Works will be performed in line with the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a) and the standard measures detailed in Section 5.4 below, including that roost trees are not pruned or removed while occupied by or likely to cause harm to roosting flying-fox.

5.3.5 Nudging

Nudging involves using noise and other low intensity disturbance methods to encourage flying-foxes to move from high conflict areas or roost boundaries towards to other trees within the same area of habitat. Importantly, this action is not intended to disperse or relocate flying-foxes to a different roost site.

The suitability of this action to roosts in Miriam Vale will be assessed on a case-by-case basis with consideration given to the availability of nearby roosting habitat and likelihood of success in alleviating conflict, specifically that nudging does not increase impacts to other neighbours.

If implemented, nudging activities will not be undertaken in the early morning, to reduce risk to of inadvertent dispersal of flying-foxes from the entire roost. Activities will be conducted during the daytime to encourage flying-foxes to move a small distance (ie. 10m) to nearby trees. Daytime disturbance such as this is not permitted under the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a) and will require a Flying-fox Roost Management Permit issued by DES. Disturbance will be limited in frequency (ie. twice per day or less, with regular rest days of no disturbance) to avoid animal welfare impacts. As with dispersal, careful monitoring for dependent young will also be undertaken for actions taken during breeding season.

5.4 Dispersal

Dispersal aims to encourage flying-fox to move and establish a roost at another location, through either disturbance or habitat modification.

Council will only apply dispersal to the management of flying-fox roosts at Alf Larson Lions Park at Miriam Vale. Community engagement in the development of this FFMP identified Alf Larson Lions Park as a priority for management. Given the high public visitation to this area, especially by children accessing the playground and CWA playgroup, this site represents the greatest risk of human-flying-fox conflict and dispersal is considered necessary to mitigate the human health and safety risks presented by injured or orphaned flying-fox falling from the crèche tree. This action will also have important benefits in mitigating amenity and economic impacts to nearby businesses, as well as to the heritage values of the Blomfield Street precinct.

Council has assessed that risks associated with roosts occurring on other areas of Council-managed land can be adequately mitigated with in-situ management. This approach will ensure costs to complete works and impacts to flying-foxes and other ecological values are minimised.

5.4.1 Dispersal method

Flying-fox dispersal can be broadly categorised as either 'passive' or 'active' dispersal. Passive dispersal involves removing vegetation in a staged manner to gradually make the habitat unattractive, causing flying-fox to disperse of their own accord over time with little stress. Generally, a significant proportion of vegetation needs to be removed in order to achieve dispersal of flying-foxes and prevent roost re-establishment. Due to the visual amenity and heritage values of trees within Alf Larson Lions Park, passive dispersal is not considered an appropriate dispersal method for this area.

Active dispersal involves disturbing flying-foxes using noise and visual disturbance techniques as they attempt to return to roost from nightly foraging, typically between 0300 and 0700. Flying-foxes commonly abandon a roost after a period of consecutive daily dispersals, moving to nearby camps or often created a new or several new camps very nearby (within 600m) (see Appendix 7). Despite this, flying-foxes have a very high level of fidelity to their roosts and will often return to previous sites for many years, requiring on-going dispersal action.

5.2.2 Dispersal process

Council will maintain a rapid response service for dispersal of flying-fox from the Alf Larson Lions Park area. Permanent on-site signage will be placed nearby to known roost trees within the park, encouraging members of the public who observe flying-fox roosting during the day to report roost establishment through to Council.

Following reporting of roost establishment within Alf Larson Lions Park, Council will contact the specialist environmental consultants engaged to provide the rapid response service and request immediate mobilisation to site. Council will arrange notification of the impending management actions to DES as required by the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a), and where possible, notify the Miriam Vale community through media and communication channels.

The consultants will utilise non-lethal active dispersal methods which may include light, noise and pyrotechnics, to discourage the early stages of roosting within Alf Larson Lions Park. Dispersal action will be undertaken by consultants in a controlled and coordinated way so that flying-foxes are encouraged to relocate to the primary preferred receival site of the Tranquillity Walk. All dispersal activities will be undertaken in accordance with the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a).

If, as a result of dispersal action initiated by Council, flying-foxes begin to move towards or settle within areas that are not a preferred receival site, attempts will be made to relocate the roost to the preferred receival sites listed below for a period of 5 consecutive days. If, after this timeframe, flying-foxes remain within Alf Larson Lions Park or an area that is not a preferred receival site, Council will cease further dispersal attempts and will manage roosts in accordance with the provisions of the SoMI and this FFMP.

5.4.2 Preferred receival sites

The Tranquillity Walk area has been identified as the primary preferred receival site for the dispersal of flying-fox from Alf Larson Lions Park. This area was identified as a preferred receival site during community workshops in 2017 (Appendix 6). Due to the proximity of this site to Alf Larson Lions Park (approximately 200m) and that the area is known roosting habitat, it is also considered to support the greatest likelihood of successful relocation. Previous dispersals from Alf Larson Lions Park undertaken in 2017 and 2018 have resulted in successful relocation of flying-fox to this area.

Table 6 and Figure 7 detail a number of other preferred receival sites located on Council-managed land within the Miriam Vale township. These areas are densely vegetated and a reasonable distance from

residences and businesses; a flying-fox roost in these locations are expected to pose little risk of human-flying-fox conflict. Being Council-managed land, the management responsibility for roosts within these areas would also lie with Council, alleviating the potential onus of roost management from private property owners.

Table 6 Preferred receival sites for dispersal from Alf Larson Lions Park

Area	Tenure	Lot and plan
Tranquillity Walk	Council-managed road reserve for Blomfield Street	N/A
Blomfield Street Parkland	DNRME Reserve – GRC Trustee	165/FD822, 34/FD946, 99FD/204, 72/FD585
	Council-managed road reserve for Blomfield Street	N/A
Vegetation at rear of GRC Miriam Vale Depot	DNRME Reserve – GRC Trustee	115/FD228
	Council-managed road reserve for Noveltie Street	N/A
Vegetation at rear of Gary Larson Oval	DNRME Reserve – GRC Trustee	54/FD651

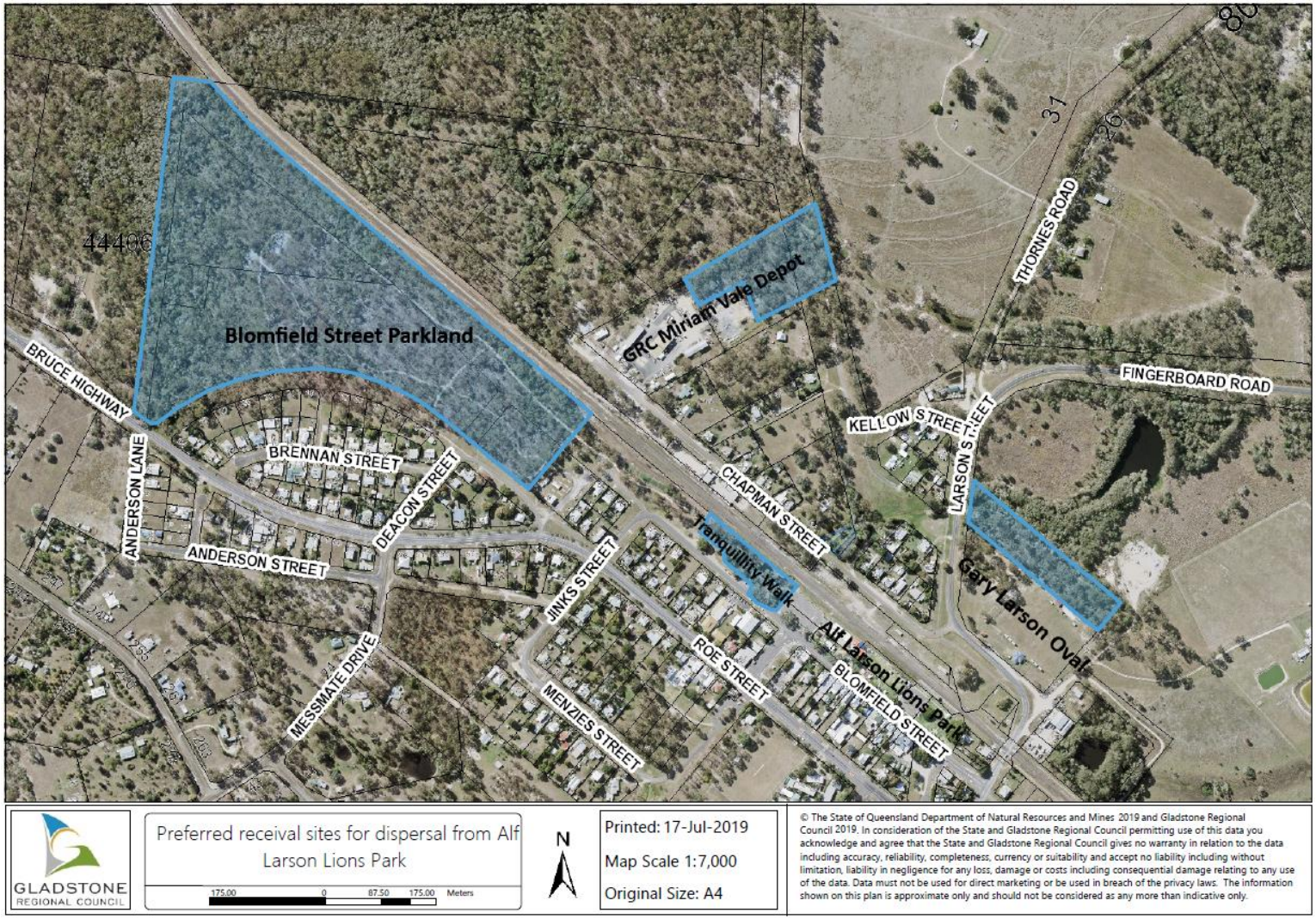

Figure 7 Preferred receival sites for dispersal from Alf Larson Lions Park

5.5 Standard measures to avoid impacts

The following general measures will be implemented during all management activities undertaken under the *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a) to minimise the potential for animal welfare and population level impacts:

- A clear monitoring program in place with trigger points to stop works if required;
- A flying-fox experienced wildlife carer or veterinarian on stand-by to accept injured or orphaned flying-foxes if required;
- Works timed to coincide with minimum numbers of flying-foxes at the roosts if possible;
- All personnel briefed prior to works commencing each day;
- All personnel debriefed at the end of each day of works to allow methods to be adapted if required;
- Clear roles and responsibilities of all personnel on site;
- Communication maintained between all personnel at all times on site;
- Works timed to avoid food bottlenecks (i.e. periods of heavy rain) which may compromise flying-fox health;
- Works not undertaken on days when temperatures are predicted to reach 38°C;
- Works not scheduled every 6th & 7th day to allow flying-foxes to rest at all sites;
- All personnel appropriately experienced, trained, and inducted to the program;
- Where works are required during months of conception (GHFF and BFF- March, LRFF- November to January), consider extending dispersal rest periods to avoid interrupting the breeding cycle;

Additional measures will be in place should vegetation management be required while flying-foxes are present:

- A works buffer of at least 30 m will be maintained between vegetation management works and any flying-fox roosting or alight;
- Works will cease for the day if more than 50% of the roost alights for more than five minutes, and/or more than 50% of individuals leave the roost;
- Clearing will be done in a sequential manner, beginning at the furthest distance and moving towards the roost to allow some level of habituation to noise and activity;
- A person experienced in flying-fox ecology and behaviour will be present at each roost being managed during any management activity (i.e. dispersal, vegetation management). This person will be vaccinated against ABLV and able to rescue any injured or orphaned flying-fox if required. They will also be responsible for monitoring flying-foxes for potential impacts and triggering appropriate action as detailed in Table 7.

Table 7 Potential impacts during flying-fox roost management activities

Potential impact	Signs	Action
Unacceptable levels of stress	• Panting • Saliva spreading	Works to cease for the day.

	• Located on or within 2m of the ground • Unusual vocalisations	
Fatigue	• Low flying • Laboured flight • Settling despite dispersal efforts	Works to cease for the day.
Injury/death	• A flying-fox appears to have been injured/killed on site (including aborted foetuses) [1] • Any flying-fox death is reported within one km of the dispersal site that appears to be related to the dispersal • >10% adult females of any species in final trimester • Dependent/creching young present • Loss of condition evident	Works to cease immediately and where any death or injury has occurred DES must be notified AND Rescheduled OR Adapted sufficiently[2] so that significant impacts (e.g. death/injury) are highly unlikely to occur, as confirmed by an independent expert (e.g. wildlife carer) OR Stopped indefinitely and alternative management options investigated.

6. Evaluation and review

The effectiveness and currency of this FFMP will be evaluated on an annual basis. Particular consideration will be given to any changes in the local flying-fox situation, regulatory framework or roost management practices and technologies, with information amended or incorporated in the plan as required. Any significant amendments will be undertaken in accordance with Council's Community Engagement Policy and communicated to stakeholders.

1 The *COP: Ecologically sustainable management of flying-fox roosts* (DES 2013a) requires all management actions to cease immediately and the Department of Environment and Science to be informed immediately if flying-foxes appear to have been killed or injured.

2 Vegetation management may be a stand-alone option to achieve passive dispersal of a colony if active dispersal should be avoided due to animal welfare reasons.

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8. Appendices

Appendix 1 – Legislation and policy framework

Nature Conservation Act 1992 (NC Act) (Qld)

The Department of Environment and Science (DES) administers the NC Act and is responsible for the conservation of flying-foxes in Queensland. The LRFF, BFF and GHFF, like all native fauna and flora, are protected under the NC Act. An unauthorised person may face financial penalty or one year imprisonment if they attempt to destroy a flying-fox roost, or drive flying-foxes away from a roost.

In 2013, the Queensland Government revised its approach for managing flying-foxes. This included the release of two codes of practice that provide authority to undertake particular activities to manage flying-foxes.

This includes the 'as-of-right' authority (ie. not an obligation) for local governments to manage and/or disperse flying-fox roosts in Urban Flying-fox Management Areas (UFFMA) in accordance with the *Code of Practice (COP): Ecologically sustainable management of flying-fox roosts* (DES 2013a), without the need for a permit. Specifically, the code outlines how Council's may:

- Destroy a flying-fox roost;
- Drive away, or attempt to drive away, a flying-fox from a flying-fox roost; and
- Disturb a flying-fox in a flying-fox roost.

Proposed management actions undertaken by local governments outside of the UFFMA or that do not comply with the codes may only be conducted under the approval of a Flying-fox Roost Management Permit (FFRMP) issued by DES. Similarly, any other landholder wishing to undertake management of a flying-fox roost must also independently apply for a FFRMP.

The COP: Low impact activities affecting flying-fox roosts (DES, 2013b) sets out how any person, including private landowners, may undertake low impact activities at any flying-fox roost. Under this code, low impact activities are mulching, mowing or weeding under or near roost trees, and/or minor trimming of roost trees, where the activities are not directed at destroying, driving away, or attempting to drive away or disturbing a flying-fox in a flying-fox roost. The code outlines the following restrictions for activities undertaken:

- No roost tree may be trimmed when there are flying-foxes in that part of the tree being trimmed, or when there are flying-foxes in that part of the tree being trimmed, or when flying-foxes are near to the tree and likely to be harmed as a result of the trimming;
- Any trimming of roost trees must be limited to 10% of the total canopy of the roost;
- Low impact activities must immediately cease, and DES immediately notified, if a flying-fox appears to have been killed or injured;
- Where low impact activities are required to be undertaken during the day time, works must immediately cease and DES be notified if 30% or more of the adult flying-foxes leave the roost for five minutes or more.

Where a private landowner wishes to manage a roost in a way not specifically outlined in the COP, they must apply to DES for a FFRMP. Operating outside of the COP is not authorised and may have legal consequences.

It is important to note that neither code provides exemptions to other legislation and provisions that are likely to be relevant to flying-fox management activities, such as the Queensland *Vegetation Management Act 1999* (VM Act), *Fisheries Act 1994*, the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and various planning provisions. They also do not provide exemptions for all vegetation under the NC Act.

All plants that are native to Australia are protected under the NC Act. Prior to any clearing of protected plants, a person must refer to the flora survey trigger map to determine if the clearing is within a high risk area.

- In a high risk area, a flora survey must be undertaken and a clearing permit may be required for clearing endangered, vulnerable and near threatened (EVNT) plants and their supporting habitat.
- If a flora survey identifies that EVNT plants are not present or can be avoided by 100 m, the clearing activity may be exempt from a permit. An exempt clearing notification form is required.
- In an area other than a high risk area, a clearing permit is only required where a person is, or becomes, aware that EVNT plants are present.
- Clearing of least concern plants will be exempt from requiring a clearing permit under the NC Act within a low risk area.

***Vegetation Management Act 1999* (VM Act) (Qld)**

The clearing of native vegetation in Queensland is regulated by the VM Act, the *Planning Act 2017* and associated policies and codes.

The type of clearing activity allowed, and how it is regulated, depends on:

- The type of vegetation (as indicated on the regulated vegetation management map and supporting maps);
- The tenure of the land (e.g. freehold or Indigenous land);
- The location, extent and purpose of the proposed clearing; and
- The applicant proposing to do the clearing (e.g. state government body, landholder).

Depending on these factors, clearing activities will either:

- Be exempt from any approval or notification process;
- Require notification and adherence to an accepted development code;
- Require notification and adherence to an area management plan; or
- Require a development approval.

VM Act exemptions allow native vegetation to be cleared for a range of routine property management activities without the need for a development approval or notification. A number of VM Act exemptions may apply to clearing vegetation that is flying-fox roosting or foraging habitat. However, specific advice should be obtained from Department of Natural Resources, Mines and Energy for each proposed vegetation clearing activity.

***Environment Protection and Conservation Biodiversity Act 1999* (C'wlth)**

The Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) provides protection for matters of national environmental significance (MNES). A referral to the Commonwealth DoEE is required under the EPBC Act for any action that is likely to significantly impact on an MNES.

MNES under the EPBC Act that relate to flying-foxes include:

- World heritage sites (where those sites contain flying-fox camps or foraging habitat)
- Wetlands of international importance (where those wetlands contain flying-fox camps or foraging habitat); and
- Nationally threatened species and ecological communities.

The grey-headed flying-fox (*Pteropus poliocephalus*; GHFF) is listed as a vulnerable species under the EPBC Act, meaning it is an MNES. It is also considered to have a single national population. DoEE has developed the Referral guideline for management actions in GHFF camps (DoE 2015) (the Guideline) to guide whether referral is required for actions pertaining to GHFF.

The Guideline defines a nationally important GHFF camp as one that has either:

- Contained ≥10,000 GHFF in more than one year in the last 10 years, or
- Been occupied by more than 2500 GHFF permanently or seasonally every year for the last 10 years.

The Miriam Vale roosts do not currently meet criteria to be considered nationally important and therefore actions are unlikely to require referral.

International agreements

All flying-fox species are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as species that may become threatened with extinction unless international trade is not closely controlled.

The GHFF is listed as Vulnerable on the International Union for Conservation of Nature and Resources (IUCN) Red List because of continuing population decline, estimated at a decline of more than 30% over the last three generations (Lunney et. al. 2008).

Appendix 2 – Flying-fox ecology

Ecological role

Flying-foxes, along with some birds, make a unique contribution to ecosystem health through their ability to move seeds and pollen over long distances (Southerton et al. 2004). This contributes directly to the reproduction, regeneration and viability of forest ecosystems (DoEE 2016a).

It is estimated that a single flying-fox can disperse up to 60,000 seeds in one night (ELW&P 2015). Some plants, particularly *Corymbia* spp., have adaptations suggesting they rely more heavily on nocturnal visitors such as bats for pollination than daytime pollinators (Southerton et al. 2004).

GHFF may travel 100 km in a single night with a foraging radius of up to 50 km from their camp (McConkey et al. 2012), and have been recorded travelling over 500 km in two days between camps (Roberts et al. 2012). In comparison bees, another important pollinator, move much shorter foraging distances of generally less than one kilometre (Zurbuchen et al. 2010).

Long-distance seed dispersal and pollination makes flying-foxes critical to the long-term persistence of many plant communities (Westcott et al. 2008; McConkey et al. 2012), including eucalypt forests, rainforests, woodlands and wetlands (Roberts et al. 2006). Seeds that are able to germinate away from their parent plant have a greater chance of growing into a mature plant (DES 2012). Long-distance dispersal also allows genetic material to be spread between forest patches that would normally be geographically isolated (Parry-Jones & Augee 1992; Eby 1991; Roberts 2006). This genetic diversity allows species to adapt to environmental change and respond to disease pathogens. Transfer of genetic material between forest patches is particularly important in the context of contemporary fragmented landscapes.

Flying-foxes are considered ‘keystone’ species given their contribution to the health, longevity and diversity among and between vegetation communities. These ecological services ultimately protect the long-term health and biodiversity of Australia’s bushland and wetlands. In turn, native forests act as carbon sinks, provide habitat for other fauna and flora, stabilise river systems and catchments, add value to production of hardwood timber, honey and fruit (e.g. bananas and mangoes; Fujita 1991), and provide recreational and tourism opportunities worth millions of dollars each year (DES 2012; ELW&P 2015).

Flying-foxes in urban areas

Flying-foxes appear to be roosting and foraging in urban areas more frequently. There are many possible drivers for this, as summarised by Tait et al. (2014):

- Loss of native habitat and urban expansion;
- Opportunities presented by year-round food availability from native and exotic species found in expanding urban areas;
- Disturbance events such as drought, fires, cyclones;
- Human disturbance or culling at non-urban roosts or orchards;
- Urban effects on local climate;
- Refuge from predation; and
- Movement advantages, e.g. ease of manoeuvring in flight due to the open nature of the habitat or ease of navigation due to landmarks and lighting.

Flying-foxes and human health

Flying-foxes, like many animals, carry pathogens that may pose human health risks. Many of these are viruses which cause asymptomatic infections in flying-foxes themselves but may cause significant disease in humans or other animals that are exposed. In Australia, the most well-defined of these include Australian bat lyssavirus (ABLV), Hendra virus (HeV) and Menangle virus. Specific information on these viruses is provided below.

Excluding those people whose occupations require contact with bats, such as wildlife carers and vets, human exposure to ABLV, HeV and Menangle virus, their transmission and frequency of infection is extremely rare. HeV infection in humans requires transfer from an infected intermediate equine host (i.e. close contact with an infected horse) and spread of the virus directly from bats to humans has not been reported.

These diseases are also easily prevented through vaccination, personal protective equipment, safe flying-fox handling (by trained and vaccinated personnel only) and appropriate horse husbandry. Therefore, despite the fact that human infection with these agents can be fatal, the probability of infection is extremely low and the overall public health risk is also judged to be low (Qld Health 2016).

Australian bat lyssavirus (ABLV)

ABLV is a rabies-like virus that may be found in all flying-fox species on mainland Australia. It has also been found in an insectivorous microbat and it is assumed it may be carried by any bat species. The probability of human infection with ABLV is very low with less than 1% of the flying-fox population being affected (DPI 2013) and transmission requiring direct contact with an infected animal that is secreting the virus. In Australia three people have died from ABLV infection since the virus was identified in 1996 (NSW Health 2013).

Domestic animals are also at risk if exposed to ABLV. In 2013, ABLV infections were identified in two horses (Shinwari et al. 2014). There have been no confirmed cases of ABLV in dogs in Australia; however, transmission is possible (McCall et al. 2005) and consultation with a veterinarian should be sought if exposure is suspected.

Transmission of the virus from bats to humans is through a bite or scratch, but may have potential to be transferred if bat saliva directly contacts the eyes, nose, mouth or broken skin. ABLV is unlikely to survive in the environment for more than a few hours, especially in dry environments that are exposed to sunlight (NSW Health 2013).

Transmission of closely related viruses 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 bat roosting areas (NSW Health 2013).

The incubation period in humans is assumed similar to rabies and variable between two weeks and several years. Similarly, the disease in humans presents essentially the same clinical picture as classical rabies. Once clinical signs have developed the infection is invariably fatal. However, infection can easily be prevented by avoiding direct contact with bats (i.e. handling). Pre-exposure vaccination provides reliable protection from the disease for people who are likely to have direct contact with bats, and it is generally a mandatory workplace health and safety requirement that all persons working with bats receive pre-vaccination and have their level of protection regularly assessed. Like classical rabies, ABLV infection in humans also appears to be effectively treated using post-exposure vaccination and so any person who suspects they have been exposed should seek immediate medical treatment. Post-exposure vaccination is usually ineffective once clinical manifestations of the disease have commenced.

Hendra virus (HeV)

Flying-foxes are the natural host for Hendra virus (HeV), which can be transmitted from flying-foxes to horses. Infected horses sometimes amplify the virus and can then transmit it to other horses, humans and on two occasions, dogs (DPI 2014). There is no evidence that the virus can be passed directly from flying-foxes to humans or to dogs (AVA 2015). Clinical studies have shown cats, pigs, ferrets and guinea pigs can carry the infection (DPI 2015a).

Although the virus is periodically present in flying-fox populations across Australia, the likelihood of horses becoming infected is low and consequently human infection is extremely rare. Horses are thought to contract the disease after ingesting forage or water contaminated primarily with flying-fox urine (CDC 2014).

Humans may contract the disease after close contact with an infected horse. HeV infection in humans presents as a serious and often fatal respiratory and/or neurological disease and there is currently no effective post-exposure treatment or vaccine available for people. The mortality rate in horses is greater than 70% (DPI 2014). Since 1994, 81 horses have died and four of the seven people infected with HeV have lost their lives (DPI 2014).

Previous studies have shown that HeV spillover events have been associated with foraging flying-foxes rather than camp locations. Therefore, risk is considered similar at any location within the range of flying-fox species and all horse owners should be vigilant. Vaccination of horses can protect horses and subsequently humans from infection (DPI 2014), as can appropriate horse husbandry (e.g. covering food and water troughs, fencing flying-fox foraging trees in paddocks, etc.).

Although all human cases of HeV to date have been contracted from infected horses and direct transmission from bats to humans has not yet been reported, particular care should be taken by select occupational groups that could be uniquely exposed. For example, persons who may be exposed to high levels of HeV via aerosol of heavily contaminated substrate should consider additional PPE (e.g. respiratory filters), and potentially dampening down dry dusty substrate.

Water supply contamination

Flying-foxes, like all animals, carry bacteria and other microorganisms in their guts, some of which are potentially pathogenic to other species. Direct contact with faecal material should be avoided and general hygiene measures taken to reduce the low risk of gastrointestinal and other disease.

Contamination of water supplies by any animal excreta (birds, amphibians and mammals such as flying-foxes) poses health risks to humans. Household tanks should be designed to minimise potential contamination, such as using first flush systems to divert contaminants before they enter water tanks. Trimming vegetation overhanging the catchment area (e.g. the roof of a house) will reduce wildlife activity and associated potential contamination. Tanks should also be appropriately maintained and flushed, and catchment areas regularly cleaned of potential contaminants.

Public water supplies are regularly monitored for harmful bacteria, and are filtered and disinfected before being distributed. Management plans for community supplies should consider whether any large congregation of animals, including flying-foxes, occurs near the supply or catchment area. Where they do occur, increased frequency of monitoring should be considered to facilitate early detection and management of contaminants.

Flying-foxes under threat

Flying-foxes roosting and foraging in urban areas more frequently can give the impression that their populations are increasing; however, the GHFF is in decline across its range. At the time of listing, the species was considered eligible for listing as vulnerable as counts of flying-foxes over the previous decade suggested that the national population may have declined by up to 30%.

The main threat to GHFF in QLD is clearing or modification of native vegetation. This threatening process removes appropriate roosting and breeding sites and limits the availability of natural food resources, particularly winter–spring feeding habitat. The urbanisation of the coastal plains of south-eastern Queensland and northern NSW has seen the removal of annually-reliable winter feeding sites, and this threatening process continues.

There is a wide range of ongoing threats to the survival of the GHFF, including:

- Habitat loss and degradation;
- Conflict with humans (including culling at orchards);
- Infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.);
- Predation by native and introduced animals; and
- Exposure to extreme natural events such as cyclones, drought and heat waves.

Flying-foxes have limited capacity to respond to these threats and recover from large population losses due to their slow sexual maturation, small litter size, long gestation and extended maternal dependence (McIlwee & Martin 2002).

Heat stress events

Flying-foxes suffer from heat stress when the ambient temperature exceeds the physiological limits flying-foxes can endure for maintaining a comfortable body temperature (Bishop 2014). Factors that contribute to a heat stress event vary from colony to colony, depending on geographic location, weather, roost characteristics and demographics (Table 8).

Table 8 Heat stress event variables

Weather/climate	Roost characteristics	Demographics
>40°C	Species composition	No. of lactating mothers
No. of consecutive hot days	Size of roost	No. and age of juveniles
Humidity %	Understorey vegetation	Birthing season – early or late

During heat stress events, there is a predictable behavioural sequence displayed by both BFF and GHFF:

- Wing fanning;
- Shade seeking;
- Clustering/clumping;
- Salivating;
- Panting; and
- Falling from trees.

Roost characteristics

All flying-foxes are nocturnal, roosting during the day in communal camps. These camps may range in number from a few to hundreds of thousands, with individual animals frequently moving between camps within their range. Typically, the abundance of resources within a 20–50 km radius of a camp site will be a key determinant of the size of a camp (SEQ Catchments 2012). Therefore, flying-fox camps are generally

temporary and seasonal, tightly tied to the flowering of their preferred food trees. However, understanding the availability of feeding resources is difficult because flowering and fruiting are not reliable every year, and can vary between localities (SEQ Catchments 2012). These are important aspects of camp preference and movement between camps and have implications for long-term management strategies.

Little is known about flying-fox camp preferences; however, research indicates that apart from being in close proximity to food sources, flying-foxes choose to roost in vegetation with at least some of the following general characteristics (SEQ Catchments 2012):

- Closed canopy >5 m high;
- Dense vegetation with complex structure (upper, mid- and understorey layers);
- Within 500 m of permanent water source;
- Within 50 km of the coastline or at an elevation <65 m above sea level;
- Level topography (<5° incline); and
- Greater than one hectare to accommodate and sustain large numbers of flying-foxes.

Optimal vegetation available for flying-foxes must allow movement between preferred areas of the camp. Specifically, it is recommended that the size of a patch be approximately three times the area occupied by flying-foxes at any one time (SEQ Catchments 2012).

Species profiles

Black flying-fox (*Pteropus alecto*)

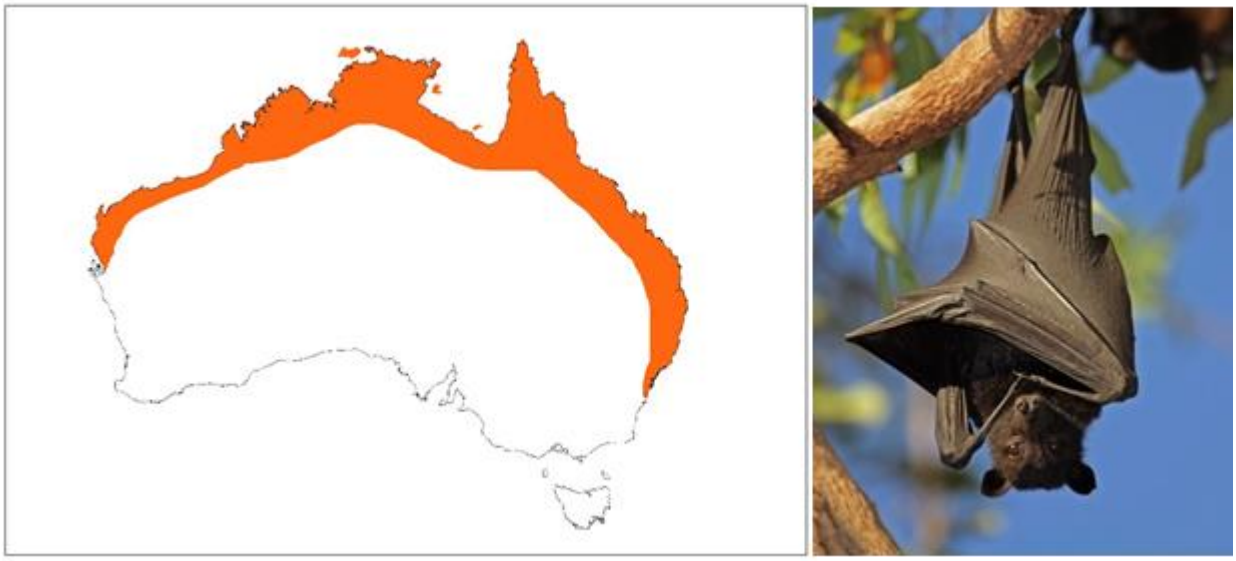


Figure 8 Black flying-fox indicative species distribution, adapted from OEH 2015a

The BFF (Figure 8) has traditionally occurred throughout coastal areas from Shark Bay in Western Australia, across Northern Australia, down through Queensland and into NSW (Churchill 2008; OEH 2015a). Since it was first described there has been a substantial southerly shift by the BFF (Webb & Tidemann 1995). This shift has consequently led to an increase in indirect competition with the threatened GHFF, which appears to be favouring the BFF (DoEE 2016a).

They forage on the fruit and blossoms of native and introduced plants (Churchill 2008; OEH 2015a), including orchard species at times. BFFs are largely nomadic animals with movement and local

distribution influenced by climatic variability and the flowering and fruiting patterns of their preferred food plants. Feeding commonly occurs within 20 km of the camp site (Markus & Hall 2004).

BFFs usually roost beside a creek or river in a wide range of warm and moist habitats, including lowland rainforest gullies, coastal stringybark forests and mangroves. During the breeding season camp sizes can change significantly in response to the availability of food and the arrival of animals from other areas.

Grey-headed flying-fox (*Pteropus poliocephalus*)

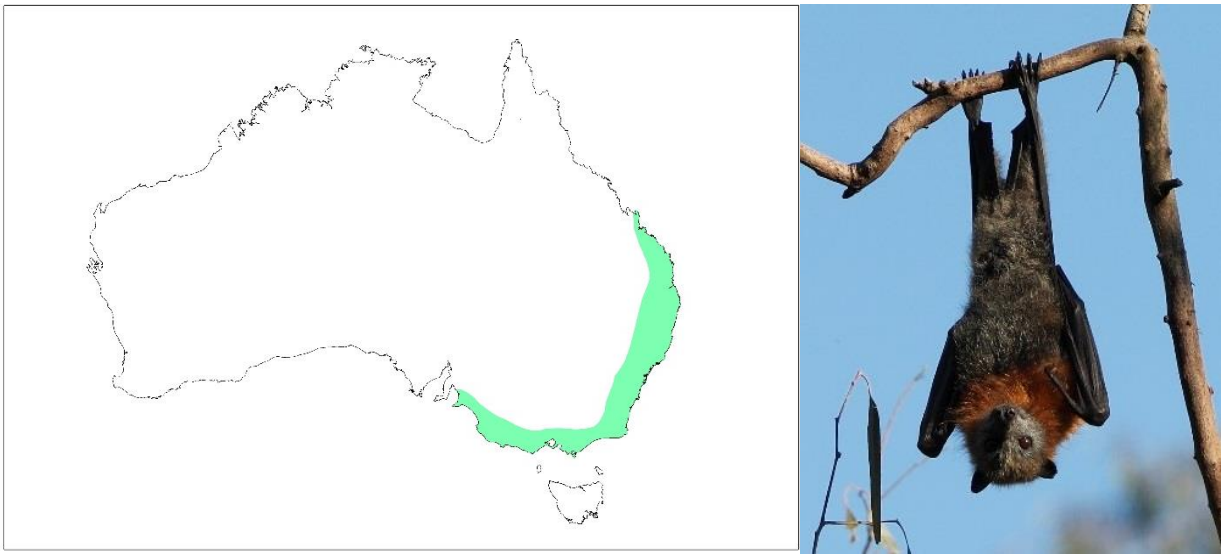


Figure 9 Grey-headed flying-fox indicative species distribution, adapted from OEH 2015a

The GHFF (Figure 9) is found throughout eastern Australia, generally within 200 kilometres of the coast, from Finch Hatton in Queensland to Melbourne, Victoria (OEH 2015d). This species now ranges into South Australia and has been observed in Tasmania (DoEE 2016a). It requires foraging resources and camp sites within rainforests, open forests, closed and open woodlands (including melaleuca swamps and banksia woodlands). This species is also found throughout urban and agricultural areas where food trees exist and will raid orchards at times, especially when other food is scarce (OEH 2015a).

All the GHFF in Australia are regarded as one population that moves around freely within its entire national range (Webb & Tidemann 1996; DoEE 2015). GHFF may travel up to 100 kilometres in a single night with a foraging radius of up to 50 kilometres from their camp (McConkey et al. 2012). They have been recorded travelling over 500 kilometres over 48 hours when moving from one camp to another (Roberts et al. 2012). GHFF generally show a high level of fidelity to camp sites, returning year after year to the same site, and have been recorded returning to the same branch of a particular tree (SEQ Catchments 2012). This may be one of the reasons flying-foxes continue to return to small urban bushland blocks that may be remnants of historically-used larger tracts of vegetation.

The GHFF population has a generally annual southerly movement in spring and summer, with their return to the coastal forests of north-east NSW and south-east Queensland in winter (Ratcliffe 1932; Eby 1991; Parry-Jones & Augee 1992; Roberts et al. 2012). This results in large fluctuations in the number of GHFF in NSW, ranging from as few as 20% of the total population in winter up to around 75% of the total population in summer (Eby 2000). They are widespread throughout their range during summer, but in spring and winter are uncommon in the south. In autumn they occupy primarily coastal lowland camps and are uncommon inland and on the south coast of NSW (DECCW 2009).

There is evidence the GHFF population declined by up to 30% between 1989 and 2000 (Birt 2000; Richards 2000 cited in OEH 2011a). There is a wide range of ongoing threats to the survival of the GHFF, including habitat loss and degradation, deliberate destruction associated with the commercial horticulture industry, conflict with humans, infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.) and competition and hybridisation with the BFF (DECCW 2009). For these reasons it is listed as vulnerable to extinction under federal legislation (see Appendix 2).

Little red flying-fox (*Pteropus scapulatus*)

Figure 10 Little red flying-fox indicative species distribution, adapted from OEH 2015a

The little red flying-fox (LRFF) (Figure 10) is widely distributed throughout northern and eastern Australia, with populations occurring across northern Australia and down the east coast into Victoria.

The LRFF forages almost exclusively on nectar and pollen, although will eat fruit at times and occasionally raids orchards (Australian Museum 2010). LRFF often move sub-continental distances in search of sporadic food supplies. The LRFF has the most nomadic distribution, strongly influenced by availability of food resources (predominantly the flowering of eucalypt species) (Churchill 2008), which means the duration of their stay in any one place is generally very short.

Habitat preferences of this species are quite diverse and range from semi-arid areas to tropical and temperate areas, and can include sclerophyll woodland, melaleuca swamplands, bamboo, mangroves and occasionally orchards (IUCN 2015). LRFF are frequently associated with other *Pteropus* species. In some colonies, LRFF individuals can number many hundreds of thousands and they are unique among *Pteropus* species in their habit of clustering in dense bunches on a single branch. As a result, the weight of roosting individuals can break large branches and cause significant structural damage to roost trees, in addition to elevating soil nutrient levels through faecal material (SEQ Catchments 2012).

Throughout its range, populations within an area or occupying a camp can fluctuate widely. There is a general migration pattern in LRFF, whereby large congregations of over one million individuals can be found in northern camp sites (e.g. Northern Territory, North Queensland) during key breeding periods (Vardon & Tidemann 1999). LRFF travel south to visit the coastal areas of south-east Queensland and NSW during the summer months. Outside these periods LRFF undertake regular movements from north to south during winter–spring (July–October) (Milne & Pavey 2011).

Reproduction

Black and grey-headed flying-foxes

Males initiate contact with females in January with peak conception occurring around March to April/May; this mating season represents the period of peak camp occupancy (Markus 2002). Young (usually a single pup) are born six months later from September to November (Churchill 2008). The birth season becomes progressively earlier, albeit by a few weeks, in more northerly populations (McGuckin & Blackshaw 1991), however out of season breeding is common with births occurring later in the year.

Young are highly dependent on their mother for food and thermoregulation. Young are suckled and carried by the mother until approximately four weeks of age (Markus & Blackshaw 2002). At this time, they are left at the camp during the night in a crèche until they begin foraging with their mother in January and February (Churchill 2008) and are usually weaned by six months of age around March. Sexual maturity is reached at two years of age with a life expectancy up to 20 years in the wild (Pierson & Rainey 1992).

As such, the critical reproductive period for GHFF and BFF is generally from August (when females are in final trimester) to the end of peak conception around April. Dependent pups are usually present from September to March (Figure 11).

Little red flying-fox

The LRFF breeds approximately six months out of phase with the other flying-foxes. Peak conception occurs around October to November, with young born between March and June (McGuckin & Blackshaw 1991; Churchill 2008) (Figure 11). Young are carried by their mother for approximately one month then left at the camp while she forages (Churchill 2008). Suckling occurs for several months while young are learning how to forage. LRFF generally birth and rear young in temperate areas.

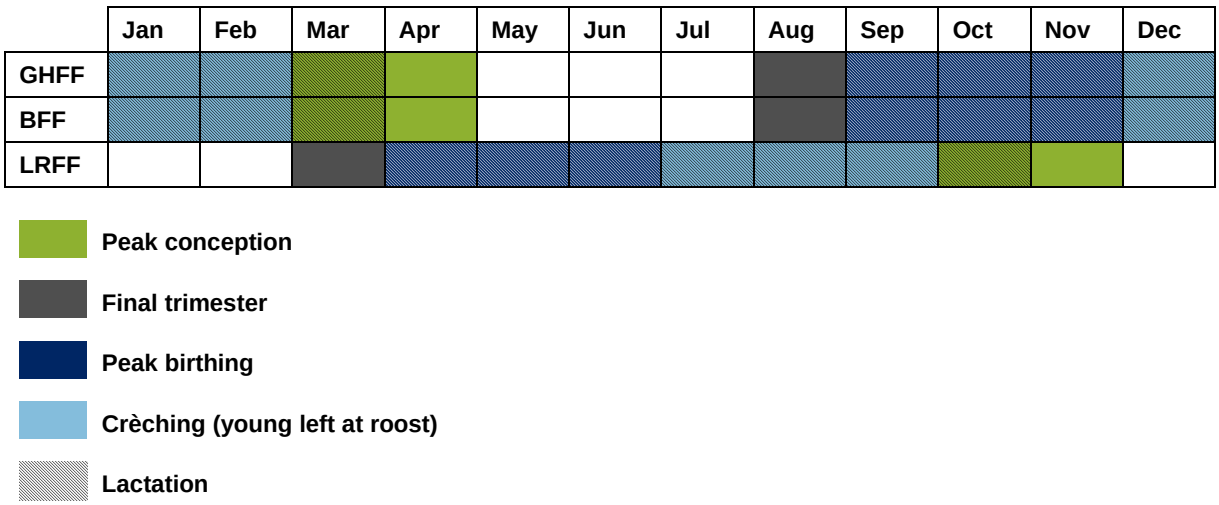
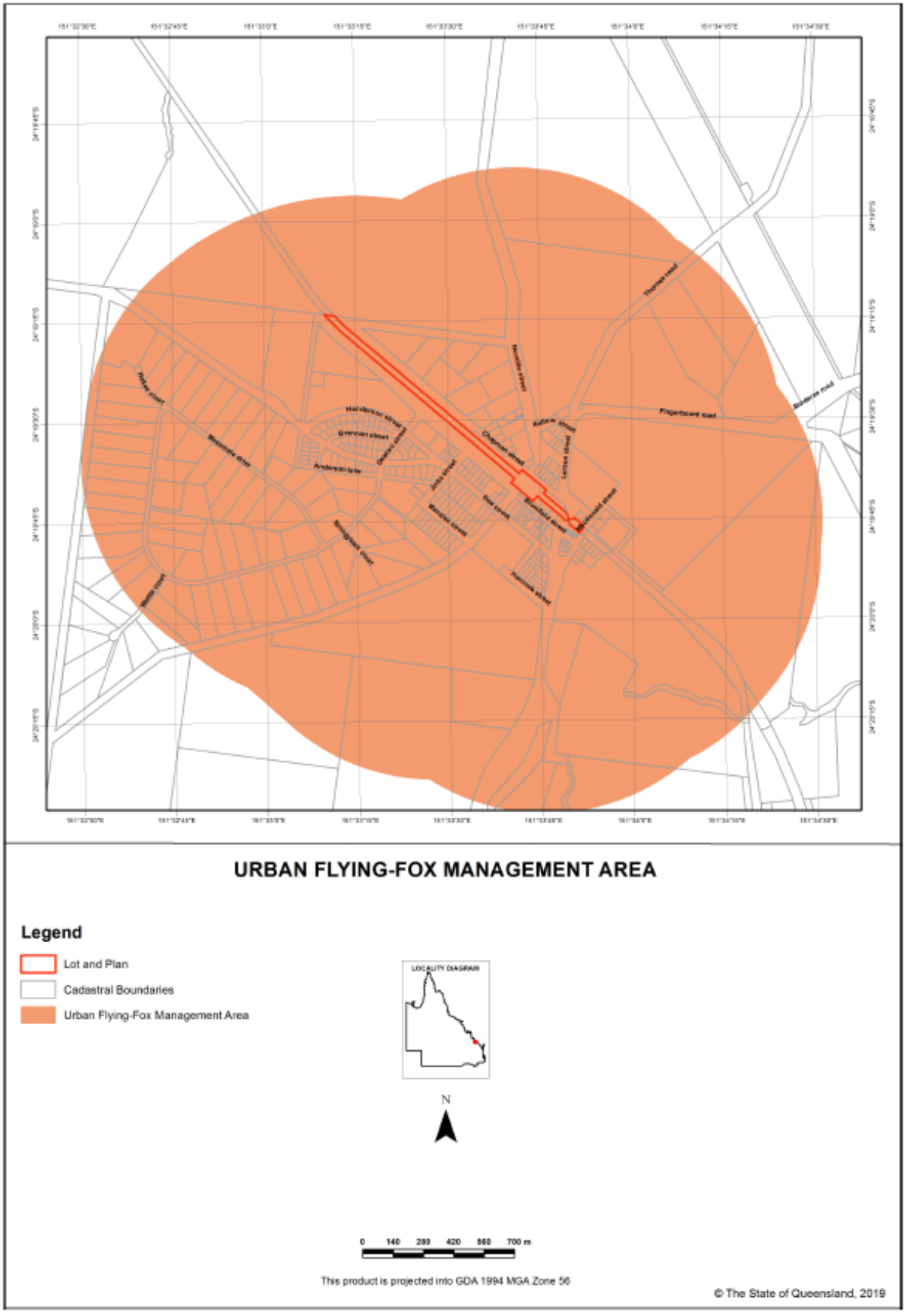


Figure 11 Indicative flying-fox reproductive cycle

The breeding season of all species is variable between years and location, and expert assessment is required to accurately determine phases in the breeding cycle and inform appropriate management timing.

Appendix 3 – Urban Flying-fox Management Area surrounding Miriam Vale township



Appendix 4 – Statement of Management Intent Flying-fox Roost Management

GLADSTONE
REGIONAL COUNCIL

STATEMENT OF MANAGEMENT INTENT
FLYING-FOX ROOST MANAGEMENT

2014

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). An UFFMA for a local government area is defined by maps available from the website of the Department of Environment and Heritage Protection (EHP).

Outside an UFFMA, a local government requires a Flying-fox roost management permit (FFRMP), available from EHP. A non-council applicant requires a FFRMP irrespective of the location of the roost.
Further information on the Queensland Government's roost management framework is available at the following webpage:
http://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/roost-management.html

2. Purpose

The purpose of this Statement of Management Intent (SoMI) is to articulate the approach that Gladstone Regional Council will take to the management of flying-fox roosts in the Gladstone Region.

3. Location of the UFFMA in Gladstone Regional Council

A map of the Gladstone Regional Council UFFMA is available at the following webpage:
https://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/maps/gladstone-regional.pdf

Residents who wish to view a map of their own property in relation to the UFFMA can do so through the following website:
http://www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/management-areas/map-request.php

4. Council intentions and considerations

Council will co-ordinate the management of flying-fox roosts on Council owned or State land placed under the control of Council pursuant to the *Land Act 1994* within and outside the UFFMA. Costs relating to the management of the flying-fox roost will be negotiated prior to the application for or implementation of any permit or action.

Where a flying-fox roost is on Council owned or State land placed under the control of Council pursuant to the *Land Act 1994* and either State land(s) or private land(s), Council will work with the relevant landholder to manage the flying-fox roost. Costs relating to the management of the flying fox roost will be the responsibility of both Council and the relevant landholders and will be negotiated prior to the application for or implementation of any permit or action.

Council's intent is to have no involvement in the management of flying-fox roosts solely on State land(s) or private land(s) or a combination of the two.

Factors that Council will consider before deciding whether to take any action at particular sites, includes:

- The wellbeing impacts and concerns that nearby residents are experiencing;
- Whether Council considers that there are any risks to human health or wellbeing from the roost;
- Whether the roost is on Council land and State land(s) or private land(s), and if State land(s) or private land(s), whether consent for Council to undertake management has

been provided by all relevant landholders, and full cost recovery, proportionate to the land, has been agreed to.

Additional factors that Council will consider in deciding the most appropriate action to take at particular sites, includes:

- The cost of various management actions; and who would contribute to these costs;
- The number of each species of flying-foxes at the roost, and what Council's intention would be should the flying-foxes be breeding or rearing their young;
- Whether good outcomes may be achieved with minimal management interventions (such as community education) or moderate management interventions such as 'nudging' or 'buffering', processes by which the impact of an existing roost may be managed by its reduction.

Further factors that Council will consider, where Council decides, for particular sites, that the most appropriate action is dispersal, includes:

- The number of years that flying-foxes have used a particular roost site;
- The likelihood of flying-foxes relocating to a site of greater conflict with the community
- Whether flying-foxes at the site are capable of independent flight at the time of year proposed for driving them away
- Whether a proposed management action may cause harm to flying-foxes.

If residents are dissatisfied with Council's approach at a particular roost site, they may apply for a permit directly from EHP.

If a roost is on private land(s), low impact activities may be undertaken by a person as-of-right under the relevant code of practice. The *Code of practice – Low impact activities affecting flying-fox roost*.

Council's roost management actions will be undertaken in compliance with the *Code of Practice – Ecologically sustainable management of flying-fox roosts*.

5. Further information

For further information on flying-fox management contact Gladstone Regional Council on 4970 0700 or visit Council's website at http://www.gladstone.qld.gov.au/ or visit the Department of Environment and Heritage Protections website at http://www.ehp.qld.gov.au.

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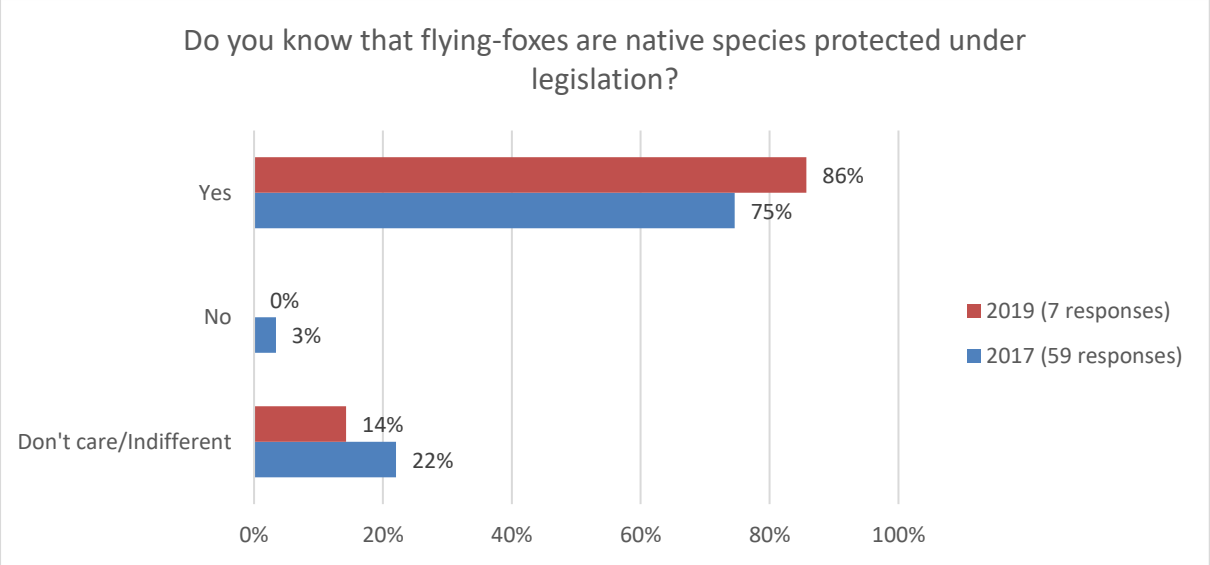
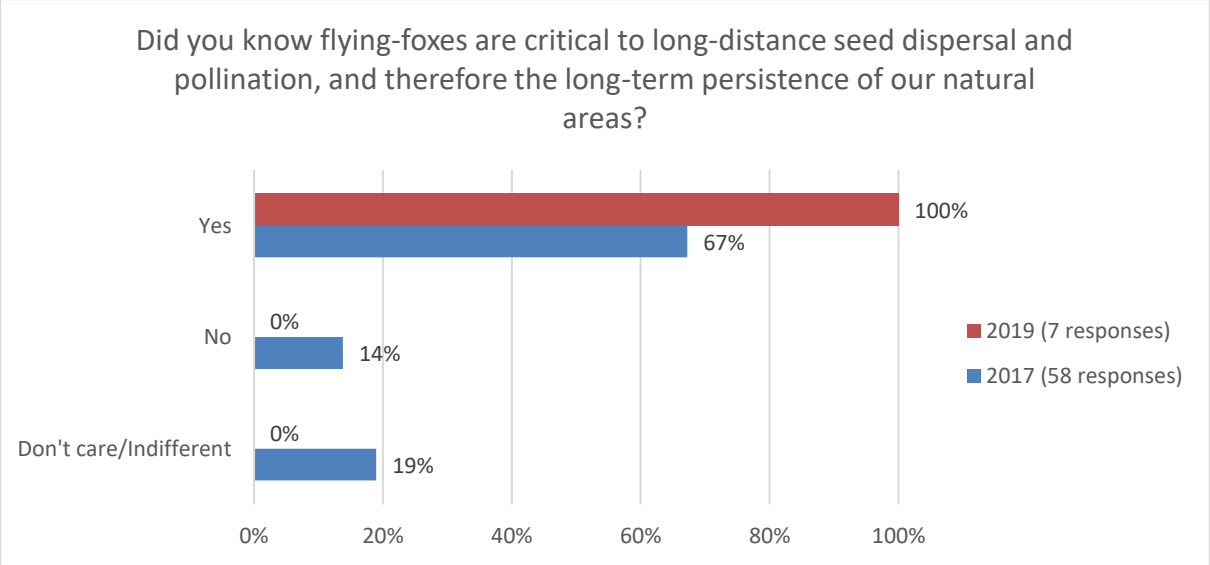
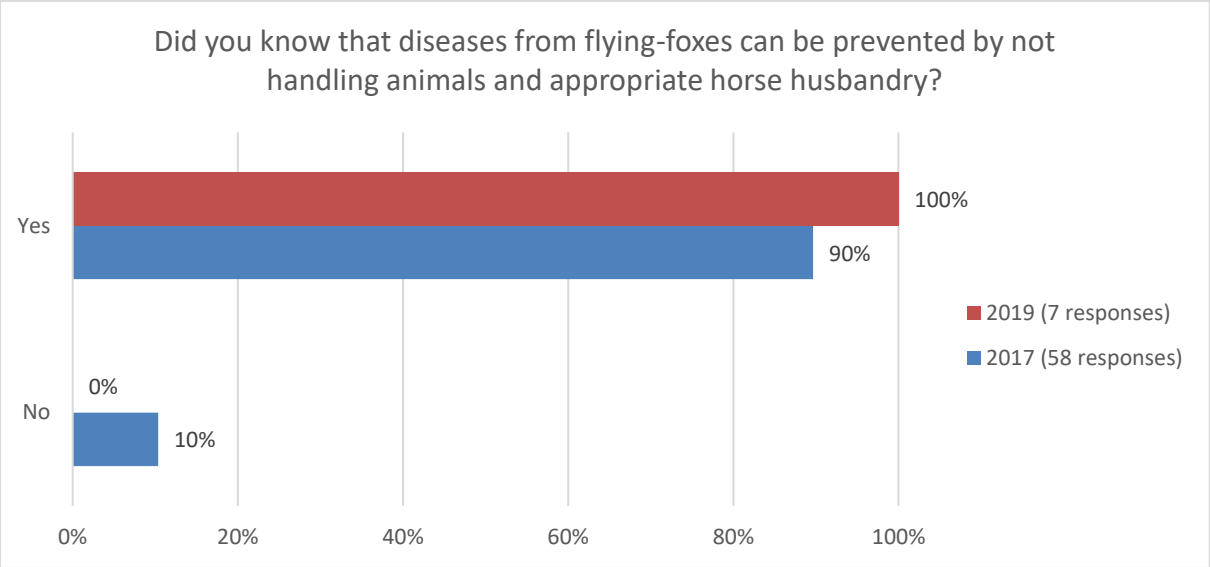
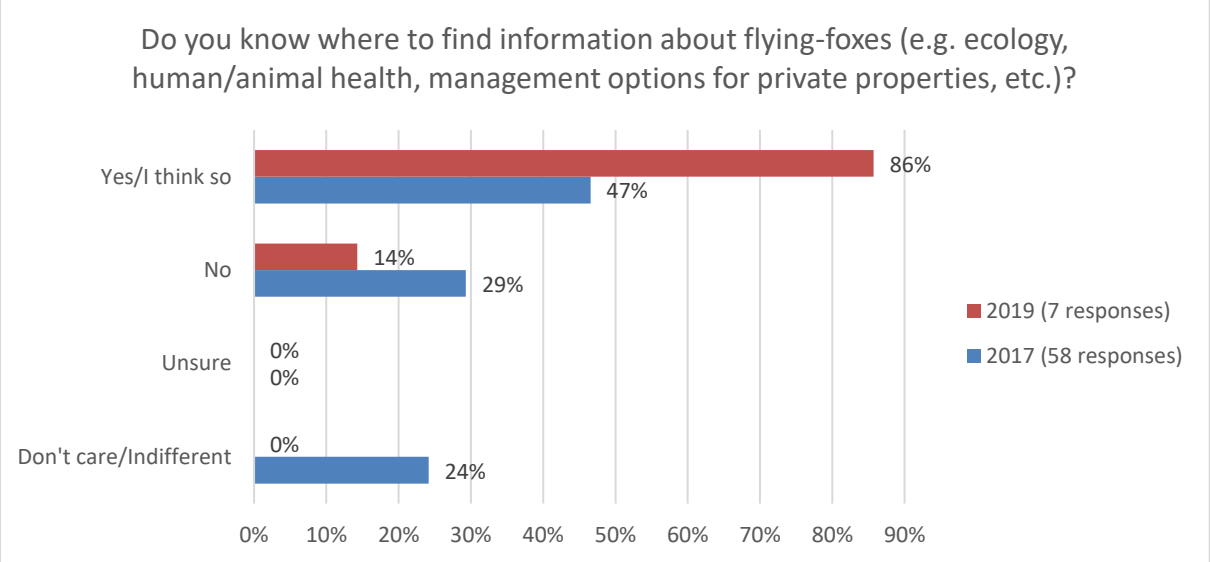
Appendix 5 – Community survey results





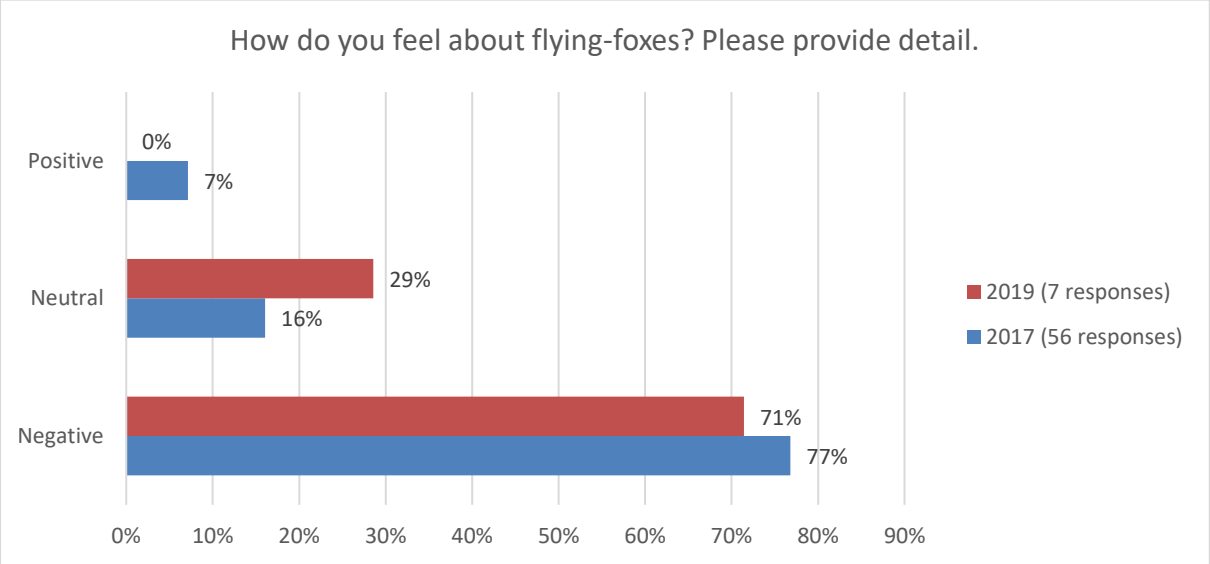




2019 survey comments
Internet
Google
any website available, any library that is open when I am off work, any council website & office open when I am not at work, any institues that are available to me

2017 survey comments
Google it
Just google it. It's not hard.
Google has everything

Google Search
would look on the internet
Council
Government web sites
They are pests and should never allowed to have a camp in a town or a residential area
Council
Internet, national parks
Internet
Internet
Google
Internet
Ehp website, coucil factsheet
on varies government and scientific web sites
dr google
Internet
You can google it easily enough



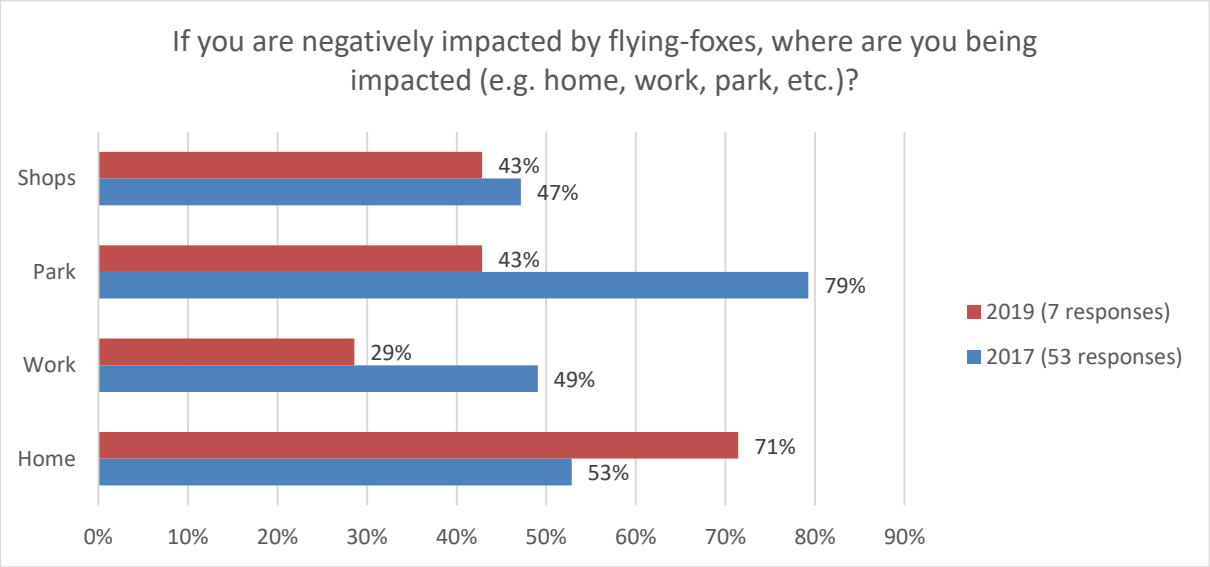
2019 survey comments
They are noisy smelly s**t all over my properties

smell noisy shirts on my cloths cars houses in my water tank good for environment until coucil chops down the trees where they roost so how can they be good for environment if u do that
Flying-fox colonies should be removed from ALL urban areas - not just Gladstone and Boyne Tannum. Also, if it's okay to have flying-foxes roosting in the Miriam Vale town area because they are 'native' then it's find to leave mosquitoes unmolested in Gladstone because they too are 'native'
They are noisy and their fecies is putrid
They have been roosting in my street (Chapman Street & Blomfield street for 4 years. This year it has been non stop
they can bite, spread disease and are s**ting all over the streets and parks

2017 survey comments
They smell, make noise, destroy trees, carry disease
Same categories as dinosaurs - extinct
Yes, they have their place in the ecosystem. But when you have to smell and listen to them ALL DAY, can't drink the tank water, have to wash bat poo off things every day it is really too much.
All right in the bush but not in town
The animals should not be living in a populated area where humans heavily rely on rain water for drinking and everyday use.
Should not be in residential
Do not want them in town park
They are okay in moderate numbers
I used to help raise baby flying-foxes where mothers were paralysed from ticks (in NQ) for a short while
They shouldn't be allowed in town area
They spread germs
I agree they shouldn't be harmed but I don't think they should be able to breed where there is no natural predators
Don't like them at all
They don't affect me until they nest in our township. They destory the trees and make the whole town stink. Its disgusting, the smell.
Noisy and dirty
They stink, poo on everything and damage trees.
Detest them

I understand their role in ecosystem however I don't believe they should be living/breeding etc in the main street and public places.
Not where kids play
I had to live with the stench and mess and noise of them in the N.T and it ruins your life
No. 1 - change the law to protect them. they should be removed from residential areas because they cause disease. They decimate famers' crops and deficate on public parks and smell
Flying-foxes should be relocated to areas of bush land not it childrens parks.
I think they should be culled - big time
not in a town where people are trying to live
They leave a stench through the town, leave their droppings on hanging washing, and solar panels that are on rooves. They fight and screech all through the night and day.
I understand their ecological reason for being, however if they pose a threat to small children then they need to be managed.
I want them to go. They are too dangerous to our health.
They are in plague proportions & makes for along season when they are roosting
do not belong in town roosting only a recent thing they do need to be moved on
They destroy my trees
Not In public spaces
They are a native animal and necessary for ecology but a damn nuisance if the nest over or near your home or public area.
they have a place in our ecology
I think they should not be allowed in townships especially near parks and playgrounds as their seed dispersal value is much better suited to the bush where they belong
Important pollinators and seed dispersers. Nightly flyouts are spectacular. Yes, they are noisy, but it is privilage to observe them close hand.
The bats are disgustingly dirty and do droppings on our roof which is our rain water source and disease can go in the water tank
Make our town smell appalling and are not healthy for our children at the park.
They are a nuisance, smelly, horrible, messy creatures
They need to be kept away from towns, parks. They pollute tanks, drinking water, destroy vegetation and trees, they smell, and are noisy. Their needs should not be put above resident's health and well being. People who think they should be able to roost in towns or near communities should spend a month in this environment. They would soon change thheir minds..

Quite fine when their colonies are located in out of the way areas. When there are thousands of them in the town centre and residential area it is a very different matter

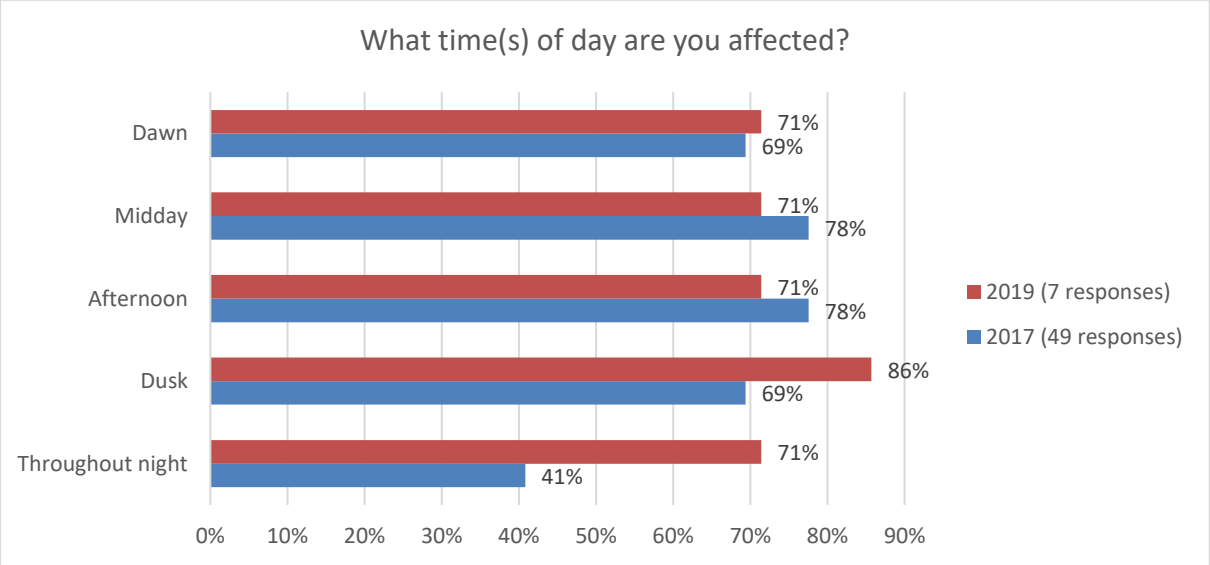


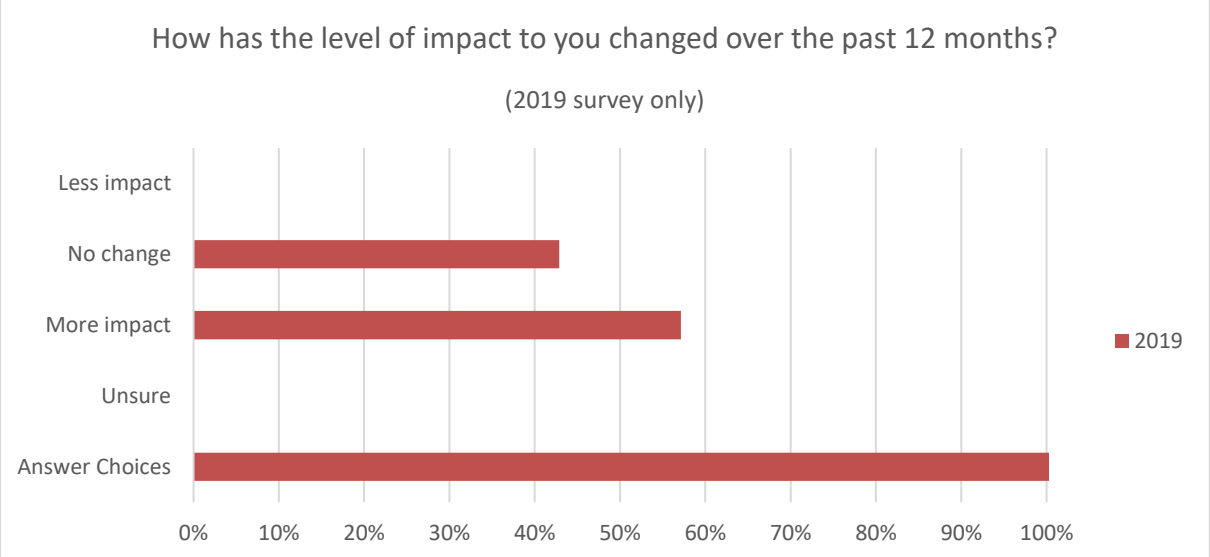
2019 survey comments
chapman street
Chapman street miri am vale
Bllomfield st, and just about anywhere in Miriam Vale
Miriam Vale SS
I live in Chapman Street. They are roosting 4 doors up from my house. The constant noise, stink, droppings are a major health hazard to me and any visitors I have, including my mother who is on permanent oxygen to breath now with out the effects of these animals. I cannot leave my car outside the garage as it gets covered in droppings. My drinking water is effected even with the first flush system in place and the water filter on the tap.
main street. I cannot let me children play in the park

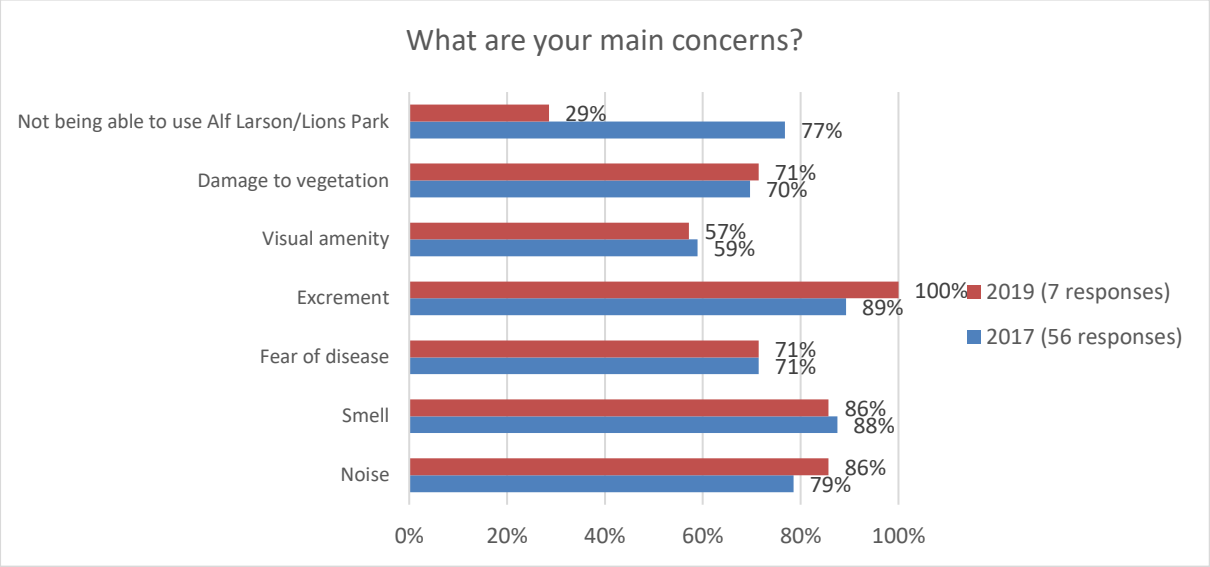
2017 survey comments
Blomfield Street, opposite council building. Businesses along Blomfield Street, multi million dollar park do not feel safe taking children to park.
Miriam Vale
Blomfield Street, Miriam Vale - GRC building, the park and all shops in the vicinity
Blomfield Street
Car park near CWA under breeding tree
Miriam Vale Blomfield Street

Main Street
Nouise opposite works is deplorable poo in park is deplorable
We are unable to use our tank water due to their proximity. Blomfield Street park, CWA Hall, playgroup area, park playground, damage to trees they roost in.
Blomfield St, Miriam Vale (Post Office)
Blomfield Street
T's Coffee Shop Bomfield Street
7 Menzies St MV MV Main St
Blomfield Street
Blomfield Street
Blomfield St. Hotel
Blomfield Street
Blomfield St, Lifeline also 5 Brennan St, Miriam Vale
Miriam Vale Pharmacy Blomfield Street
Blomfield St, Miriam Vale
Alf Larsen Park/Miriam Vale
The upgraded Alf Larson park.
Public parks and in my fruit trees - Pashley street
I live, work, shop and relax in Miriam Vale
Bloomfield st miriam vale
Roe Street and the shops, hotel and parks on the main street. When the fences are up the shaded walking path cannot be used because of them
The park at Miriam Valencia is a fantasia place for children and families to gather. However both it and the playgroup next door are being negatively impacted by the flying-foxes. They have been found inside the playgroup hedge, in reach of toddlers and the only space of grass for the toddlers to play on is covered in faces.
Blomfield & Chapman Street
they smell they are noisy and ruin the new park in town
Cawthrays road
Curlew Park Tannum Sands -bats have started to roost in mangroves close to houses

Miriam vale
Home bats have a flight path over our house and do droppings on the roof and property effects our drinking water which bats carry diseases into our water bats roost in trees in Blomfield street and do droppings on the children's park and play equipment
Miriam Vale Main Street & also Roe Street
Roe Street and Blomfield Street
blomfield st
Messmate Drive mMiriam Vale, park and playground at Miriam Vale, shops at Miriam Vale.
Alf Larson park. Dovedale
The businesses and shops in Blomfield St, Miriam Vale



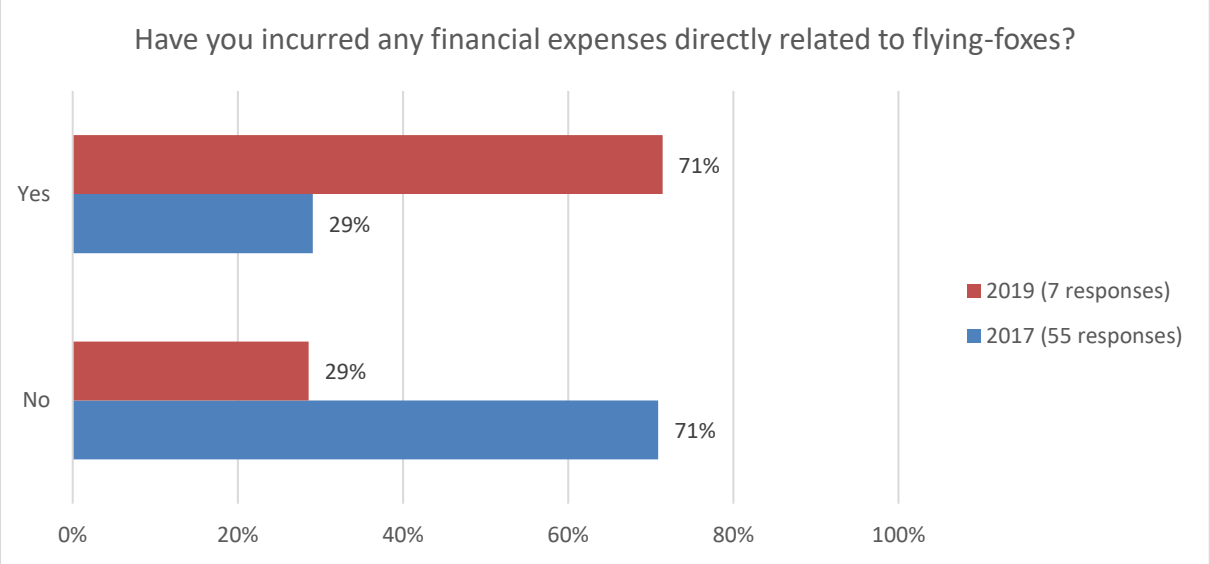




2019 survey comments
Don't care about Alf Larson park. I'm being impacted by the colony in Chapman Street that you people don't want to talk about.
remaining sane, and healthy
i have watched council workers wash the footpath and the water runs down into where the kids play

2017 survey comments
The smell comes through the airconditioner. Breathing it in
Isn't this enough?
I cannot imagine how the residents of the homes in Blomfield and Chapman Streets felt. It was bad enough just being here in working hours.
Tourists are affected contaminated tank water at work
Restrics parking in main street even less parking now
Contaminated tank water
Children being exposed to faeces
Excrements on cars
Water! Tank water is not drinkable
Loss of trade - travellers have commented negatively and implied they will not stop here again.
Contaminated Tank Water

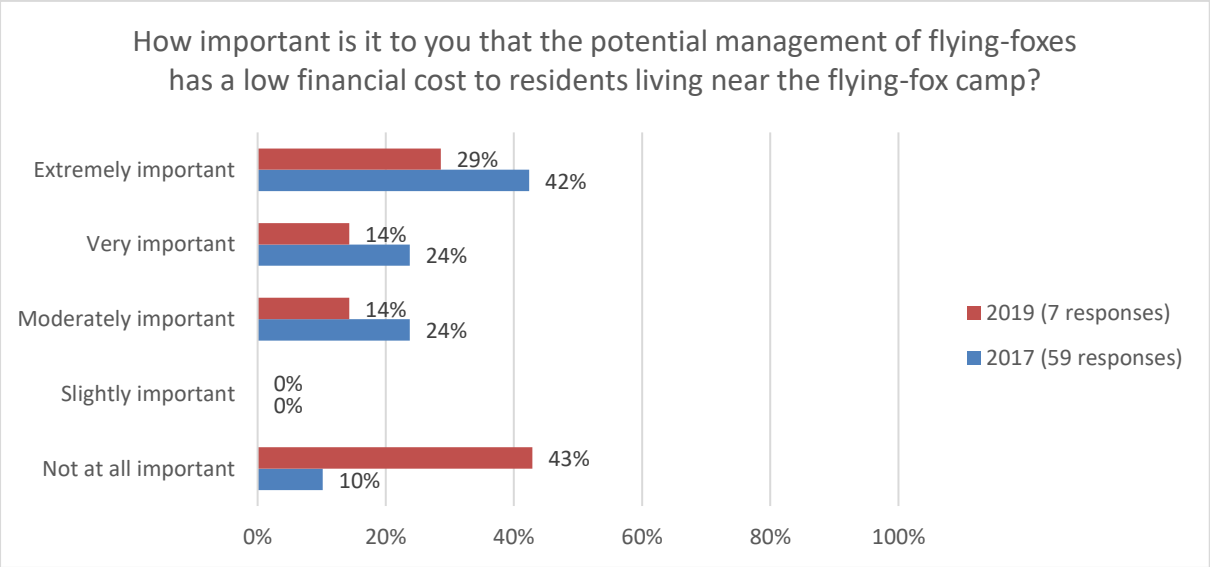
They fly over our property, and every morning our garage is covered in there s**t, all over my fences, garden hoses plants, caravan.iam so sick of it, it just stains everthing.
cost to farmers to progtect their crops
Damage to property value, ie for sale purposes and rental.
Health and well being of children
They are also at the Playgroup next to the CWA. In the shrubs at a height where our inquisitive little ones will try to touch them. And the droppings on the ground where they play.
roosting site is close to bike track used by high school stidents
Million dollar park which is not fully accessible because of a new bats problem which effects the health and economy of the Main Street that has been obviously had a lot of money spent on the Main Street and now in resent years is being ruined after a lot of improvements
Decline in people using park and playground.
It is not just the park area around the playground, it is also the area further up Blomfield St behind the Council admin building. This is the location of the larger part of the colony

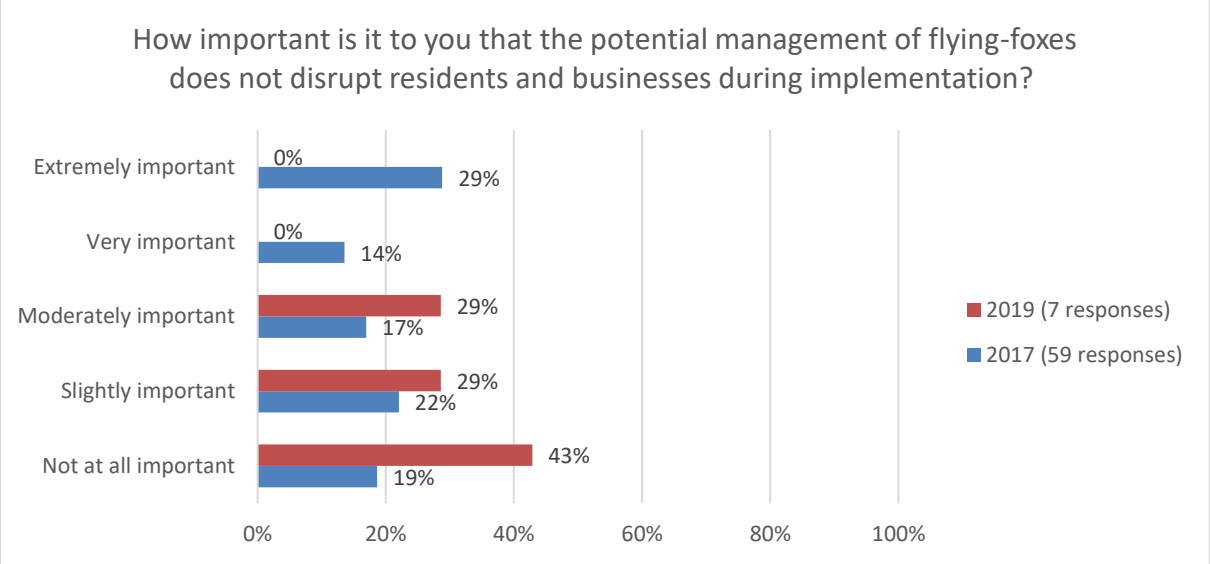


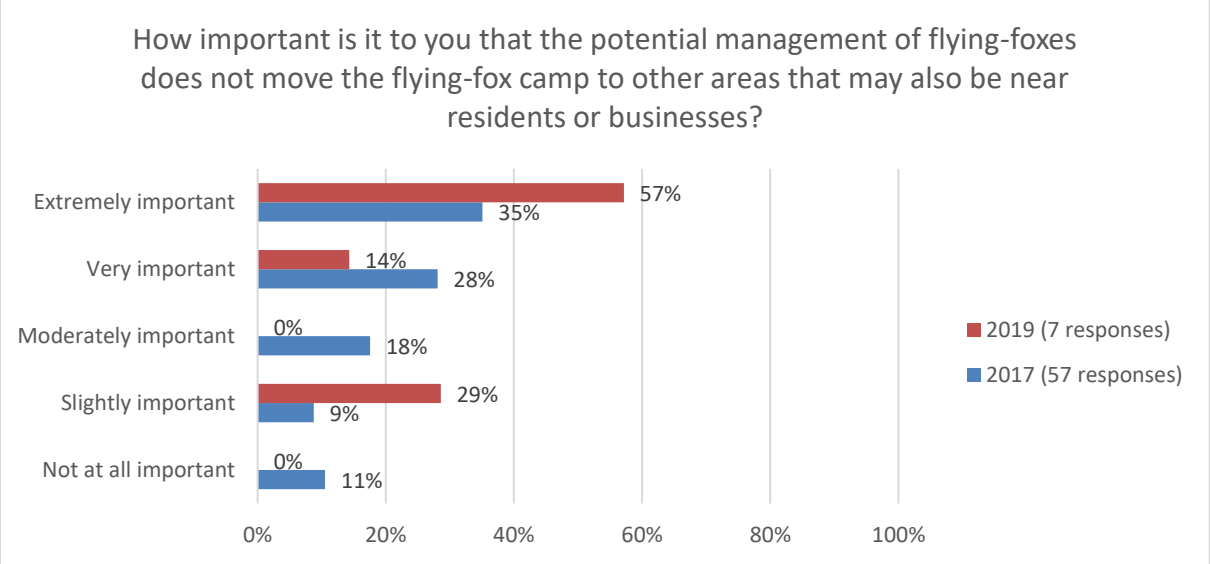
2019 survey comments
Cleaning of my cars buying water pressures to clean house garage shit in my tank and on my house,. Cleaning out tank. cover all items had to buy tarps. Electricity to run my pressure hose. Thousands
brought gErnie to clean house cars more of my water used electricity to run water pressure and my pump have to clean out my tank water pressure gerni two hundred dollars electricity for two years one thousand dollars repaint my house where s**t removed my paintwork five hundred yet to clean out tank by contractor three dollars. my time to do these extra jobs
Damage to car paintwork and lost property value off possibly close to 100%

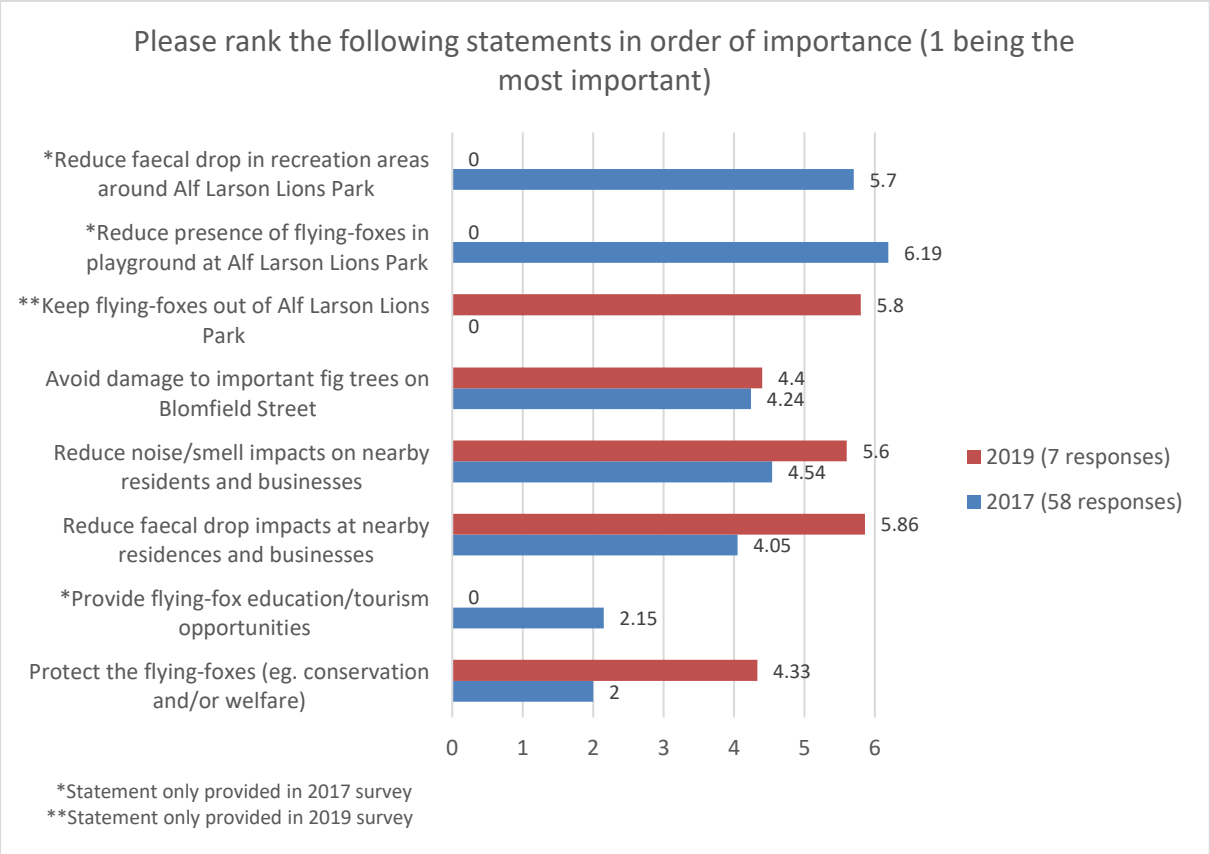
washing house & cars constantly as the s**t they drop damages paintwork which is very costly to repair. Water filter costs have increase significantly
cleaning bat s**t from my car

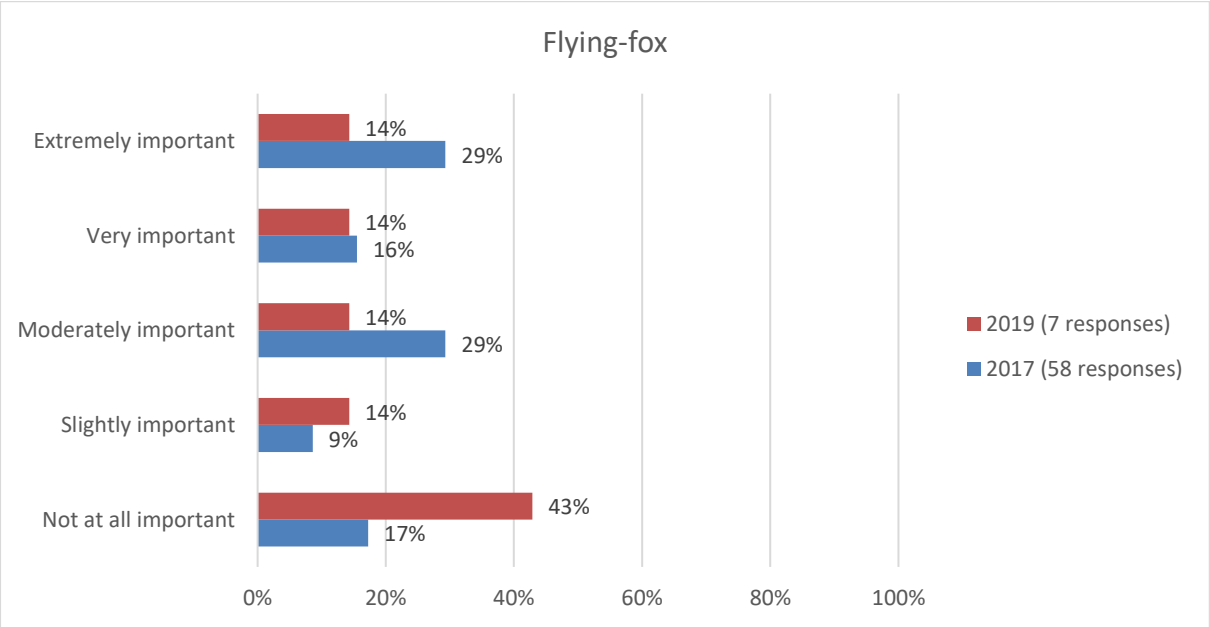
2017 survey comments
Only cost of removal of damaged trees - as a rate payer it affects me
Retrap on tank & water filter ($250 + ongoing costs)
Loss of house value
Paint damage on vehicle
purchaing water to drink, using dryer because we can't use the clothesline
Water tank, house/shed cleaning
Loss of trade (unknown value)
just a lot of work cleaning up their mess
Not as yet but I'm sure it will effect sale price of home.
Loose our bananas and pawpaws
but I do have to clean up after their mess
getting someone to come to my home who was able to climb onto the roof and clean their droppings off the solar panels
Lose of business
I've had to purchase deterrents and protecters for my fruit trees
Hose the roof and clean bats droppings off with out flushing into tank plumbing supplies
Loss of business gave me a negative income- travelers stopped for a much shorter period.
Cleaning the mess the bats make.
Could not rent house. $200 a week.

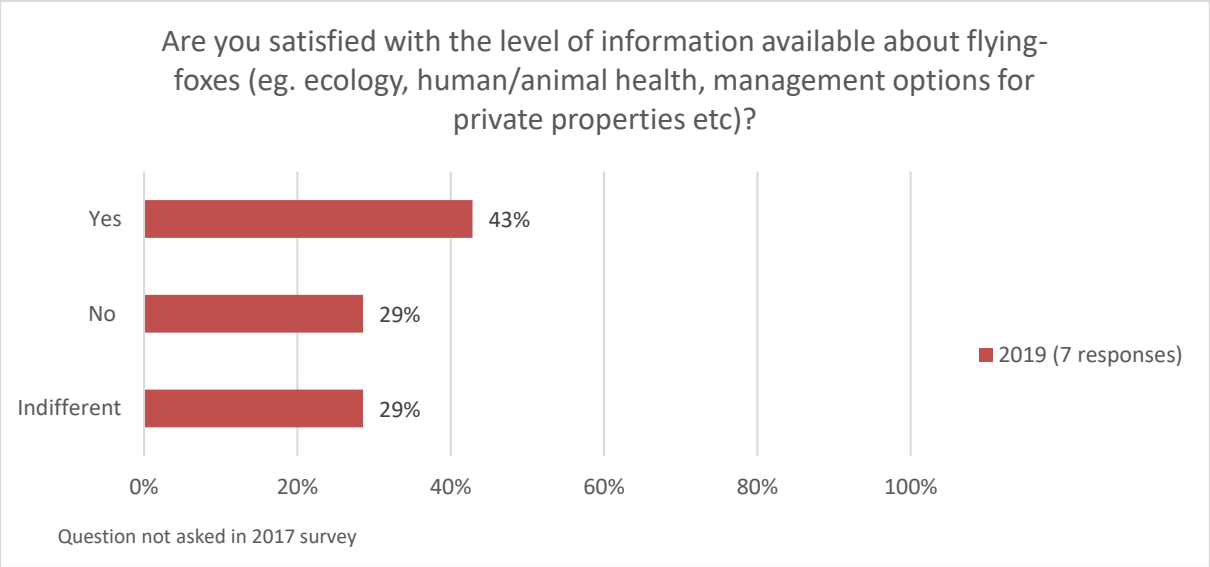

How important is it to you that the potential management of flying-foxes has a low financial cost to residents living near the flying-fox camp?
Extremely important
Very important
Moderately important
Slightly important
Not at all important
29%
42%
14%
24%
14%
24%
0%
0%
43%
10%
0%
20%
40%
60%
80%
100%
2019 (7 responses)
2017 (59 responses)

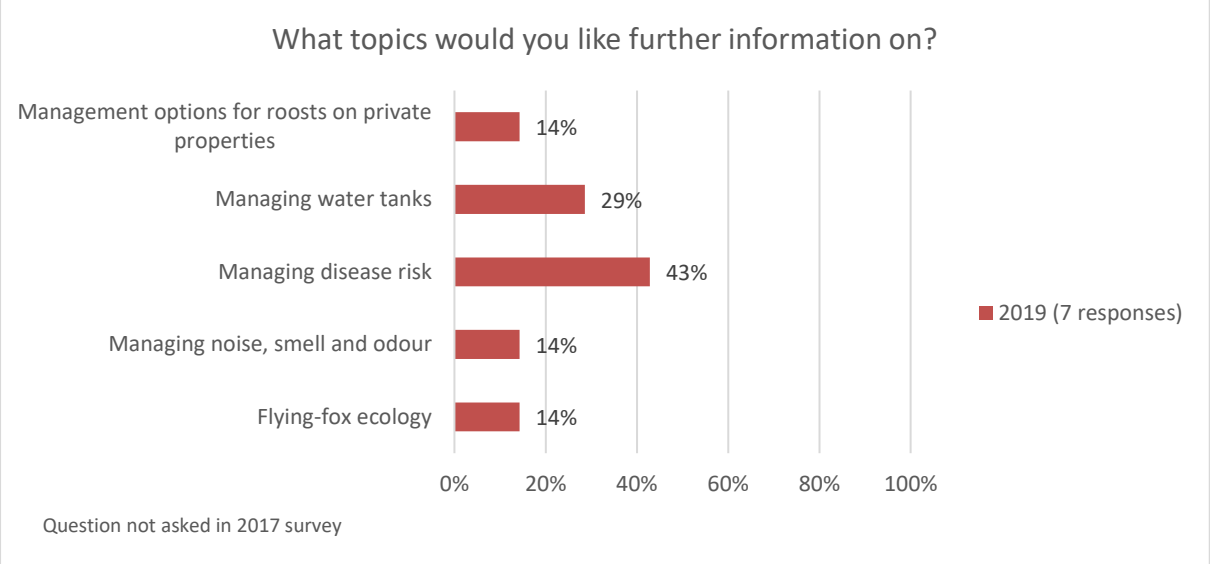

How important is it to you that the potential management of flying-foxes does not disrupt residents and businesses during implementation?
Extremely important
Very important
Moderately important
Slightly important
Not at all important
0%
29%
0%
14%
29%
17%
29%
22%
43%
19%
0%
20%
40%
60%
80%
100%
2019 (7 responses)
2017 (59 responses)


How important is it to you that the potential management of flying-foxes does not move the flying-fox camp to other areas that may also be near residents or businesses?
Extremely important
Very important
Moderately important
Slightly important
Not at all important
57%
35%
14%
28%
0%
18%
29%
9%
0%
11%
0%
20%
40%
60%
80%
100%
2019 (7 responses)
2017 (57 responses)

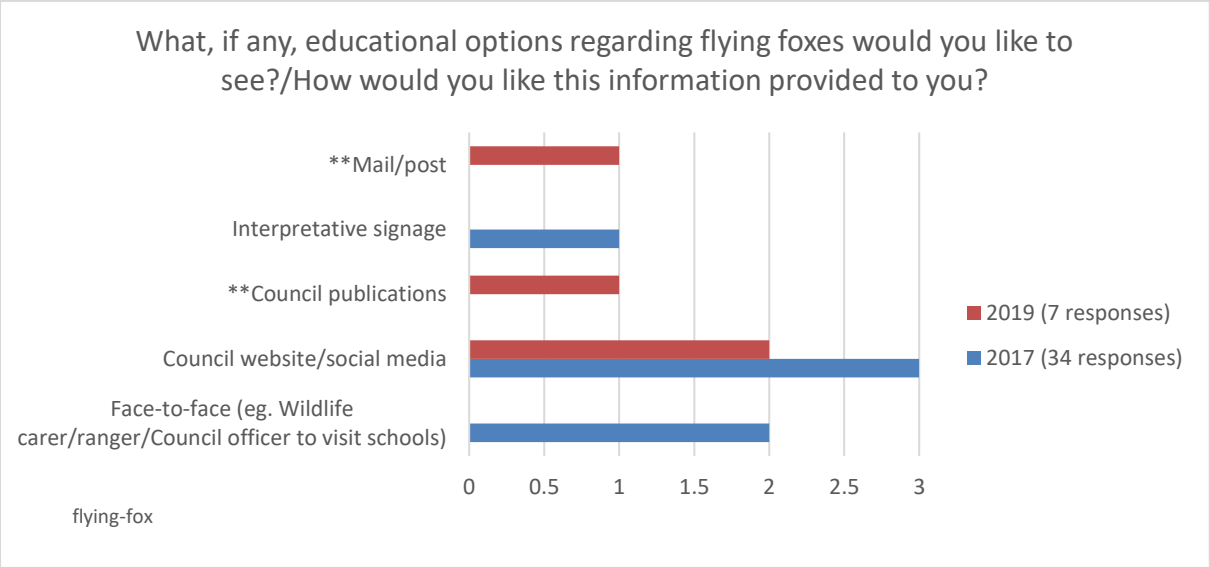

Please rank the following statements in order of importance (1 being the most important)
*Reduce faecal drop in recreation areas around Alf Larson Lions Park
0
5.7
*Reduce presence of flying-foxes in playground at Alf Larson Lions Park
0
6.19
**Keep flying-foxes out of Alf Larson Lions Park
5.8
0
Avoid damage to important fig trees on Blomfield Street
4.4
4.24
Reduce noise/smell impacts on nearby residents and businesses
5.6
4.54
Reduce faecal drop impacts at nearby residences and businesses
5.86
4.05
*Provide flying-fox education/tourism opportunities
0
2.15
Protect the flying-foxes (eg. conservation and/or welfare)
4.33
2
0 1 2 3 4 5 6
2019 (7 responses)
2017 (58 responses)
*Statement only provided in 2017 survey
**Statement only provided in 2019 survey


Flying-fox
Extremely important
14%
29%
Very important
14%
16%
Moderately important
14%
29%
Slightly important
14%
9%
Not at all important
43%
17%
0% 20% 40% 60% 80% 100%
2019 (7 responses)
2017 (58 responses)

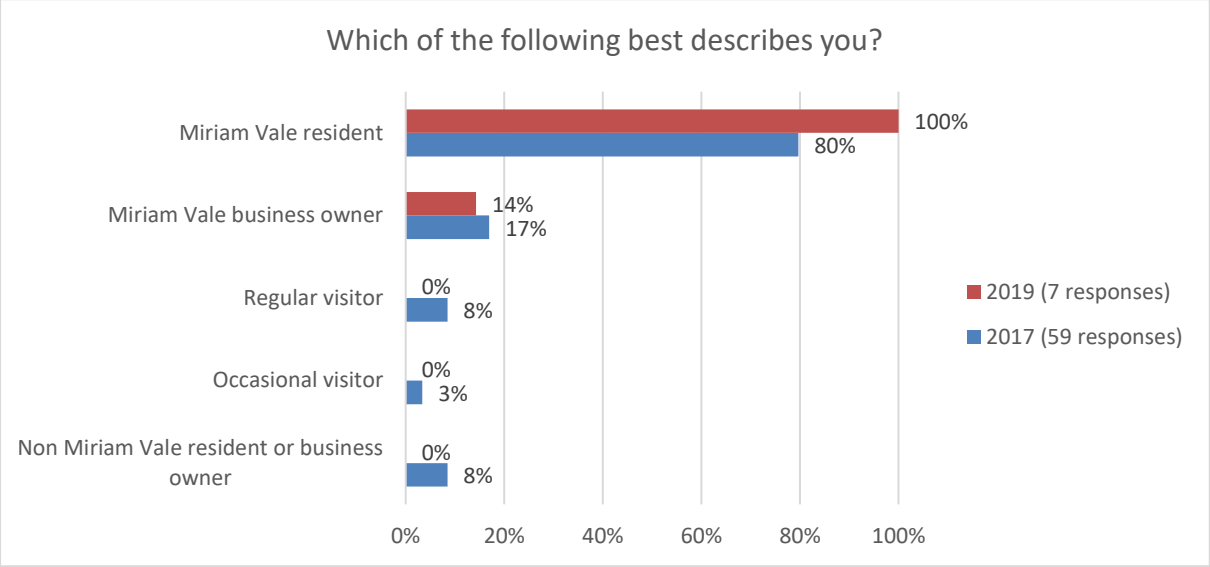


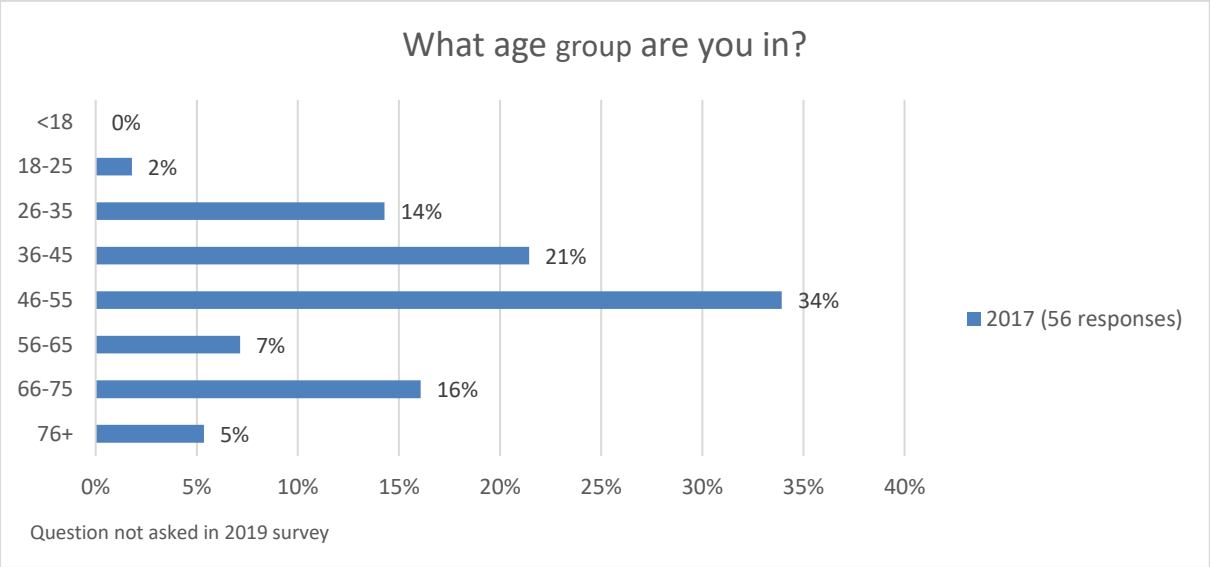


2019 survey comments
When u are going to remove them
How the Council plan to get the things out of the town area.
We have all the information. We just want them gone
none I have the information.... 4 years worth



2019 survey comments
email
I want the councilors to come and live with the bats/foxes for 3 months full time so they can get there own personal experience and information for themselves





Do you have any additional comments, questions or concerns you would like to share?

2019 survey comments
Move the flying-fox away from people.
If I had the road beside me and not the trees I would not have these creatures on top of me
Please do something other that pretentious statements and waffle.
Yes. Why is it that the information sessions & management sessions take place when most residents are either still at work or travellling from work. Just because you only work business hours doe not mean that we do. 12 hour shifts away from the town effected is the usual. We are voters & live in this shire so technically you are taking money from our pockets and not delivering what we pay for. These animals should be relocated to an area outside the city limits where they can live happily ever after. Spend anymore money on training will be considered usless. Just move them.
council wear protective suits when they hose off flying fox waste yet the council expects residents to allow their children to play there. Yet they tell us there is no risk so why the protective clothing to clean up after the bats

2017 survey comments
Extermination
The flying foxes have been here seasonally for the last 2-3 years. During early 2017 the sheer number of them was astounding. The smell and noise was unbelievable. The smell was so bad it seemed as if you could taste it in your mouth. Surely there is some sort of preventative action that can be taken before they come back to stop them settling here again. It is not just the tree in the playground. The largest population was located in the trees across the road from the council admin building, ranging across the railway line and in Chapman Street.

Awareness of the problem won't solve the issue that affects the whole town. The noise and smell is horrendous. Having to hear and smell it for 6 months drives everyone crazy. The cost to the town in terms of people stopping is terrible. They not only effect the park, but there is thousands that roost across from the council building and in Chapman Street. They affect everyone, both residents and tourists.
People will not stop in the town when the flying foxes move in. The smell, noise, and bat pooh is not an inviting image! Council has spent and advertised the beautiful park (including exercise equipment) which cannot be used. Tourist do not come. Would you let your child play in bat pooh? I would not! People cannot walk dogs as dogs eat everything and anything! Yummy bit of bat pooh! Next thing Rover is sick, gives the whole family loving licks, the family is ill. Powers to be say this cannot happen - like to see them out there frolicking under the trees with pooh and dead bats! The town uses rain water for drinking, on most houses another point!
Low impact removal Spray water - sprinker in tree in the park like Mataranka hat pods. low impact on residents low cost effective removal not harming flying foxes.
Q15. Humane methods to remove the problem. The damage they do to trees in the bush is bad enough, but in park areas in town, particularly where children are involved, it's disgusting. One tree they were roosting in is used for climbing at times! The trees in the park have either cost money or are heritage listed - doesn't this entitle them to some protection!
I like flying foxes and I understand their importance to our environment is critical. however I can understand also that other residents don't see things the way I do.
Collective community dispersal upon roosting. High pitch noise system, sirens
I don't want the flying foxes harmed but do believe that they should not be allowed to breed where there is no natural predators or where they can poo on children play on playground equipment
Keep them out of town area and residential area (use some common sense)
Please get rid of them. they are affecting our town, health and park.
Other tourist towns in QLD have participated in programs to move the Flying Fox colonies on, so it can be done.
currently having to allow time every morning to wash vehicle due to the bats excrement and fear of further damage to paint
We want them gone!!
Sprinklers, high pitch noise systems, lights.
they are just a stinking dirty pest
Please eradicate or relocate them away from affected farmers, residents, park users, playgrounds
Cull the flying foxes and remove them from the populated areas and from local fruit growing farms
Think of us please
They need to go

There are thousands of flying foxes that roost in the trees across from the Council admin building, not just in the park. The noise & smell is horrendous to the point where you can't walk past without holding your breath
stop beating around the bush just drive them out of town they are ruining our town people first not bats.
Moving the flying foxes on will not hurt them nor cost the rate payers a thing.
Commecialise the flying foxes whilst they are there. Eco tours or chats. If you cant get rid of them, make the most of them.
Bats have an important role to play, however they should not be allowed to roost within 500m of residential, commercial and industrial areas
Educate the community as to potential benefits of the colony to the community. Promoting flying fox presence as an honour - an opportunity to educate travellers (interactive information installation) about their ecosystem services, life cycles and habits, and potential health risks. Associated marketing and merchandise. It is a seasonal inconvenience which can be turned into a positive with a change of attitude. I am totally against relocation.
The health of the families in this community is at risk and the town has gone through a major facelift (park improvements) which has a massive cost to rate payers in this region And this has a impact on the future of the town as a popular pass through town and tourist site
They need to be relocated if they get as bad as they were before it's going to impact our town again and it's hard enough without their help
The flying foxes are noisy and extremely smelly and they make a horrible mess.They roost right in the kids playground in our Main Street and make the playground a total mess and people definitely don't want to take there kids there. Not only do they effect the park but when they move morning and night the fly directly over our home, making a mess on our houseand even stop to stay in our trees. I really hope council moves them on because they affect our town, not just the Main Street.
We do not want the bats taking over Miriam Vale like they did last year and early this year
Get rid of them at any cost.

Appendix 6 – Community workshop results

A two hour community workshop was facilitated by Ecosure on 24 August 2017 during the development of this FFMP. The workshop was attended by 26 members of the community as well as Council staff and Councillors. The audience were presented information on flying-fox ecology, legislation, roost management techniques and a number of flying-fox management case studies. Attendees were invited to share their experiences and impacts associated with flying-foxes roosting and forging in Miriam Vale, and offer suggestions for resolving issues. Table 9 provides a summary of the comments and suggestions offered during the workshop.

Table 9 Community experiences regarding flying-foxes received in 2017 workshop

Stakeholder	Comment/suggestion
CWA member	Faeces on building, paint peeling off, on-going expenses
Coffee shop owner	Has received complaints from customers about faeces dropping on people, flying-foxes falling in playground a risk to children
Lifeline	Flying-foxes in palms outside building – not against removal of palms
Community member	Is it possible to net the roost/creche tree?
Community member	Concern about faeces, noise and damage to fruit trees
Business owner	Worried about effect of flying-foxes on their business
Community member	Finds flying-foxes fascinating. Noticed that since crows are no longer in park, flying-foxes have increased. Has extra lighting in park provided more suitable conditions for flying-foxes?
Community member	Too many bats along Tranquillity walk.
Community member	Would predators like goannas, birds of prey, ants deter flying-foxes from the fig tree?
Community member	Flying-foxes leave when it gets cold – could cold air be blown on the roost with large industrial fans?
Community member	Flying-foxes are usually present in Miriam Vale when wind is predominantly south easterly

The community was prompted for preferred management actions in Miriam Vale and offered the following suggestions:

- Alf Larson Lions Park and Blomfield Street roost is a priority.
- Tranquillity walk and cemetery is a preferred option to nudge flying-foxes to.
- Preferred receiving sites from a dispersal action are across railway line to the north-east.
- That Council continue to advocate, where possible (eg. LGAQ meetings), for the State to take more responsibility for flying-fox management.

Appendix 7 – Summary of dispersals in Australia 1990 to 2013

Roberts and Eby (2013) summarised 17 known flying-fox dispersals between 1990 and 2013, and made the following conclusions:

In all cases, dispersed animals did not abandon the local area[3].

1. In 16 of the 17 cases, dispersals did not reduce the number of flying-foxes in the local area.
2. Dispersed animals did not move far (in approx. 63% of cases the animals only moved <600 m from the original site, contingent on the distribution of available vegetation). In 85% of cases, new camps were established nearby.
3. In all cases, it was not possible to predict where replacement camps would form.
4. Conflict was often not resolved. In 71% of cases conflict was still being reported either at the original site or within the local area years after the initial dispersal actions.
5. Repeat dispersal actions were generally required (all cases except where extensive vegetation removal occurred).
6. The financial costs of all dispersal attempts were high, ranging from tens of thousands of dollars for vegetation removal to hundreds of thousands for active dispersals (e.g. using noise, smoke, etc.).

Ecosure, in collaboration with a Griffith University Industry Affiliates Program student, researched outcomes of management in Queensland between November 2013 and November 2014 (the first year since the current Queensland state flying-fox management framework was adopted on 29 November 2013). An overview of findings[4] is summarised below.

There were attempts to disperse 25 separate roosts in Queensland (compared with nine roosts between 1990 and June 2013 analysed in Roberts and Eby (2013)). Compared with the historical average (less than 0.4 roosts/year) the number of roosts dispersed in the year since the Code was introduced has increased by 6250%.

Dispersal methods included fog[5], birdfrite, lights, noise, physical deterrents, smoke, extensive vegetation modification, water (including cannons), paintball guns and helicopters.

The most common dispersal methods were extensive vegetation modification alone and extensive vegetation modification combined with other methods.

In nine of the 24 roosts dispersed, dispersal actions did not reduce the number of flying-foxes in the LGA.

In all cases it was not possible to predict where new roosts would form.

When flying-foxes were dispersed, they did not move further than 6 km away.

As at November 2014 repeat actions had already been required in 18 cases.

[3] Local area is defined as the area within a 20 km radius of the original site = typical feeding area of a flying-fox.

[4] This was based on responses to questionnaires sent to councils; some did not respond and some omitted responses to some questions.

[5] Fog refers to artificial smoke or vapours generated by smoke/fog machines. Many chemical substances used to generate smoke/fog in these machines are considered toxic.

Conflict for the council and community was resolved in 60% of cases, but with many councils stating that they feel this resolution is only temporary.

The financial costs of all dispersal attempts, regardless of methods used were considerable, ranging from $7500 to more than $400,000 (with costs ongoing).