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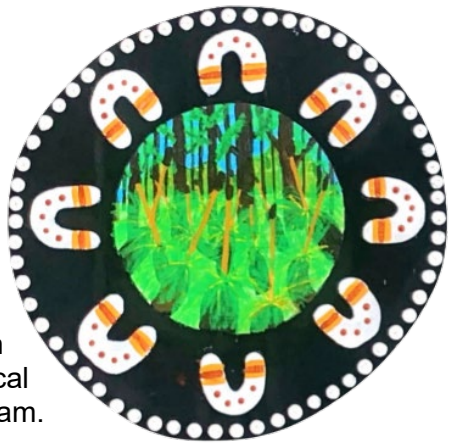
WARATAH RESERVE TEWANTIN FLYING-FOX MANAGEMENT PLAN

October 2023

NOOSA SHIRE COUNCIL

Acknowledgements



Ecosure acknowledge the Traditional Custodians of the lands and waters where we work. We pay deep respect to Elders past and present who hold the Songlines and Dreaming of this Country. We honour and support the continuation of educational, cultural and spiritual customs of First Nations peoples.

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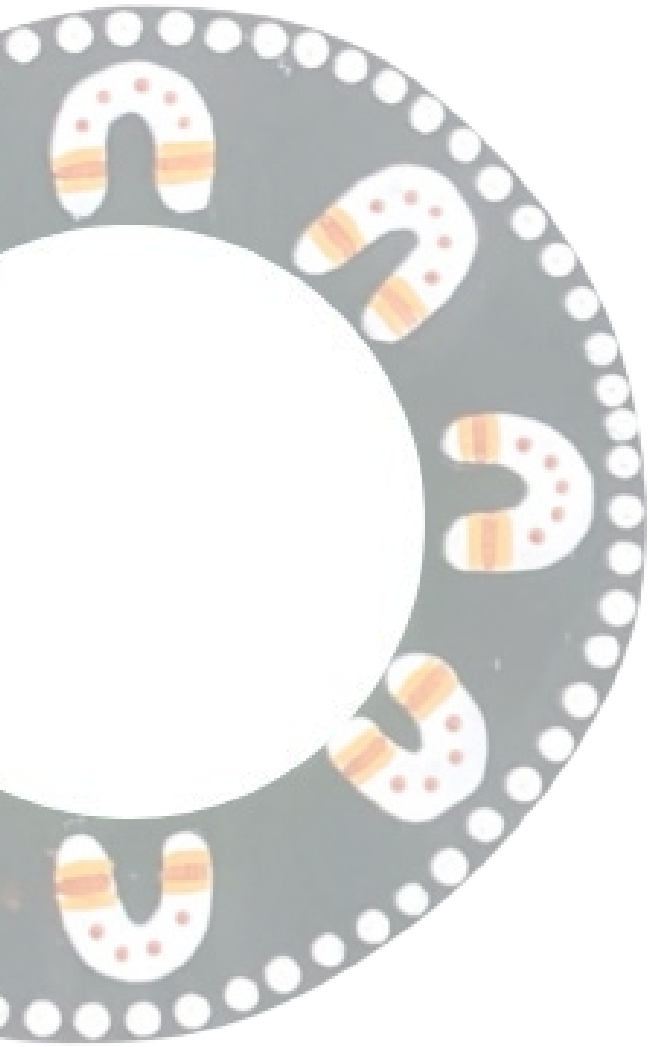

Acronyms and abbreviations

ACP Act	*Animal Care and Protection Act 2001* (Queensland)
BFF	Black flying-fox (*Pteropus alecto*)
Council	Noosa Shire Council
DES	Department of Environment and Science (Queensland)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
FFMP	Waratah Reserve Flying-fox Management Plan
FFRMP	Flying-fox roost management permit
GHFF	Grey-headed flying-fox (*Pteropus poliocephalus*)
HSE	Heat stress event
LGA	Local Government Area
Low Impact COP	*Code of Practice – Low impact activities affecting flying-fox roosts*
LRFF	Little red flying-fox (*Pteropus scapulatus*)
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992* (Queensland)
NC Plants Regulation	Nature Conservation (Plants) Regulation 2020 (Queensland)
the Regulation	Planning Regulation 2017 (Queensland)
the Reserve	Waratah Reserve, Tewantin
Roost Management COP	*Code of Practice – Ecologically sustainable management of flying-fox roosts*
SoMI	Statement of Management Intent
UFFMA	Urban Flying-fox Management Area
VM Act	*Vegetation Management Act 1999* (Queensland)

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1 Introduction

1.1 Background

Residents surrounding Waratah Reserve (the Reserve), Tewantin have been experiencing conflict associated with flying-foxes at the Reserve over the past 12 months. Conflict was particularly notable during a large influx of little red flying-foxes (*Pteropus scapulatus*; LRFF) in February and March 2023. As a result, Noosa Shire Council (Council) has engaged Ecosure to develop a management plan for the Waratah Reserve flying-fox roost. In accordance with Council's Statement of Management Intent (SoMI), this Waratah Reserve Flying-fox Management Plan (FFMP) aims to mitigate community conflict at the site, while ensuring the conservation of flying-foxes and the critical ecosystem services they provide.

1.2 Legislation

There are four species of flying-fox found on mainland Australia. Three of these four species have been known to occur at different times within the Noosa Shire Council Local Government Area (LGA), including the LRFF, black flying-fox (*Pteropus alecto*; BFF) and grey-headed flying-fox (*P. poliocephalus*; GHFF). As native animals, all flying-foxes and their roost habitat are protected under State legislation. The GHFF is a threatened species and is therefore also protected under Commonwealth legislation. An overview of relevant Commonwealth and State legislation are provided below, with further detail provided in Appendix 1.

Commonwealth

The Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) provides protection for the environment, specifically Matters of National Environmental Significance (MNES). A referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is required under the EPBC Act for any action that is likely to significantly impact on an MNES. The GHFF is listed as a vulnerable species under the EPBC Act, meaning it is classified as an MNES.

State

All flying-foxes and their roost habitat are protected under the Queensland *Nature Conservation Act 1992* (NC Act). Under this legislation, administered by the Department of Environment and Science (DES), it is an offence to harm the animals, or disturb flying-foxes from daytime roosts[1] without approval.

The Reserve roost is located within an Urban Flying-fox Management Area (UFFMA). As such, Council has an 'as-of-right' authority to undertake roost management activities in accordance with the *Code of Practice – Ecologically sustainable management of flying-fox roosts* (Roost Management COP) (DES 2020a). Council must notify the DES prior to any planned management actions being undertaken. Notification is by means of a completed 'flying-fox management notification form' via the DES website and submitted at least two business days prior to commencing any management actions. Notification is valid for all notified management actions for a four-week timeframe.

Anyone other than local governments looking to undertake any management actions directed

[1] There are legislative differences between a 'roost', where breeding has been confirmed, and a daytime camp where breeding has not occurred, as outlined in Appendix 1. Waratah Reserve is protected as a confirmed 'roost' and this will be the main collective term used throughout.

at roosting flying-foxes, or likely to disturb roosting flying-foxes, is required to apply for a Flying-Fox Roost Management Permit (FFRMP). Certain low impact activities (e.g. mowing, minor tree trimming) do not require approval if undertaken in accordance with the *Code of Practice – Low impact activities affecting flying-fox roosts* (Low Impact COP) (DES 2020b).

In addition, the Queensland *Animal Care and Protection Act 2001* (ACP Act) applies to all living vertebrate animals, including wildlife. To comply with the ACP Act, flying-fox management actions must not cause mental or physical suffering, pain, or distress to these animals.

Native vegetation is also protected under various legislation, including the NC Act, Nature Conservation (Plants) Regulation 2020 (NC Plants Regulation), and in some cases the *Vegetation Management Act 1999* (VM Act) and *Planning Act 2016*. Clearing of vegetation in core koala habitat and/or a koala priority area is prohibited, with few exemptions (see Schedule 21 and 24 of the Planning Regulation 2017 [the Regulation] for exempted works). Clearing of vegetation in a high-risk area under the NC Plants Regulation requires a protected plant survey to be undertaken. Permits/approvals may be required for trimming or clearing protected habitat/plants.

Local

The Flying-fox Roost Management Guideline (DES 2020c) has been developed to provide local government with additional information that may assist decision making and management of flying-fox roosts. Furthermore, local governments are required to apply for a FFRMP for management options not specified in the Roost Management COP.

Council has developed a SoMI to articulate the approach that will be taken to manage flying-fox roosts in the Noosa LGA. The intent is to manage flying-fox roosts on Council-owned or managed land. Council does not undertake management actions on private land, however, may provide advice and assistance to residents and landowners affected by a flying-fox roost. Where a roost crosses Council and private land, Council will work cooperatively with landowners to develop and implement suitable mitigation actions.

The Reserve is classified as an ‘Area of Biodiversity Significance’ under the Noosa Plan 2020 (Noosa Shire Council 2020) and therefore is afforded a higher level of protection under local policy.

1.3 Community engagement

Council has undertaken ongoing consultation with affected residents during and after the LRFF influx.

Engagement activities completed during the LRFF influx included:

- Regular written updates to residents through letter box drops including information about the importance of flying foxes, health advice and information on how they could access Council’s flying-fox subsidy program during the influx.
- Face-to-face meeting with residents of Hibiscus Noosa Outlook Retirement Village, as well as representatives from Council’s Environmental Services and Public Health Teams and Queensland Health.
- Responding directly to emails and phone calls, as well as processing subsidy requests.

Engagement activities as part of the draft FFMP will include:

- Face-to-face meetings with key representatives from Keyton Retirement Villages.
- Face-to-face meetings with residents of Hibiscus Noosa Outlook Retirement Village.
- Face-to-face meetings with private residents adjacent to the Reserve.
- Online surveys to seek feedback on the FFMP.

These engagement activities prior to finalisation of the FFMP will allow stakeholders to ask questions and provide feedback regarding proposed actions within the FFMP.

2 Waratah Reserve flying-fox roost

2.1 Site location and description

The Reserve roost is located primarily on Council-managed land (Lot/Plan 1RRP889434) located in Tewantin. The Reserve is bordered to the north by houses along Waratah Close and Maple Avenue, while the south of the Reserve is bordered by the Hibiscus Noosa Outlook Retirement Village (Figure 1).

During the influx of 67,500 LRFF in February and March 2023, some of the LRFF were roosting in trees bordering/on private properties.

2.1.1 Ecological and cultural values

The Reserve is mapped as non-remnant vegetation and is dominated by mostly paperbark trees (*Melaleuca quinquenervia*). The Reserve is mapped as core koala habitat. Vegetation removal (with a few exemptions including essential maintenance and firebreak maintenance) in core koala habitat is prohibited under State legislation and requires an approval. The Reserve is also mapped as a high-risk area for protected plants under the NC Plants Regulation, which requires a flora survey report prior to vegetation clearing, unless the clearing meets the general exemption requirements. There is a mapped vegetation management watercourse/drainage feature that runs through the Reserve. Vegetation management within a certain distance of a watercourse/drainage feature is prohibited depending on the stream order. Council should liaise with the Department of Resources if vegetation management outside of exempt works is proposed.

The Reserve is mapped as an 'Area of Biodiversity Significance' under the Noosa Plan 2020. Council is committed to the protection of ecologically important areas such as the Reserve, given the increasing threats of climate change, weeds and invasive species, vegetation clearing, and habitat fragmentation.

Two threatened fauna species were recorded within 1 km of the roost on the WildNet database (of confirmed records since 1980) including the wallum froglet (*Crinia tinnula*) and glossy black cockatoo (*Calyptorhynchus lathami*) (WildNet 2023). Four special least concern plant species were also recorded, including pygmy sundew (*Drosera pygmaea*), branched comb fern (*Schizaea dichotoma*), swamp grasstree (*Xanthorrhoea fulva*) and bottlebrush grass tree (*Xanthorrhoea macronema*) (WildNet 2023).

The Reserve is deemed to be a 'Moderate' risk in Council's Bushland Reserve Strategic Fire Management Plan and 'low risk' under State Potential Bushfire Intensity mapping. For these reasons, combined with the Reserve being along a drainage line and the understorey consisting of wet vegetation, the Reserve does not require a fire break.

There were no Cultural Heritage Management Plans, Designated Landscape Areas, Registered Cultural Heritage Study Areas or National Heritage Areas (Indigenous values) recorded at the Reserve (DATSIP 2023).

Any management undertaken must consider these values and relevant legislative requirements.

2.2 Flying-fox occupancy

Council understands through anecdotal information from the local community that the Reserve has been occupied by BFF and GHFF sporadically for approximately the last 10 years. No regular monitoring at the Reserve occurred prior to November 2022, however Council began monitoring the site regularly in November 2022 based on community reports that flying-foxes were present at the site. Typically numbers of BFF and GHFF present within the Reserve are below 1,000 individuals. Since November 2022, residents have noticed a slight increase in BFF and GHFF with numbers reaching approximately 1,000 more consistently. There has been one recorded influx of 67,500 LRFF during February and March 2023, where they naturally vacated the site on the 21st of March. The roost extent shown in Figure 1 represents the maximum extent during the LRFF influx in February and March 2023.

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. BFF and GHFF also move regularly in response to climatic variability and the flowering and fruiting patterns of their preferred food plants. Feeding commonly occurs within 20-50 km of the roost site (Markus and Hall 2004, McConkey et al. 2012). Large numbers of roosting flying-foxes can damage vegetation, however, most native vegetation is resilient and generally recovers well (e.g. casuarina and eucalypts), and flying-foxes naturally move within and between roosting sites allowing vegetation to recover.

2.3 Community impacts

The Reserve roost is bordered by residential properties on the northern and southern boundaries. Most concerns raised by residents were in response to the LRFF influx during February and March 2023. Prior to this influx a smaller number of concerns had been raised by residents regarding increased numbers of GHFF and BFF (up to approximately 1,000 animals), however the roost was not considered high conflict.

Impacts cited by surrounding residents include:

- noise
- smell, with some residents unable to close windows in summer due to lack of air conditioning
- faecal drop and associated financial impacts on properties/assets
- health concerns associated with using pools/water quality concerns, flying-foxes flying over houses/under verandas and potential for children and pets to find dead/injured flying-foxes and being scratched/bitten
- being unable to utilise their backyards, especially during dusk fly-out
- falling branches within some property boundaries due to the weight of large numbers of roosting flying-foxes
- impacts to work (when working from home), sleep and mental wellbeing
- safety of using Reserve footpaths due to potential falling branches
- dust/air quality impacts due to vegetation damage from trees with flying-foxes creating airborne contaminants

- impacts to other native fauna including birds and possums that inhabit the Reserve.

It is acknowledged that living near a flying-fox roost can also cause significant impacts on mental health. This FFMP has been developed with consideration to the impacts experienced by the surrounding community.

Figure 1: Waratah Reserve site context

Noosa Shire Council

Waratah Reserve Flying-fox Management Plan

- Watercourse
- Maximum flying-fox roost extent (March 2023)
- Core koala habitat
- High risk area for protected plants
- Property boundary

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Job number: PR7936
Revision: 1
Author: TD
Date: 30/06/2023

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Metres

GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

3 Previous management activities

Since the influx of LRFF during February and March 2023, Council has undertaken several management actions to address residents' concerns at the Reserve roost. Following a slight increase in numbers of BFF and GHFF since November 2022, in accordance with Council's SoMI, Council has been undertaking regular monitoring of the site.

During and immediately following the influx of LRFF, Council consulted with affected residents and the Hibiscus Noosa Outlook Noosa Retirement Village to understand the impacts residents were experiencing. Consultation also allowed Council to provide educational material and outline potential management options for the site. During consultation with the retirement village, Queensland Health representatives were present to provide information for residents who were concerned about the health impacts of living close to a flying-fox roost.

Vegetation management has been undertaken by Council at the Reserve both during and after the LRFF influx, including:

- immediate priority buffers created (targeting vegetation adjacent to retirement homes and primary-impacted properties along Waratah Close, trees overhanging walkways)
- vegetation trimming at the entrance of the Reserve off Waratah Close
- further buffers through vegetation trimming along roost edges adjacent to houses (areas not targeted during immediate priority buffer areas)
- vegetation removal and trimming for trees causing safety risks
- weed maintenance (primarily along pathways and along property boundaries)
- general cleaning of the Reserve including taking out woody debris, cleaning footpaths, foot bridges and railings.

Vegetation management while flying-foxes were occupying the site was conducted at night under the Low Impact COP to avoid disturbance. Residents also undertook minor trimming of trees within private property boundaries in accordance with the Low Impact COP and in accordance with Council's Tree Management Policy (provided by Council to residents).

On arrival of the significant influx of LRFF, Council sought additional budget to increase the allowance of the existing Flying-fox Subsidy Program to help reduce some of the impacts experienced by residents. Council is one of only a few south-east Queensland councils to offer a Flying-fox Subsidy Program This decision was based on the number of LRFF and characteristics of the site. Internal approval processes meant that Council could not offer the increased allowance to residents until the 3rd of March 2023. During and following the influx, Council offered several subsidies to impacted residents. This included:

- provision of odour neutralising pots to residents
- contracted high-pressure cleaning of properties
- increased subsidies up to $300 per eligible household towards the purchase of items or services to alleviate some of the impacts from flying-foxes.

4 Available roost management actions

Potential flying-fox impact management options (Appendix 2) have been reviewed and those deemed to be suitable for the Reserve roost are outlined below. These management actions aim to reduce impacts on residents through a combination of short-term and long-term management approaches. It should be noted that some of these actions have already taken place during and immediately following the 2023 LRFF influx (see Section 3 and Appendix 3). It also must be noted that given the width of the Reserve (35 m wide in most areas), some management actions are not suitable for the site (such as canopy-mounted sprinklers and wide scale nudging/dispersal).

This FFMP is written to outline staged management actions Council can consider for potential future influxes. Section 5 provides a management trigger table outlining management actions that Council can consider for potential future influxes at the Reserve, with consideration to roost dynamics.

As stated within Council's SoMI, Council does not undertake management actions on private land, however, is committed to providing advice and assistance to landholders affected by a flying-fox roost. Where a roost crosses Council and non-Council land (as was the case when LRFF were temporarily roosting on private property), Council will work cooperatively with affected community to develop mitigation actions.

Note all management actions need to comply with relevant State and Commonwealth legislation and some may require approvals (as outlined in Section 1.2, Table 1 and Appendix 1).

4.1 Short-term roost management actions

Management actions have been separated into a preferred hierarchical approach beginning with lower forms of intervention and progressing if required, however Council may choose to implement in an alternative order as needed.

4.1.1 Monitoring

Monitoring should always be the first stage when responding to resident concerns to determine what management actions (if any) may be required. Monitoring will be undertaken regularly, especially during an influx (e.g. monthly when the roost is present in baseline numbers and increased to fortnightly or weekly when roosting in larger numbers). During monitoring, data collected should include:

- number and species of flying-foxes present
- current roost extent (GPS coordinates)
- breeding status
- general behavioural observations
- impacts noticed at the site and specific properties which may be affected (e.g., tree damage, excessive odour).

4.1.2 Fact sheet for residents

A fact sheet may be developed for residents outlining general information about flying-foxes, including impact mitigation options available at a property level and corresponding legislative requirements. Additional fact sheets could provide information on flying-fox ecology and behaviour, which may assist residents to understand when and why they may experience different impacts (e.g. increasing noise impacts during hot weather, increased odour impacts during the breeding season, when influxes may be expected etc.). Information about foraging plant species could also be provided to allow residents to make informed decisions on plant species to avoid planting around their homes that may attract foraging flying-foxes.

4.1.3 Consultation

Council will consult with primary-impacted resident/s (e.g. via house visit, phone call, email, letter drop), especially residents where flying-foxes are roosting on, or directly adjacent to their property. The level of consultation is highly dependent on roost dynamics (number, extent etc.) and the associated level of conflict. Consultation provides an opportunity for residents to share their experiences/concerns regarding the roost and how they are being impacted. This also allows Council to inform residents of management options available and/or planned actions (where relevant) to help alleviate community concerns.

Council will directly consult with the Hibiscus Noosa Outlook Retirement Village management staff who can relay information to the retirement village residents and consult with primary-impacted residents outside of the retirement village, especially during large influxes.

Consultation sessions may involve Councillors and external professionals such as Queensland Health officers, flying-fox experts, etc.

4.1.4 Temporary signage

Council will consider installation of temporary interpretive signage at high-trafficked areas in the Reserve (e.g. at entrance points) to convey key flying-fox information and promote conservation. Signage could include information such as flying-fox ecology and human/animal health information. Signage can increase community awareness and help convey that influxes are variable throughout the seasons and large influxes are temporary.

Temporary signage will also be used if the Reserve requires closure and conveys that the community should not enter due to safety concerns such as falling branches (see below).

4.1.5 Temporary Reserve closure

If warranted, Council will consider closing the Reserve to public access. This should be implemented if there is a significant safety risk of falling branches or during a heat stress event (HSE). Council should erect temporary closure signs and barriers to block access at Reserve entrance points. Council should also cease any regular maintenance activities within or adjacent to the park (e.g. scheduled mowing) in order to minimise disturbance to roosting flying-foxes.

4.1.6 Indoor odour neutralising pots

Odour neutralising systems (which modify odour-causing chemicals at the molecular level rather than just masking them) are commonly used in contexts such as waste management, food processing, and water treatment. They have the potential to be a powerful tool for managing odour impacts associated with flying-foxes. A Hostogel™ pot containing a gel-based formula has been trialled for neutralising indoor odour. These are inexpensive, only require replacement every few months, and may be sufficient to mitigate odour impacts in houses affected by flying-fox roosts. Initial results from a trial suggest there may be a positive localised effect in reducing flying-fox odour within homes (Ecosure 2021). This option may be useful for affected residents, as residents could choose whether they wish to have a gel-pot in their living space and can simply put the lid back on the pot when the odour is not impacting on them. If residents rely on keeping windows open for airflow in warmer months, this may not be a suitable option for minimising odour.

During influxes, affected residents may be supplied with Hostogel™ pots from Council under the flying-fox subsidy program subject to supplier availability.

4.1.7 Buffers through understorey weed management

Where flying-foxes are roosting in undesirable areas, adjacent to or over property boundaries, and/or overhanging reserve pathways, Council can consider undertaking understorey weed management in the buffer areas surrounding the roost with the aim of creating less desirable roosting conditions close to private properties and public footpaths. This understorey weed removal should aim to establish a minimum of a 2 m buffer adjacent to property boundaries and footpaths. To minimise disturbance, this should be undertaken at night if flying-foxes are present during the day and should be avoided if crèching young are present.

This option will likely only be effective if there is other suitable roosting habitat in the Reserve where flying-foxes can shift to (i.e. during a large LRFF influx, this will likely not be effective in providing a buffer if all available roosting habitat is occupied). This option will often only be effective in areas with high weed density (although there are instances where removing only a Singapore daisy [*Sphagneticola trilobata*] understorey in a buffer has successfully shifted flying-foxes out of a buffer [Sunshine Coast Council pers. comm. 2022]. Based on contemporary knowledge of flying-fox roost preferences (while acknowledging there is much still to learn), it is assumed this effect is through altering the microclimate (e.g. humidity). As such, it will be important to manage the area with the aim of retaining altered conditions. For example, reduced humidity achieved by removing succulent weeds should be retained by avoiding succulent replacement species but rather selecting a native grass or spaced plantings with cleared areas, mulch, or stones between. This option may be considered in conjunction with further vegetation modification which may be required if understorey weed removal is unlikely to be sufficient (see Section 4.1.8).

4.1.8 Immediate tree buffer works around primary-impacted areas

In order to increase the buffer between the roost and private properties/public footpaths, Council can consider midstorey/canopy vegetation management in immediate buffer areas) where flying-foxes are currently roosting and are causing a direct impact on private properties and/or public footpaths (e.g. tree trimming/removal along property boundaries where trees are overhanging private properties, and areas with trees overhanging footpaths). Buffer works should aim to establish a minimum of a 2 m buffer adjacent to property boundaries and footpaths. Due to the narrow width of the Reserve, establishing a larger buffer is not viable. Vegetation works should be undertaken as night works if flying-foxes are present during the day and should be avoided when crèching young are present. DES notification is required for

works outside of the Low Impact COP. As of September 2023, Council has completed all priority tree buffer works based on the roost footprint extent during the LRFF influx that occurred in February and March 2023.

4.1.9 Private landholder property modification

Manipulating the existing built environment can reduce the need for roost management (e.g. vegetation modification), while reducing negative impacts experienced by residents and can increase tolerance of living close to a flying-fox roost. A range of property modifications may be considered by private landholders to reduce impacts associated with living next to a flying-fox roost.

It is understood that services (e.g. cleaning) and property modifications may be costly, therefore Council should investigate the potential for providing subsidies to residents to assist in covering some of the cost of these items (or service subsidies; see Section 4.2.1). Property modification examples are outlined below.

Property modifications that can be considered on a private property level include:

- covers for vehicles, pools/spas, and clothes lines (e.g. with carports or tarp covers)
- moving or covering eating areas (e.g. BBQs and tables) within close proximity to a roost or foraging tree to avoid contamination by flying-foxes
- installation of double-glazed windows, door seals, insulation, and/or sound-proof curtains
- purchase of white noise machine, odour-neutralising pots, fragrance dispensers and/or deodorisers
- creating visual/sound/smell barriers with fencing or hedges (plants selected for hedging should not produce edible fruit or nectar-exuding flowers, should grow in dense formation between two and five metres (Roberts 2006), or be maintained at less than five metres). Vegetation that produces fragrant flowers can assist in masking roost odour where this is of concern
- managing foraging trees (i.e. plants that produce fruit/nectar-exuding flowers) through pruning/covering with bags or wildlife friendly netting
- removing exotic trees.

4.1.10 Vegetation management of private land

Vegetation management can be undertaken by private landholders on their property to reduce suitability of trees for roosting flying-foxes under the Low Impact COP and Councils Tree Management Policy. This should be undertaken regularly while flying-foxes are not present within the Reserve, or not roosting close to proposed trimming area (e.g. > 10 m away) to avoid disturbance of the flying-foxes which may increase impacts to nearby residents. Regularly trimming and maintaining vegetation can reduce the likelihood of flying-foxes roosting in vegetation stemming from private property if an influx does occur. As outlined in the Low Impact COP, private landholders can trim up to 10% of the total canopy of roost trees in a 12-month period. Any further vegetation modification would require a FFRMP, unless it meets section 2.2.2 of the Roost Management COP, where additional work can be undertaken to protect public safety. Residents considering vegetation management of private land should

contact Council for information and advice on additional permits that may be required under the Noosa Plan 2020.

If during an influx flying-foxes begin roosting in trees stemming from private properties, residents should immediately notify Council. Residents are not permitted to undertake vegetation management while flying-foxes are roosting in the trees on their property or attempt to disturb/drive away the flying-foxes.

4.1.11 Nudging from backyards

If flying-foxes continue to roost on private properties after undertaking buffer works, the resident may consult with DES and/or Council who will provide further information about management options and the process to obtain a FFRMP. A FFRMP is required by the landholder if the landholder is wanting to undertake management activities outside of the Low Impact COP (such as nudging).

Under some circumstances, Council may consider undertaking the nudging on select private properties to move flying-foxes back into the Reserve. This should be limited to no more than two properties at any given time to limit the risk of colony splintering or nudging flying-foxes into other private properties. Nudging outlined in the Roost Management COP should be conducted using low intensity disturbance methods, such as the use of visual or noise deterrents.

As with any management action outlined in the Roost Management COP, notification to DES is required at least two business days prior to undertaking management actions.

4.1.12 Dispersal of flying-foxes

In line with Council's SoMI, dispersal is generally not supported. Dispersals are often unsuccessful in relocating flying-foxes, can increase disturbance to surrounding residents with dispersal activities commencing early in the morning, are highly expensive and resource intensive and can impact the welfare of flying-foxes.

If a roost is considered a high conflict roost, Council may consider dispersal where risk and/or significant impacts remain after all other management options are exhausted. A thorough risk management analysis must be undertaken to assess the costs and benefits of undertaking dispersal. Council should also consult with private landholders and Hibiscus Noosa Outlook Retirement Village management staff to outline the potential risks and impacts associated with dispersal. Dispersal requires notification to DES and must follow other requirements outlined in the Roost Management COP.

4.2 Post-influx management actions

4.2.1 Service subsidies

A range of service subsidies may alleviate impacts experienced by residents. Affected residents may apply for the flying-fox subsidy program within one month of flying-foxes vacating the Reserve following an influx. With consideration to Council budget and the current subsidy program, Council may consider partially or wholly subsidising services such as:

- high pressure cleaning outside areas
- roof and solar panel cleaning

- trimming and/or removing exotic trees.

Service subsidies may encourage tolerance of living near a roost, promote conservation of flying-foxes, can be undertaken quickly, will not impact the roost site, and would reduce the need for property modification. Additional items/property modifications may be considered for subsidisation as per Section 4.1.9.

4.2.2 General Reserve maintenance

Council should continue to undertake scheduled maintenance of the Reserve as per the bushland reserve tier ranking (i.e. Tier 5). Following a large influx, Council should undertake additional reserve maintenance such as removal of woody debris, pressure cleaning of footpaths and repair of any damaged infrastructure (e.g., timber bridges). Undertaking maintenance following an influx can improve reserve amenity and encourage tolerance of living near a roost.

4.2.3 Re-assessment of buffers and understorey weeds on Council managed land

Following a large influx and/or following the undertaking of vegetation management, Council should reassess the Reserve to identify additional areas where buffers could be applied (through vegetation trimming and/or understorey weed management). This should be undertaken ideally when flying-foxes are vacant, in order to proactively identify areas where buffers could be applied prior to times where influxes may be experienced (e.g. prior to winter when BFF and GHFF generally roost in the region, and prior to late spring/early summer when LRFF numbers may increase in the region). Buffer works should aim to establish a minimum of a 2 m buffer adjacent to property boundaries which may be in close proximity to future influxes based on the roost footprint of previous influxes.

4.3 Long-term roost management actions

4.3.1 Flying-fox monitoring

Council should undertake regular monitoring while flying-foxes are present at the Reserve (e.g. on monthly basis when present). If flying-foxes are present in large numbers, more regular monitoring (e.g weekly or fortnightly) should be conducted in order to maintain current knowledge of the roost size and extent (see Section5. Regular monitoring (including collecting data outlined in Section 4.1.1) allows for Council to make informed decisions on appropriate management actions and allows for an assessment on the efficacy of management actions that have been undertaken at the site.

4.3.2 Research

Council should incorporate new flying-fox management research into ongoing management where appropriate. Research can be used to identify native flowering events in the area and how this can impact flying-fox movements and roosting preferences. Research should also aim to investigate the efficacy of new, innovative management technique, such as odour-neutralising technology.

Council should continue liaising with other SEQ Councils to share ideas and discuss efficacy of trialled management options.

4.3.3 Subsidy program review

There are a number of factors to consider when establishing a subsidy program, including when to offer the subsidy (i.e. only during influxes which occur for more than four weeks) who to offer subsidies to (i.e. who is eligible, generally based on proximity to roost), what subsidies to offer (e.g. service-based or property-based), how subsidies should be offered (e.g. reimbursements for purchases or upfront funding), the amount of funding available for subsidies, and how the program will be evaluated to determine effectiveness for reducing flying-fox impacts to residents.

A review of Council's subsidy program may be undertaken to ensure efficient delivery and meaningful contributions towards short or long-term modifications. Expansion of the subsidy program could be warranted. Considerations will be made regarding the maximum amount of funding available per property. If the subsidy program warrants further expansion, the delegation of funding will be based on site-specific factors affecting residents, the availability of funding, the maximum amount of funding available per property and what modifications are most appropriate at each property.

4.3.4 Education and engagement

Education will form an important part of the ongoing management of flying-foxes to alleviate misconceptions and unnecessary fears. Council should ensure access to up-to-date information is available (with a particular focus on the low-health risk of living with flying-foxes, ecological importance of flying-foxes etc.), and residents are aware of impact mitigation options available at a property level (e.g. odour-neutralising gel pots, sound-proof curtains, white noise machines) and legislative responsibilities. Educational material should aim to cover key messages in a way that educates and informs, rather than cause alarm, e.g. emphasising that there is no risk associated with living or playing near a flying-fox roost (Queensland Government 2023) – 'no touch, no risk' (BCRQ 2019). Council should aim to provide regular and easily accessible information, through educational signs, informational sheets, updates on Council's website and school engagement programs. Community engagement will be particularly important during large influxes of flying-foxes.

4.3.4.1 School education programs

Council could consider facilitating an educational program at schools in the region. School education programs can foster a sense of appreciation for the environment and Australia's unique biodiversity from a young age and dispel misinformation regarding flying-foxes that may be present in the community. Information should include the ecological and cultural importance of flying-foxes, information on human health, and ways to coexist with flying-foxes. Educational material developed by the New South Wales Government and Hunter Joint Organisation as part of the Little Aussie Battler campaign may provide suitable material for distribution throughout the community and schools.

4.3.4.2 Community restoration activities

Council could consider facilitating community restoration activities. This may include weed management at the Reserve, planting of native plants at the Reserve to beatify the area and replace weed species, and restoration of alternative habitat sites. Though this may be cost prohibitive, Council could seek additional funding for these community restoration activities. Involving the community in caretaking for their natural areas can foster a sense of appreciation and pride in the local environment, as well as allow residents to make a meaningful contribution to their community.

4.3.5 Protocols to manage incidents

Council should respond to HSEs as per the Flying-fox Heat Event Response Guideline for south-east Queensland (Bishop et al. 2019) or consider developing a region-specific HSE document. Council should engage with wildlife carers and nearby residents and park users, particularly during potential mass mortality events such as HSEs and post-storm recovery.

4.3.6 Appropriate land use planning

Land-use planning should be used to ensure adequate distances are maintained between future residential developments and existing or historical flying-fox roosts. This may include requirements for buffers, noise attenuating building materials, covered car parks and clotheslines, bedrooms and outdoor areas positioned furthest from the roost, and lawn or gardens over hard surfaces to reduce cleaning. While this management option will not assist in the resolution of existing conflict, it is critical to avoiding future conflict.

4.3.7 Ongoing vegetation management on Council land

Council will consider undertaking ongoing understorey weed management in priority buffer areas (i.e. adjacent to property boundaries and footpaths) with the aim of making these buffer zones less desirable for roosting. To beautify these areas, reduce maintenance and stabilise soil, Council could plant low-growing species such as lomandras (*Lomandra spp.*). Council should facilitate community involvement where appropriate in the restoration works and engage Hibiscus Noosa Outlook to ensure coordinated weed management efforts across the Reserve and Lendlease property. This weed management may reduce the number of flying-foxes roosting in these high-conflict buffer areas and may result in making the site less desirable for large influxes. Due to logistical constraints of removing all understorey weeds at the site, due to upstream weeds constantly being deposited on site, removing all understorey weeds is not currently feasible.

Council should also consider undertaking quarterly assessments of vegetation within the Reserve and ensure a 2 m buffer is maintained surrounding property boundaries. Quarterly assessments should include assessment of trees in the Reserve that may pose a safety risk to people or properties (subject to Council budget and resourcing allocations).

If weed/vegetation management occurs across wider areas of the Reserve (i.e. outside of immediate buffer zones), weed removal needs to be undertaken in a staged approach to avoid colony splintering and potential emergence of new roosts in the area. Altering the habitat of any animal can result in unpredictable outcomes and could result in flying-foxes roosting in equally or even higher conflict locations.

In the event that previous management actions do not reduce impacts on residents by repeated, large influxes, vegetation thinning in the Reserve may be considered to make the site less desirable for roosting. It should be noted that vegetation thinning outside of buffer zones could also increase the likelihood of new roosts if flying-foxes are completely excluded from the area. Vegetation thinning may also increase impacts experienced by residents by opening the tree canopy where noise and smell may more easily transmit to adjacent properties. Given that the Reserve is core koala habitat and a mapped high-risk area for protected plants, Council should consult with State government compliance with relevant legislation before considering thinning.

The Reserve is currently classified and managed as a Tier 5 bushland reserve. Council could consider an internal review of this ranking, based on the level of service required to action the adopted recommendations of this FFMP.

4.3.8 Ongoing vegetation management on private land

Private landholders should regularly maintain vegetation to reduce the likelihood of flying-foxes roosting on their properties. This may include understorey weed removal to reduce the habitat suitability and/or midstorey/canopy vegetation trimming.

Private landholders must consider biodiversity mapping as vegetation on private land may be mapped as regulated vegetation. If a vegetated area is mapped as an area of regulated vegetation (e.g., core koala habitat, high-risk area for protected plants) the private landholder require relevant approval under legislation before undertaking vegetation management.

Private landholders must comply with the Low Impact COP and Councils Tree Management Policy. Vegetation management should be undertaken regularly while flying-foxes are not present within the Reserve, or not roosting close to proposed trimming area (e.g. > 10 m away) in order to avoid disturbance of the flying-foxes which may increase impacts to nearby residents. Regularly trimming and maintaining vegetation can reduce the likelihood of flying-foxes roosting in vegetation stemming from private property if an influx does occur. As outlined in the Low Impact COP, private landholders can trim up to 10% of the total canopy of roost trees in a 12-month period. Any further vegetation modification would require a FFRMP (with this FFMP able to support applications). Residents considering vegetation management on private land should contact Council for information and advice on permit requirements.

If flying-foxes begin roosting in trees stemming from private properties, residents should immediately notify Council. Residents are not permitted to undertake vegetation management while flying-foxes are roosting in the trees on their property or attempt to disturb/drive away the flying-foxes.

4.3.9 Alternative habitat improvement

Council should consider identifying suitable areas for lower conflict flying-fox roosts and undertake habitat improvement at these sites. This option must consider resources and availability of suitable alternative habitat, which may be limited. Council should consider incorporating this as part of a community restoration committee.

If deemed feasible, this option is likely to be more successful if aimed at improving or expanding known flying-fox roosts that are in lower conflict areas. In selecting new sites where flying-foxes have not been known to roost, preferred habitat characteristics detailed below (MacDonald et al. 2021, SEQ Catchments 2012) should be considered prior to undertaking habitat improvement.

- closed canopy > 5 m high
- dense vegetation with complex structure (upper, mid and understorey layers)
- shorter, less dense ground cover layer
- generally located within 200 m of watercourse (50% of roosts).
- within 50 km of the coastline or at an elevation < 65 m above sea level
- level topography (< 5° incline)
- ideally greater than one hectare to accommodate and sustain large numbers of flying-foxes and allow the roost to shift its extent so vegetation can recover (note this does not appear to be a strong flying-fox preference, but more a consideration in roost habitat creation/improvement)

- preference for ten tree species (accounting for 68% of roost habitats), including *Eucalyptus*, *Melaleuca*, *Rhizophora*, *Avicennia*, *Corymbia*, and *Tamarandus* species.

Selecting new sites and attempting to attract flying-foxes to them has had limited success in the past, and ideally, habitat at known roosts sites would be dedicated as a flying-fox reserve. However, if a staged and long-term approach is used to make unsuitable current roosts less attractive, while concurrently improving appropriate sites, it can be a viable option (particularly for the transient and less selective LRFF). Supporting further research into flying-fox roost preferences may improve the potential to create new flying-fox habitat.

5 Management triggers for potential future influxes

Figure 2 and Table 1 provide guidance on management actions that will be considered when certain thresholds are met during potential future flying-fox influxes. This allows a transparent and consistent system for approaching management at the Reserve. The following provides a framework only and Council may adapt as required.

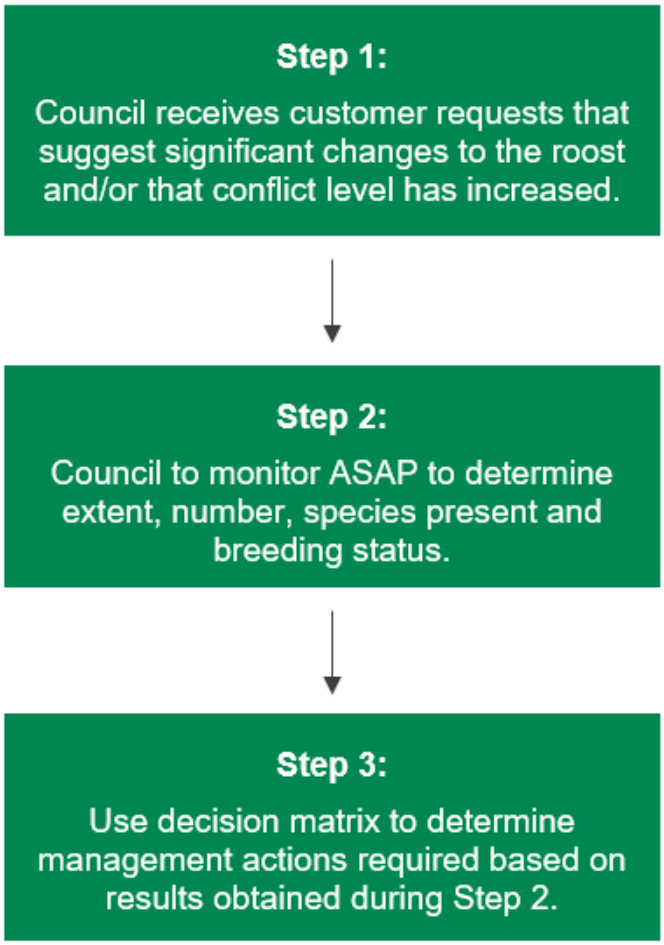

Figure 2 Steps in responding to changes at the Reserve and determine potential management actions for influxes of flying-foxes.

Table 1 Management actions decision matrix for the Waratah Reserve roost

	Number of flying-foxes at roost and associated management actions			
Circumstances	**<1,500**	**>1,500 - 5,000**	**>5,000 - 10,000**	**>10,000**
All circumstances	· Monitor site **monthly** to maintain current knowledge of numbers and extent. · Council to provide information on the management triggers and potential actions as requested by residents. · Inform residents to contact Council if numbers increase or extent shifts closer to private properties. If so, re-monitor ASAP to determine action required.	· Monitor site **fortnightly** to maintain current knowledge of numbers and extent. · Council to provide information on the management triggers and potential actions as requested by residents. · Inform residents to contact Council if numbers increase or extent shifts closer to private properties. If so, re-monitor ASAP to determine action required.	· Monitor site **fortnightly** to maintain current knowledge of numbers and extent. · Council to provide information on the management triggers and potential actions as requested by residents. · Inform residents to contact Council if numbers increase or extent shifts closer to private properties. If so, re-monitor ASAP to determine action required.	· Monitor site **weekly** to maintain current knowledge of numbers and extent. · Council to provide information on the management triggers and potential actions as requested by residents. · Inform residents to contact Council if extent shifts closer to private properties. If so, re-monitor ASAP to determine action required.
Roosting > 2 m from property fence line/s	· Provide adjacent residents with information about private property mitigation measures (private property tree management, white noise machines, double glazing windows etc.), health information and flying-fox ecology, as requested by residents.	As per previous column.	As per previous column, plus: · Undertake understorey weed management in buffer areas (if appropriate)*.	As per previous column, plus: · Residents located directly adjacent to roosting flying-foxes may request Hostogel pots or other base subsidy allowances which may include subsidies car covers, pressure cleaners and other items or services through Council's Customer Service Centre.
Roosting < 2 m from property fence line/s	· Provide adjacent residents with information about private property mitigation measures (private property tree management, white noise machines, double glazing windows etc.), health information and flying-fox ecology, as requested by residents.	As per previous column, plus: · Consultation with directly affected residents. <u>If roost persists for 4 weeks or more:</u> · Vegetation trimming in buffer area directly adjacent to affected property/s (if not	As per previous column, plus: · Residents located directly adjacent to roosting flying-foxes may request Hostogel pots or other base subsidy allowances which may include subsidies car covers, pressure cleaners and other items or services through Council's Customer Service Centre. <u>If</u>	As per previous column. <u>If roost persists for 2 weeks or more:</u> · Consider a fixed cost subsidy allowance for directly affected properties.

	Number of flying-foxes at roost and associated management actions			
Circumstances	**<1,500**	**>1,500 - 5,000**	**>5,000 - 10,000**	**>10,000**
	· Understorey weed management in immediate area to create buffer (if appropriate)*. · Trimming of overhanging vegetation if required*.	currently providing sufficient buffer)*.	roost persists for 4 weeks or more: · Consider a subsidy allowance for adjacent properties.	
If roosting on private property	· Provide guidance to private residents with trimming of vegetation stemming from private properties*. · If roosting on private property continues after vegetation trimming, consider nudging flying-foxes from private property/s to the Reserve.			
Tree/s determined to be a safety risk	· Restrict access to immediate area or entire Reserve. · Erect temporary signage about safety risk. · Vegetation removal/trimming of trees with safety risk*.			
Ongoing risk/impacts to community	· If all management actions have been exhausted and flying-foxes continue to roost in backyards after undertaking buffer works, and residents experience ongoing risk and/or impacts and high conflict remains, nudging from backyards or dispersal may be considered. This should be conducted using low intensity disturbance methods such as the use of visual or noise deterrents. Council will undertake a thorough risk management analysis prior to undertaking nudging and/or dispersal activities.			
Post-influx	· Assess the need for park clean up e.g. removal of fallen debris, cleaning of footpaths. Preferably undertake clean up once flying-foxes have vacated / reduced to <1,500 to minimise disturbance (Section 4.2). · Consider the provision of subsidised cleaning services. · Reassess buffers and understorey weeds on Council managed land. Where required undertake weed treatment and vegetation trimming/removal.			

*If flying-foxes are present during the day, night works should be conducted. If crèching young are present and works cannot be postponed due to safety reasons, a flying-fox knowledgeable person should be present on site for duration of works, with a wildlife carer ready and on call to receive orphaned young if necessary.

6 Community consultation

Effective community engagement and education has benefits for both communities and land managers. These benefits include increasing community understanding and awareness of flying-foxes, their critical ecological role, and factors that need to be considered in developing a management approach to reduce community conflict.

Council has sought feedback with the surrounding community to understand how residents perceive management to date and to convey their opinion of the revised draft Waratah Reserve FFMP.

Two community consultation sessions were held in August 2023, one session with residents from the Hibiscus Noosa Outlook Retirement Village and staff, and another session with residents surrounding the Reserve outside the retirement village. Letter drops were sent to 64 properties outside the retirement village, and 54 properties within the retirement village three weeks prior to the date of the sessions. Residents were provided with a link to provide feedback online if they were unable to attend the in-person consultation session.

During these consultation sessions, Council and Ecosure presented the FFMP, previous management actions, proposed future management actions, as well as the general ecology of flying-foxes in the region. Residents attending the session were given the opportunity to ask questions and raise concerns with the FFMP or management at the Reserve.

Combined with the online feedback from residents unable to attend the community consultation sessions, feedback from the community and Ecosure and Council's responses to community feedback are summarised below.

6.1 Survey results

A total of 14 feedback forms were submitted either online or in person at the consultation meetings. Of the respondents, 50% were residents from Hibiscus Noosa Outlook Retirement Village, 43% were from Maple Avenue or Waratah Close, and the remaining 7% provided no answer.

In general, majority of respondents (> 50%) supported all short-term management options excluding dispersal. Overall, the most supported short-term management actions by majority of the respondents (> 77% support) were immediate tree buffer works around primary impacted house, buffers through understorey weed management, vegetation management on private land, flying-fox monitoring, nudging from backyards (as a last resort when required), and community consultation. Private landholder property modification and fact sheets for residents were still relatively well supported, with 69% and 63% support respectively. Temporary signage and temporary closure of the reserve was supported by just over half of respondents (56% support), with 13% neutral, and 25% not supporting these options.

Excluding dispersal, indoor odour neutralising pots was the least supported short term management option, with just over half supporting indoor odour neutralising pots (54% support), 23% were neutral, and 23% did not support this option.

Dispersal was the least supported management option with only 40% of respondents supporting dispersal as a management action. 13% of respondents were neutral towards dispersal, and 23% did not support dispersal. 24% of respondents did not answer their degree of support towards dispersal (Figure 3).

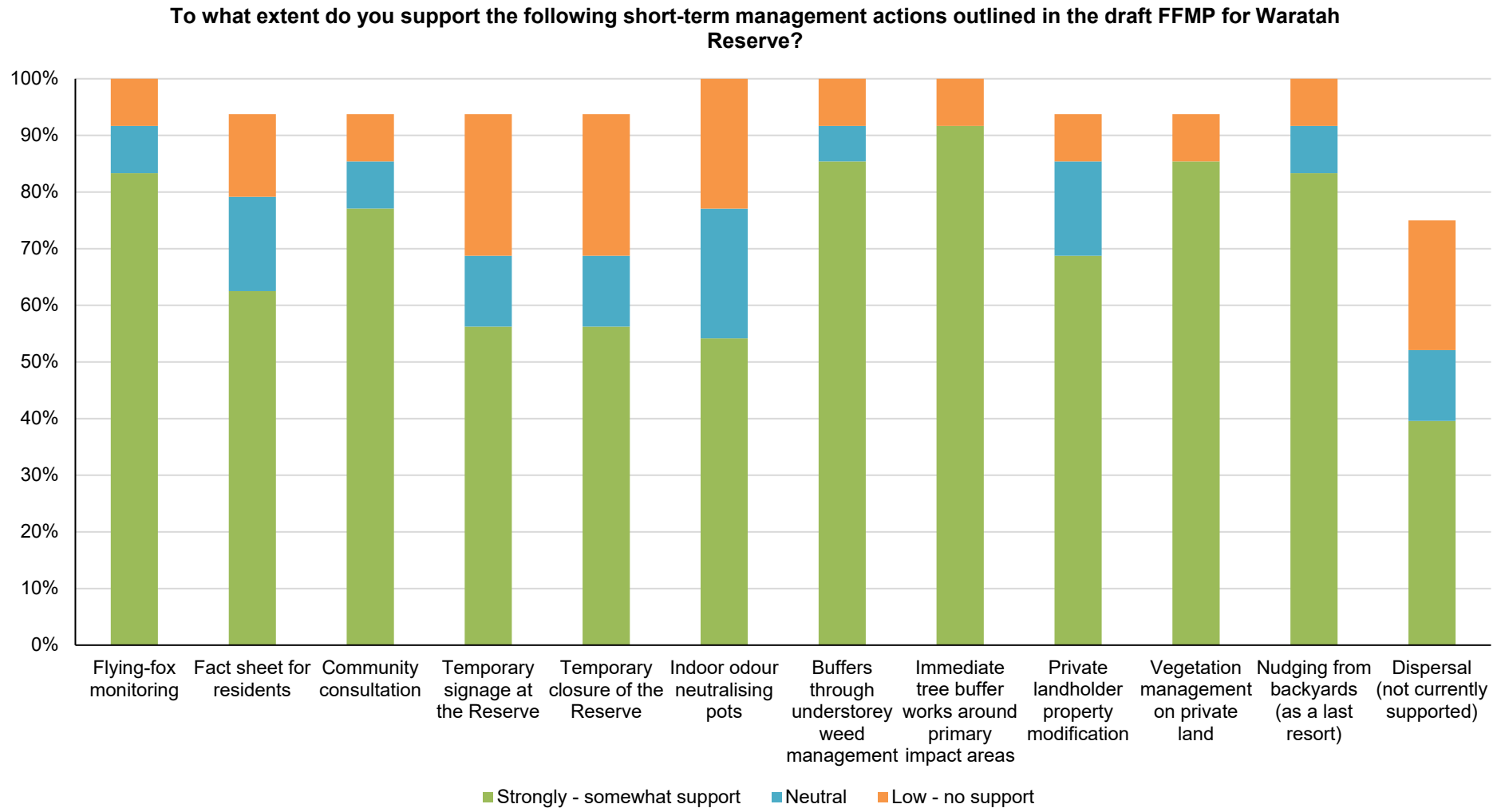

Figure 3 Responses to the question: 'To what extent do you support the following short-term management actions outlines in the draft FFMP for Waratah Reserve?'. Note: some respondents did not answer for each of the listed management actions, therefore some do not equal 100%. n = 14.

A high percentage of respondents (>79%) were supportive of service subsidies, general reserve maintenance and reassessment of buffers and understorey weeds on Council managed land as post-influx roost management actions (Figure 4).

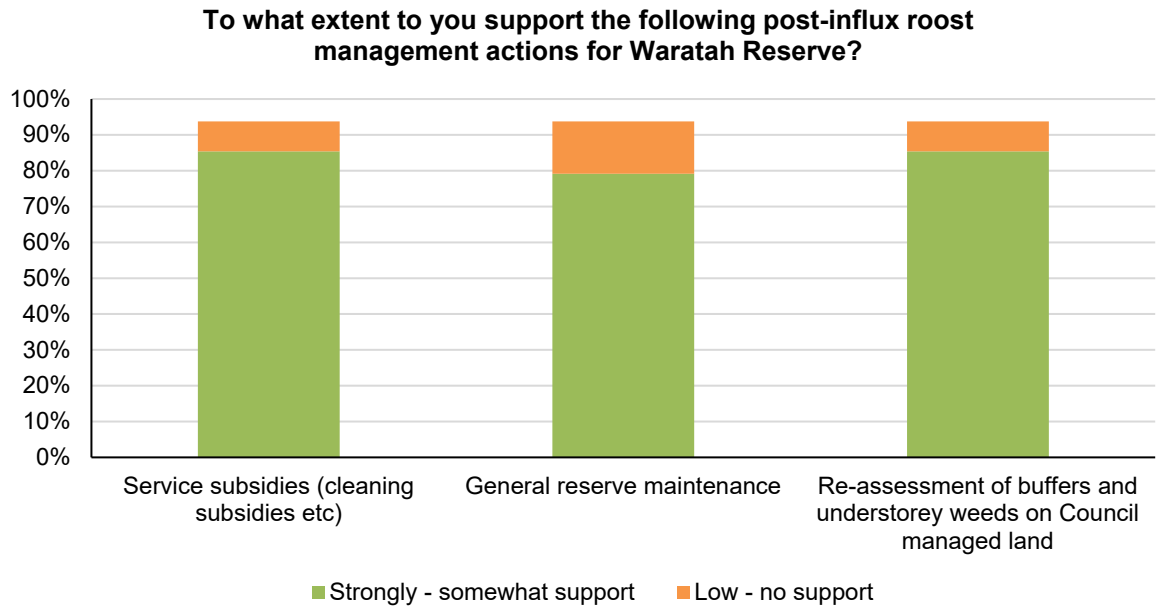

Figure 4 Responses to the question: 'To what extent do you support the following post-influx roost management actions for Waratah Reserve?'. Note: some respondents did not answer for each of the listed management actions, therefore some do not equal 100%. n = 14.

Of the long-term management actions, respondents were most supportive of a subsidy program review and ongoing vegetation management on Council management land (> 77% support). Ongoing vegetation management on private land and alternative habitat improvement were supported by majority of respondents (>60%). Only 48% of respondents were supportive of school education programs and only 33% of respondents were supportive of permanent educational signage (Figure 5).

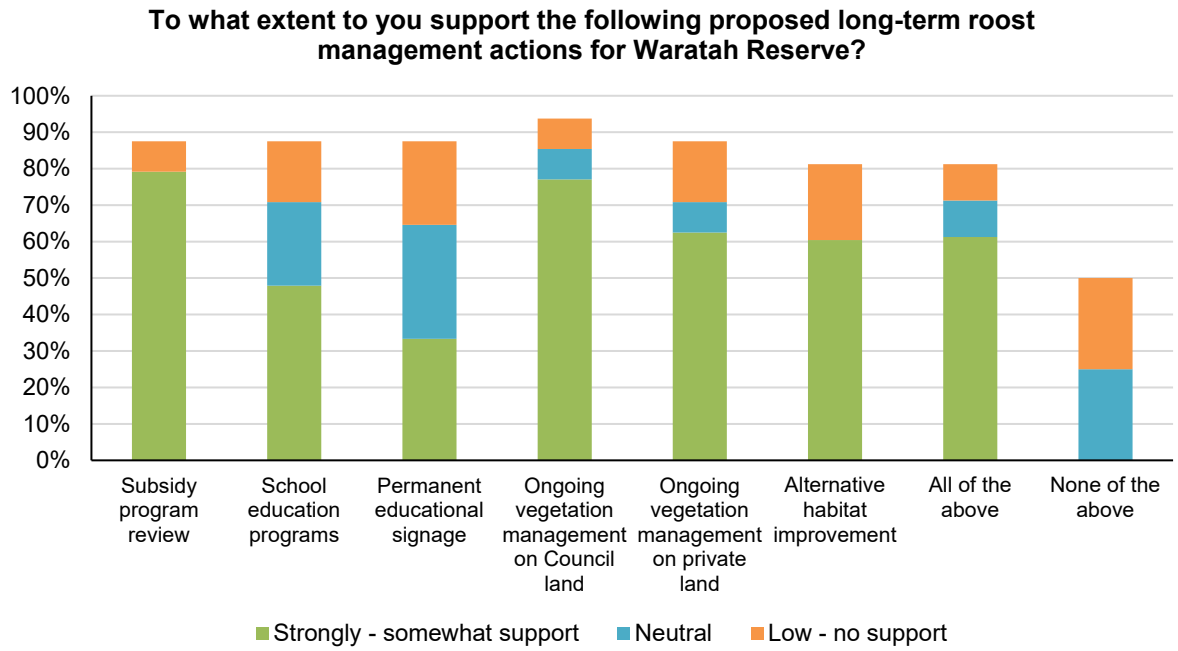

Figure 5 Responses to the question: 'To what extent to you support the following proposed long-term roost management actions for Waratah Reserve? Note: some respondents did not answer for each of the listed management actions, therefore some do not equal 100%.' n = 14.

Overall, majority of respondents (60%) agreed that the FFMP demonstrates best practice using latest research and using innovative solutions. Majority of respondents (73%) were satisfied with the opportunity to provide input on the draft FFMP (Figure 6).

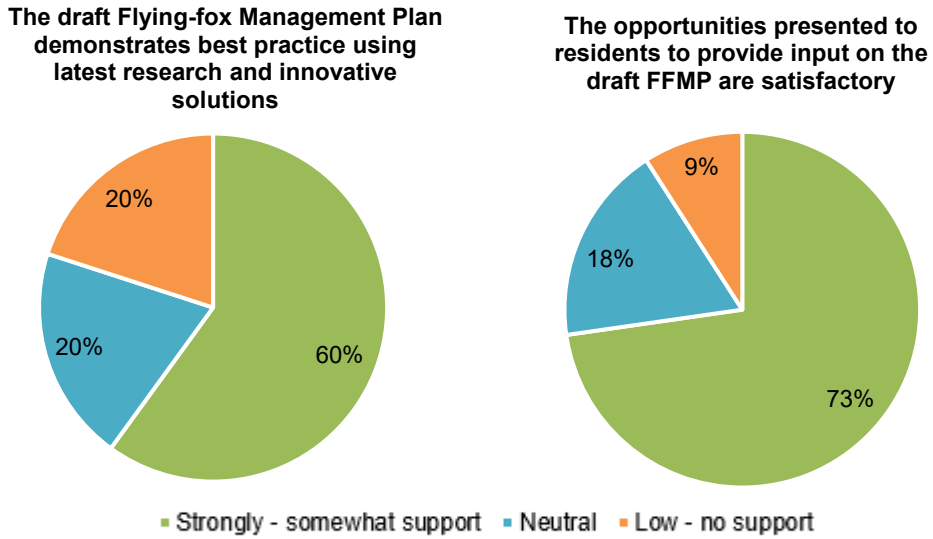

Figure 6 Respondents answers when asked if the FFMP demonstrates best practice and if community consultation was adequate during the development of the FFMP. n = 10 (left) and n = 11 (right).

6.2 Addressing community feedback

The following table (Table 2) lists some key community concerns and perceptions that were raised in the consultation sessions or were left as comments in the online feedback survey.

Table 2 Ecosure and Council's response to community feedback

Key Topic	Community Concern or Perception	Response
Canopy mounted sprinklers (CMS)	Some residents believe that CMS should be used	CMS have not been deemed suitable for this site for many reasons. CMS have a buffer radius of approximately 15 m. If CMS are deployed at property boundaries on both sides of the Reserve, this would effectively exclude flying-foxes from the area. This will likely cause flying-foxes to shift within the Reserve to areas where there are no CMS, and therefore simply shift the problem within the Noosa Shire. CMS would have to be established all along the border of the Reserve, which would be a very high cost, and flying-foxes would likely relocate to another unsuitable location (e.g. Cranks Creek Park). This would create conflict at another site requiring increased management effort and further impacted community. CMS also require expensive ongoing maintenance to ensure they function and have enough pressure to disperse water that is sufficient to deter flying-foxes from roosting. CMS may not be entirely effective at the Reserve and flying-foxes may continue to roost in the Reserve while the CMS are operating, which could unintentionally create more disturbance for residents due to flying-foxes relocating from tree to tree and increase vocalisations due to stress. CMS may also deter other wildlife species from utilising the Reserve.
Roosting deterrents	Some residents believe that lights and/or noise emitters should be used to deter flying-foxes from roosting in the Reserve	Noise emitters can either be regular acoustic devices (within the hearing range of humans) or ultrasonic (outside the detectible hearing range of humans). Flying-foxes can hear frequencies from 2 – 54 kHz, compared to humans which can hear 0.02 – 20kHz (Ecosure 2021, Purves et al. 2001). Therefore, flying-foxes can detect sound in the 20-54 kHz range that humans cannot hear. A study undertaken by Van der Ree et al. (2002) found that flying-foxes were not impacted or deterred by the use of ultrasonic noise emitters in the 21 – 25kHz range. Further research and trials could be undertaken, however the potential impact to other wildlife species must be considered if using ultrasonic devices. It is well known that acoustic noise can be used to deter or disrupt flying-foxes. Sudden, loud noises are most disruptive compared to continuous or intermittent noise, however sound within hearing range of humans can be equally disruptive to surrounding residents if this were to be trialled at the Reserve. Using noise to deter flying-foxes can also increase stress responses and may cause increase vocalisations and flight of flying-foxes, further increasing disturbance to residents. Standard lighting (continuous or flashing) is not generally effective at deterring flying-foxes as they quickly habituate once it is learnt that the lights will not cause them harm. ProVOLITANS is a light company that have designed lights that are specifically disruptive to flying-foxes, anecdotal evidence from a ProVOLITANS trial suggests lights were effective in deterring 80% of flying-foxes from the trees where the lights were installed. This caused flying-foxes to roost at least 150 m away from the light source. If light were to be installed at the Reserve, they would have to be installed at regular intervals surrounding the Reserve to avoid simply pushing the flying-foxes closer to another problematic area. Installing lights all around the Reserve would also likely be high in cost, and would effectively be an exclusionary method, which creates issues associated with dispersal, such as the establishment of splinter roosts.
Preventative management actions	Some residents believe that not enough preventive management is being undertaken and flying-foxes will simply return in large numbers again	Council has undertaken many management actions at the Reserve during and following the LRFF influx in February and March 2023. Council has established a 2 m buffer in priority areas of the Reserve and will continue undertaking vegetation management in buffer areas in non-priority areas and will continue regular assessments at the Reserve to ensure these buffers are maintained. With the FFMP in place, Council is much better placed to undertake immediate actions if flying-fox numbers do increase. Due to the extensive vegetation damage caused during the LRFF influx, LRFF are unlikely to return for several years, and may not even return at all, given the uncharacteristic roosting at a Reserve of this nature.

Key Topic	Community Concern or Perception	Response
Natural damage to native vegetation from large influxes of flying-foxes	Dangerous trees/branches falling creating property damage and/or safety concerns	It is known that flying-foxes can cause significant damage to vegetation, especially LRFF which roost in a higher density than GHFF and BFF. This vegetation damage was noted following the February/March 2023 influx. Council have undertaken vegetation risk assessments within the Reserve and have removed trees likely to cause a safety risk to people or properties. Council will continue regular assessments (ideally quarterly) which will ensure regular management of vegetation likely to pose a safety risk within the Reserve.
	Degraded habitat values for other wildlife	Damage to natural vegetation during large influxes is a natural process which is far outweighed by the important ecological values that flying-foxes provide to the Noosa region. Melaleuca species are known to be highly resilient and often regenerate after large flying-fox influxes, however this process can take several years.
Ecological importance and status of flying foxes	Flying-foxes role in the ecosystem does not outweigh the impacts to residents, and they are increasing in numbers.	Flying-foxes are a keystone species in Australia, as they are the most valuable long-distance seed dispersers and pollinators. Though other vertebrates and invertebrates are also important for seed dispersal and pollination, flying-foxes are invaluable in their contribution to forests across Eastern Australia and pollination of commercially important plants (Lunn et al. 2021). Due to various threats such as habitat clearing, bushfires, extreme weather events, anthropogenic threats such as electrocution and fencing, culling on farms etc. the number of GHFF has declined significantly in the last 50 years. GHFF are listed as vulnerable to extinction due to their declining population. Determining the population size of flying-fox species is extremely difficult, however it is known that there is a trend of smaller roost sizes at known sites, and the establishment of 'new' roosts. It is thought that the reasons behind the trend of smaller roosts at more locations could be due to habitat fragmentation and the availability of a variety of foraging species in urban areas, providing more consistent food availability (Baranowski & Bharti 2023).
Vegetation management (thinning)	Some residents believe vegetation should be thinned or lopped within the roost to reduce how desirable the site is to flying-foxes.	Thinning of vegetation within the roost would reduce the likelihood of other wildlife utilising the area and is in opposition to most respondents wishes. Vegetation within the Reserve is mapped as core koala habitat under State and Commonwealth legislation and would unlikely be exempt for thinning within the Reserve for flying-fox management. Vegetation thinning in the Reserve is also not in line with Council's Plan, as the Reserve is mapped as an 'area of biodiversity significance'. Further, vegetation thinning may not result in a reduction of the number of flying-foxes roosting at the Reserve and may instead increase odour and noise impacts due to a more open canopy and reduced barrier. Vegetation lopping can cause significant damage to trees, and if resulting in tree death, is against legislation in core koala habitat. Lopping of the trees can decrease the total available habitat for other wildlife species and may not deter flying-foxes from roosting in the Reserve. Flying-foxes may simply roost lower in the canopy which may cause more conflict with residents. For these reasons, this option is not likely to be appropriate or feasible, however in the event that other management actions do not reduce impacts on residents by repeated, large influxes, this option may be considered.
Weed Management	More weed management should be undertaken to increase the overall ecological condition of the Reserve	Council will continue undertaking weed management in buffer areas around the Reserve and in line with the bushland reserve tier ranking of the Reserve. Council will also consider undertaking plantings within the Reserve that may help beautify the area and reduce weed incursion. Due to the complexity of managing Singapore daisy along the waterway, eradication is not possible, however Council will coordinate weed management efforts with Hibiscus Noosa Outlook to reduce the spread of weeds along the waterway.

Key Topic	Community Concern or Perception	Response
Health concern	Health concerns from faecal drop, polluted air and risk of contact with flying-foxes	Council will continue to provide links to Queensland Health websites. Though health risks of living around flying-foxes is low (Queensland Health 2022), liaison with affected residents should continue (and increase during large influxes) to ensure the community is informed regarding simple measures to ensure human and animal safety (e.g. no touch, no risk). Since the establishment of buffers and removal of vegetation overhanging property boundaries, faecal drop on private properties should be decreased. It is acknowledged however that faecal drop will still be experienced during fly-in/fly-out, especially during large influxes. Hendra Virus and Australian Bat Lyssavirus (ABLV) cannot be transmitted through faecal drop or urine. ABLV is only transmitted through either bite or scratch of an infected flying-fox (which only comprises of approximately 1% of the flying-fox population). ABLV has a highly effective post-vaccination, therefore if anyone who is scratched or bitten should was the wound with gentle soapy water and should seek medical attention immediately to receive the post-vaccination treatment. Hendra Virus requires a horse for transmission to a human, therefore is not a concern for this roost. Flying-fox excrement should be treated as with excrement from any animal. Animal excrement can carry bacteria and pathogens that can cause gastrointestinal illness, and therefore if anyone comes into contact with animal excrement, hands should be washed with antibacterial soap to avoid ingestion of bacteria or pathogens. Flying-fox odour is from pheromones and is completely harmless from a health perspective. Airborne vegetation particles from flying-foxes landing, taking off or adjusting on branches may impact people with asthma, as can pollen from flowers which may be attracting flying-foxes to the area. If this is experienced, air purifiers could be utilised in the home to decrease airborne particles. The subsidy could be used towards the purchase of an air purifier. In the unlikely event of finding a deceased or injured flying-fox in the Reserve or a private backyard, residents should report the event to Flying-Fox Rescue and Release Noosa Inc and Wildlife Noosa to ensure formal reports and suitable response.
Flying-fox monitoring	Flying-fox monitoring does nothing to reduce impacts to residents	Regular monitoring of the flying-fox roost is critical to provide Council an understanding of trends in where flying-foxes are roosting, number of flying-foxes, breeding status (which can affect timing of management actions) and if flying-foxes are causing impacts to surrounding properties. This is the baseline of information that Council require in order to determine if any management is necessary and what level of management is necessary. Understanding the trends in when flying-foxes can be expected to roost in the Reserve can help Council to better proactively manage the Reserve prior to an influx, and better prepare residents on when more impacts may be experienced.
Flying-foxes in urban areas	Some residents believe flying-foxes should be moved on from urban areas	Flying-foxes are a native, wild animals that choose their roost locations for a number of reason, many of which we do not understand. Studies and previous attempts have shown that dispersals are often ineffective (refer to Appendix 2 for further information), are extremely resource intensive, and often result in roosting in multiple locations. For these reasons, Council's policy position as outlined in the SoMI is that dispersal of flying-fox roosts is not supported.
Economic impacts	Residents are concerned with potential decrease in property values associated with the proximity to a flying-fox roost. This concern also includes the	Due to the concern from residents that erecting permanent education signage may cause a decrease in property values surrounding the Reserve, permanent educational signage will not be installed at the Reserve. Some residents expressed their wish for transparency in the planning scheme about roost locations, and also transparency from real estate agents about the locations of flying-fox roosts. This would ensure that buyers are aware of roosts in the region prior to purchasing a property. Conversely, some residents did not wish this information to be public, as it may result in a

Key Topic	Community Concern or Perception	Response
	worry if flying-fox roosts are included in the planning scheme.	decrease in property value.
Flying-foxes in backyards	Residents are wanting to know ways to prevent flying-foxes from foraging in their backyards	In order to decrease the likelihood of flying-foxes foraging in backyards, residents should select species that do not produce fruits or nectar exuding flowers. In order to avoid roosting, species should ideally be between 2-5 m and grow in dense formation (Roberts et al. 2006). Some potentially suitable native species include: - *Acacia shirleyi* - *Acacia georginae* - *Acacia cambagei* - *Acacia tephrina* - *Atalaya hemiglauca* - *Hovea acutifolia* - *Westringia fruticosa* - *Pultenaea villosa* - *Dodonaea viscosa* - *Jacksonia scoparia*. N.B. Not all listed species are native to the region.
Alternative habitat restoration	Alternative habitat restoration should be undertaken to move flying-foxes away from urban areas	Habitat restoration is time consuming and expensive to undertake, and though it has a net benefit to increase environmental values of the area, it does not guarantee that flying-foxes will choose the restored area for roosting. We understand some general characteristics that flying-foxes prefer for their roosting habitat, however replicating this and creating a site to have these characteristics has not yet been successful to attract flying-foxes to roost. Council should consider encouraging community groups to rehabilitate habitats that may be suitable for flying-foxes, as this would also create habitat for other wildlife species. It should be noted that even if that general characteristics of preferred roosts are created at an alternative site, there is not guarantee that flying-foxes will choose to roost at the restoration site.
Indoor odour neutralising pots	Council can not solve the issue by giving residents some indoor odour neutralising pots	Indoor odour neutralising pots may have localised effects and are used in many settings where they have proven to be effective (such as hospitals). It should be noted that indoor odour neutralising pots are more likely to be effective in a smaller room and where the space is enclosed. Therefore, the pots are unlikely to be effective outside on patios, and multiple may be required to work effectively in large open rooms. It is acknowledged that these pots will not mitigate all impacts, and Council is using many other management actions such as subsidies and Reserve management to mitigate impacts experienced by residents. Indoor odour neutralising pots are a small and relatively cost-effective way to decrease odour impacts and can be used in conjunction with other private property modifications to reduce impacts (see Section 4.1.9).

7 Evaluation and reporting

7.1 Evaluation and review

A review of the FFMP should be scheduled annually or as needed, with community consultation and expert input sought as required. The FFMP shall remain in force until a revised version is adopted by Council.

The following may trigger an earlier FFMP update:

- changes to relevant policy/legislation
- new management techniques becoming available
- outcomes of research that may influence the FFMP
- incidents associated with the roost.

The progress, priority, and effectiveness of management actions in the FFMP will be evaluated annually by Council.

7.2 Reporting

Council will complete the DES evaluation form for actions under its as-of-right authority, returned within six weeks of the date of actions being completed, and will comply with any reporting obligations under other permits or approvals obtained to implement the FFMP.

Where Council resourcing allows, an annual summary report outlining flying-fox monitoring results and management actions will be prepared.

References

Baranowski, K and Bharti, N 2023, 'Habitat loss for black flying foxes and implications for Hendra virus', *Landscape Ecology*, vol. 38, pp. 1605-1618.

BCRQ 2019, Flying-fox rescue, Bat Conservation and Rescue Qld Inc. <https://bats.org.au/rescue/>.

Churchill, S 2008, *Australian Bats*, Allen and Unwin, Crows Nest, NSW.

DATSIP 2023, Aboriginal and Torres Strait Islander Cultural Heritage Database and Register, Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships, <https://culturalheritage.datsip.qld.gov.au/achris/public/home>.

Department of Environment and Science (DES) 2020a, *Code of Practice Ecologically sustainable management of flying-fox roosts*, Queensland Government, <https://documents.parliament.qld.gov.au/tp/2021/5721T242.pdf>.

Department of Environment and Science (DES) 2020b, *Code of Practice Low impact activities affecting flying-fox roosts*, Queensland Government, <https://www.qld.gov.au/__data/assets/pdf_file/0014/221027/cp-wl-ff-low-impact-roosts.pdf>.

Department of Environment and Science (DES) 2020c, *Flying-fox Roost Management Guideline*, Queensland Government, <https://www.qld.gov.au/__data/assets/pdf_file/0009/221022/Guideline-Roost-Management.pdf>.

DES 2021, *Interim policy for determining when a flying-fox congregation is regarded as a flying-fox roost under section 88C of the NC Act*, DES, <https://www.qld.gov.au/__data/assets/pdf_file/0011/221024/op-wl-ff-roost-definition.pdf>.

Ecosure 2021, *Odour Neutralising Trial*, Report to Eurobodalla Shire Council, Brisbane.

Lunn, T, Eby, P, Brooks, R, McCallum, H, Plowright, R, Kessler, M and Peel, A 2021, 'Conventional wisdom on roosting behaviour of Australian flying-foxes – a critical review, and evaluation using new data', *Ecology and Evolution*, vol. 11, pp. 13532-13558.

MacDonald, S, Bradford, M, McKeown, A, Vanderduys, E, Hoskins, A and Westcott, D 2021, 'Camp site habitat preferences of the little red flying-fox (*Pteropus scapulatus*) in Queensland', *BioOne'.*

Markus, N and Hall, L 2004, 'Foraging behaviour of the black flying-fox (*Pteropus alecto*) in the urban landscape of Brisbane, Queensland', *Wildlife Research*, vol. 31, no. 3, pp. 345-355.

McConkey, KR, Prasad, S, Corlett, RT, Campos-Arceiz, A, Brodie, JF, Rogers H and Santamaria, L 2012, 'Seed dispersal in changing landscapes', *Biological Conservation*, doi:10.1016/j.biocon.2011.09.018.

Noosa Shire Council 2022, Flying-fox Statement of Management Intent, <https://www.noosa.qld.gov.au/Noosa_Council_Flying-

fox_Statement_of_Management_Intent_Draft.pdf>.

Queensland Government 2023, *Living near flying-foxes*, Queensland Government, <https://www.qld.gov.au/environment/plants-animals/animals/living-with/bats/flying-foxes/about-flying-foxes/living-near-flying-foxes>

Van der Ree, R, Bender, H and Nelson, J 2002, 'The effectiveness of ultrasound at deterring grey-headed flying-foxes from roosting in the fern gully, royal botanic gardens, Melbourne – a pilot study, *Australian Research Centre for Urban Ecology,* vol. 7, pp. 2-9.

Queensland Health 2022, *Bats and human health,* Queensland Health, <http://conditions.health.qld.gov.au/HealthCondition/condition/14/217/14/bats-and-human-health>.

SEQ Catchments 2012, *Management and Restoration of flying-fox Roosts: Guidelines and Recommendation*s, SEQ Catchments Ltd funded by the Australian Government's Caring for Our Country, < https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Wildlife-management/Flying-foxes/management-restoration-flying-fox-camps.pdf>.

Roberts, B 2006, 'Management of Urban Flying-fox Roosts: Issues of Relevance to Roosts in the Lower Clarence', NSW, Valley Watch Inc., Maclean.

Wildnet 2023, *WildNet database,* WildNet, <https://www.qld.gov.au/environment/plants-animals/species-information/wildnet>.

Appendix 1 Legislation

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth's EPBC Act provides protection for the environment, specifically matters of national environmental significance (MNES). A referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is required under the EPBC Act for any action that is likely to significantly impact on an MNES. The GHFF is listed as a vulnerable species under the EPBC Act, meaning it is an MNES.

State

Nature Conservation Act 1992

As native species, all flying-foxes and their roosting habitat are protected in Queensland under the NC Act. State approval is required to:

a) destroy a flying-fox roost;

b) drive away, or attempt to drive away, a flying-fox from a flying-fox roost ('drive away' is defined to mean "cause the flying-fox to move away from the roost; or if the flying-fox has moved away from the roost, deter the flying-fox from returning to the roost"); and/or

c) disturb a flying-fox in a flying-fox roost.

Note that the definition under Queensland law means that once a flying-fox roost is established, it remains as such even when it is unoccupied. The *Interim policy for determining when a flying-fox congregation is regarded as a flying-fox roost under section 88C of the NC Act* (DES 2021) has recently been released and is currently in consultation. It is our understanding that this FFMP aligns with this roost policy, however amendments can be made to the FFMP in consultation with DES if required.

A 'flying-fox roost' is defined under the NC Act as 'a tree or other place where flying-foxes congregate from time to time for breeding or rearing their young'.

Council 'as-of-right' management

Under the NC Act, local governments have an 'as-of-right' authority under the NC Act to manage flying-fox roosts in mapped Urban Flying-fox Management Areas (UFFMAs), without the requirement for a permit, in accordance with the *Code of Practice – Ecologically sustainable management of flying-fox roosts* (Roost Management COP) (DES 2020a).

Councils must however still notify DES of the planned management. Notification is by means of a completed 'flying-fox management notification form' from the DES website submitted at least two business days prior to commencing any management actions, unless an authorised person from DES provides written advice that these actions can commence earlier. Local governments may also choose to, with the relevant landholder's permission, exercise their 'as-of-right' authority on private land. Notification is valid for all notified management actions within a four-week timeframe.

The *Flying-fox Roost Management Guideline* (DES 2020c) has also been developed to provide local government with additional information that may assist decision making and management of flying-fox roosts. Councils are required to apply for a FFRMP to manage flying-fox roosts outside an UFFMA, or for management actions not specified in the COP. It must be noted that this 'as-of-right' authority does not oblige Council to manage flying-fox roosts, and does not authorise management under other relevant sections of the NC Act or other legislation (such as the *Vegetation Management Act 1999* [VM Act].

Anyone other than local government is required to apply to DES for a FFRMP for any management directed at roosting flying-foxes, or likely to disturb roosting flying-foxes. Certain low impact activities (e.g. mowing, minor tree trimming) do not require approval if undertaken in accordance with the *Code of Practice – Low impact activities affecting flying-fox roosts* (Low Impact Code) (DES 2020b).

Flying-fox roost management permits

Councils wishing to manage flying-fox roosts located outside an UFFMA or to conduct flying-fox management activities that are not Code-compliant, must apply to DES for a FFRMP. Under the Nature Conservation (Animals) Regulation 2020, a FFRMP may only be approved for management of a flying-fox roost where its resident flying-foxes are causing or may cause damage to property; or represent a threat or potential threat to human health or wellbeing. The Roost Management COP may generally also apply where such a requirement is stated on the FFRMP. Such a permit is valid for a period of one year, or up to three with a DES-approved flying-fox management plan (e.g. this Plan).

Anyone other than local government is required to apply for an FFRMP to conduct flying-fox roost management activities.

Low impact roost management

All landholders – private or public – can undertake low impact activities such as mulching, mowing and weeding near flying-fox roosts, as well as allowing trimming of up to 10% of the total canopy of the roost without a FFRMP if it is done in accordance with the Low Impact Code (DES 2020b). This authorisation is provided these activities not being undertaken with the intention of destroying the roost, or disturbing or driving away the flying-foxes.

Flying-fox management statements and planning

Council has a Statement of Management Intent (SoMI) to articulate the approach that Council will take to the management of flying-fox roosts in the Noosa region. Local councils may also opt to develop a flying-fox management plan for the whole of their LGA. If the flying-fox management plan is approved by DES, the local council can be granted three years' approval to manage flying-foxes outside their UFFMAs under an FFRMP.

The *Flying-fox roost management guideline* was developed to provide local councils and other entities wishing to manage flying-fox roosts with additional information that may assist their decision-making, including developing SOMIs and flying-fox management plans.

Vegetation under the *NC Act 1992*

All plants 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 within a low-risk area.

Vegetation under the *Fisheries Act 1994*

All marine plants, including mangroves, seagrass, salt couch, algae, samphire vegetation and adjacent plants (e.g. melaleuca and casuarina), are protected under Queensland law through provisions of the *Fisheries Act 1994*. Approval must be gained from Fisheries Queensland to destroy, damage, or disturb any marine plant. Under the Fisheries Act, a 'marine plant' includes:

a) a plant (a 'tidal plant') that usually grows on, or adjacent to, tidal land, whether it is living or dead, standing or fallen;
   - The *Fisheries Act* does not define 'adjacent' as it relates to marine plants. In the absence of a definition, the Fish Habitat Management Operational Policy describes the application of 'adjacent' in terms of when a marine plant development permit application would be required for disturbance of plants in or adjacent to the tidal zone.

b) the material of a tidal plant, or other plant material on tidal land;

c) a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

Vegetation Management Act 1999

The clearing of native vegetation in Queensland is regulated by the VM Act, the *Sustainable Planning Act 2009* 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
- 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 a self-assessable code
- require notification and adherence to an area management plan
- 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 Resources for each proposed vegetation clearing activity.

No explicit VM Act exemptions for clearing flying-fox roosting or foraging vegetation were in place as of December 2021.

Animal Care and Protection Act 2001

The *Animal Care and Protection Act 2001* (ACP Act) provides for animal welfare. The ACP Act is administered by Biosecurity Queensland within the Department of Agriculture and Fisheries. The ACP Act applies to all living vertebrate animals, including wildlife. To comply with the ACP Act flying-fox management actions must not cause mental or physical suffering, pain or distress.

Civil Aviation Act 1998

The CA Act establishes Australia's Civil Aviation Safety Authority functions in relation to civil aviation, with particular emphasis on safety. Civil Aviation Safety Regulations 1998 Part 139 contains specific requirements for wildlife hazard management.

Appendix 2 Potential management options

Management option	Brief description	Suitability for Waratah Reserve
Flying-fox roost monitoring	Monitoring should always be the first stage when responding to resident concerns to determine what management actions (if any) may be required. Monitoring will be undertaken regularly, especially during an influx (e.g. monthly when the roost is present in baseline numbers and increased to fortnightly or weekly when roosting in larger numbers).	Appraisal: Adopt. Council should undertake regular monitoring in accordance with Section 5. This allows Council to maintain current knowledge of the site and determine what (if any) management actions may be appropriate with consideration to flying-fox numbers and extent.
Education and awareness programs	This option involves comprehensive and targeted flying-fox education and awareness program to provide accurate information to the local community about flying-foxes including information about managing impacts and alleviating concern about health and safety issues associated with flying-foxes, options available to reduce impacts from roosting and foraging flying-foxes, and information about flying-fox numbers and flying-fox behaviour at the roost. Noosa Shire Council has a history of managing flying-foxes through education and community engagement to foster awareness and understanding.	Appraisal: Adopt. Collecting and providing information should always be the first response to community concerns to alleviate concerns without the need to actively manage flying-foxes or their habitat. Education options should include installation of educational signage in the park, maintaining up to date ecology and human/animal health information on Council website, investigating implementing a school or wider community-based education program to alleviate unnecessary fears, and foster awareness and understanding.
Property modification	Property-level impact mitigation is one of the most effective ways to reduce amenity impacts to residents living adjacent to a flying-fox roost. Examples of property modifications include vehicle covers, carports, clothesline covers, clothes dryers, pool/spa covers, shade cloths, high-pressure water cleaners, air conditioners, fragrance dispensers or deodorisers, double-glazing of windows, door seals, screen planting, tree netting, and lighting (to discourage flying-foxes). Opportunities for funding assistance (e.g. subsidy programs – see below) may be available for management activities that reduce the need to actively manage a roost.	Appraisal: Adopt. Property modifications could help alleviate impacts and conflict experienced at the property level. Various property modifications can help alleviate impacts such as noise, smell, and faecal mess which are some of the highest concerns at this site.
Subsidy program - property modification /	Providing subsidies to property owners for property modifications can be used to manage the impacts of the flying-foxes. Examples of property modification subsidies are listed above. Providing subsidies to install infrastructure may improve the value of the property, which may also offset concerns regarding perceived or actual property value or rental return losses. Focusing funds towards manipulating the existing built	Appraisal: Adopt. Providing financial assistance to private landholders to implement property modifications can often make property

Management option	Brief description	Suitability for Waratah Reserve
item	environment also reduces the need for modification and removal of vegetation.	modification more financially viable and can help increase tolerance for living next to a flying-fox roost. Council should consider including partial funding of property modification items as part of the subsidy program.
Subsidy program - services	This management option involves providing property owners with a subsidy to help manage impacts on the property and lifestyle of residents. The types of services that could be subsidised include clothes washing, cleaning outside areas and property, solar panel cleaning, car washing, removing exotic trees, or contributing to water/electricity bills. Service subsidies may encourage tolerance of living near a roost, promote conservation of flying-foxes, can be undertaken quickly, will not impact on the roost site, and would reduce the need for property modification.	Appraisal: Adopt. Providing services to private landholders can often help increase tolerance for living next to a flying-fox roost. These can be quickly undertaken, and cleaning services undertaken by Council following the 2023 influx were well received. Council should consider including partial or fully funded services as part of the subsidy program, and/or continue to undertake cleaning services on private properties following influxes.
Routine roost maintenance and operational activities	All persons are authorised to undertake low impact activities at roosts in accordance with the Code of practice - Low impact activities affecting flying-fox roosts (Low Impact COP) (DES 2020b). Protocols should be developed for carrying out operations that may disturb flying-foxes, which can result in excess roost noise and risk flying-fox pup mortality. Such protocols may include limiting the use of disturbing activities to certain seasons or times of the day, as is adopted by Council.	Appraisal: Adopt. Continuing to undertake maintenance at the Reserve in a way that minimises disturbance to flying-foxes can help limit impacts to nearby residents. Maintaining vegetation to ensure minimal vegetation overhanging property boundaries will reduce impacts by provided an increased buffer between roost vegetation and property boundaries. Managing vegetation on private land in accordance with the Low Impact COP and Councils tree management policy will reduce the likelihood of flying-foxes roosting in backyards. Council could consider undertaking a review of the current service ranking for the Reserve to determine if a change in ranking is required.
Alternative habitat	This management option involves revegetating and managing land to create alternative flying-fox roosting habitat through improving and extending existing low-conflict roosts or developing new roosting habitat in areas	Appraisal: Investigate. Alternative habitat improvement may provide

Management option	Brief description	Suitability for Waratah Reserve
creation	away from human settlement. Potential habitat mapping using roost preferences and suitable land tenure can assist in initial alternative site selection. A feasibility study would then be required prior to site designation to assess likelihood of success and determine the warranted level of resource allocated to habitat improvement.	an alternative roost site to the Reserve, however it must be noted that it cannot be guaranteed flying-foxes will begin roosting in an improved area and vacate the Reserve. It could however increase the available habitat in the surrounding area in a lower conflict site that can provide them the opportunity to roost at. Council should undertake a feasibility study to determine the likelihood of success, determine if there are alternative suitable sites, and whether Council has the resources to undertake habitat improvement in lower conflict areas.
Provision of artificial roosting habitat	Artificial structures can be constructed to augment roosting habitat in current roost sites or to provide new roosting habitat. Trials using suspended ropes have had limited success as flying-foxes only used the structures that were very close to the available natural roosting habitat. It is thought that the structure of the vegetation below and around the ropes is important.	Appraisal: Not suitable. This option is not considered suitable as there is limited evidence that creating artificial roosting habitat is successful in attracting flying-foxes to roost on the artificial structures if created in lower conflict areas.
Protocols to manage incidents	This management option involves implementing protocols for managing incidents or situations specific to particular roosts. Such protocols may include monitoring at sites within the vicinity of aged care or childcare facilities, management of compatible uses such as dog walking or sites susceptible to heat stress incidents (when the roost is subjected to extremely high temperatures leading to flying-foxes changing their behaviour and/or dying).	Appraisal: Adopt. Council should respond to HSEs as per the Flying-fox Heat Event Response Guideline for south-east Queensland (Bishop et al. 2019) or consider developing a region-specific HSE document. Council should engage with wildlife carers and nearby residents and park users, particularly during potential mass mortality events such as HSEs and post-storm recovery.
Research	Participating in research is important to improve knowledge of flying-fox ecology to address the large gaps in our knowledge about flying-fox habits and behaviours and why they choose certain sites for roosting. Research should also aim to investigate the efficacy of new, innovative management technique, such as odour-neutralising technology. Further research and knowledge sharing at local, regional, and national levels will enhance our understanding and management of flying-fox roosts.	Appraisal: Adopt. New research should be reviewed at least annually and incorporated into flying-fox management where appropriate. Research can be used to identify native flowering events in the area and how this can impact flying-fox movements and roosting preferences. Council should continue liaising with other SEQ

Management option	Brief description	Suitability for Waratah Reserve
		Councils to share ideas and discuss efficacy of trialled management options.
Appropriate land-use planning	Land-use planning should be used to ensure adequate distances are maintained between future residential developments and existing or historical flying-fox roosts. While this management option will not assist in the resolution of existing conflict, it is critical to avoiding future conflict. Incorporating roost locations into the planning scheme and property documentation would also assist avoiding future conflict.	Appraisal: Adopt. Incorporate planning controls where possible to avoid new development applications being built on/near known roosts / suitable roosting habitat. This may include requirements for buffers, noise attenuating building materials, covered car parks and clotheslines, bedrooms and outdoor areas positioned furthest from the roost, and lawn or gardens over hard surfaces to reduce cleaning.
Property acquisition	Property acquisition may be considered if negative impacts cannot be sufficiently mitigated using other measures. This option will generally be cost prohibitive but may be considered.	Appraisal: Not suitable. This option would likely be cost prohibitive and unlikely to be acceptable to the community, therefore is not considered suitable for this site.
Buffers through vegetation removal	Vegetation removal can be used to create a buffer between residential properties and roosting flying-foxes to reduce noise, smell, and visual impacts. Vegetation removal aims to alter the area of the buffer habitat sufficiently so that it is no longer suitable as a roost. The amount required to be removed varies between sites and roosts, ranging from some weed removal to removal of most of the canopy vegetation.	Appraisal: Adopt. Council should maintain vegetation that is overhanging private properties. Creating a buffer larger than what is already established in the Reserve is likely not feasible given the legislative protection of core koala habitat, and there are no legislative exemptions for vegetation removal to create a flying-fox buffer.
Fire break as a flying-fox buffer	Maintaining a fire break can provide a buffer in between roosting vegetation and surrounding dwellings/buildings/properties. The width of the fire break is highly dependent on the rating of the area and the risk of a bushfire.	Appraisal: Not suitable. Due to the rating of the Reserve, creating a fire break is not required, as the width of the Reserve is not sufficient to develop a full formed flame front. There are currently no exemptions in legislation to clear vegetation specifically for flying-fox management. Given the Reserve is core koala habitat and is a high-risk area for protected plants, gaining an exemption to create a flying-fox buffer is highly unlikely.

Management option	Brief description	Suitability for Waratah Reserve
Buffers without vegetation removal	Permanent or semi-permanent deterrents can be used to make buffer areas unattractive to flying-foxes for roosting, without the need for vegetation removal. This is often an attractive option where vegetation has high ecological or amenity value. Buffer options include visual deterrents, noise emitters, smell deterrents, canopy-mounted sprinklers (CMS), and screening plants. CMS are the most commonly implemented and effective of these options, however, are not always suitable for every site.	Appraisal: Not suitable. Due to the limitations of the site, with majority of the Reserve being an average of 35 m wide, installing CMS which have a radius of 15 may result in excluding them from the site entirely. This also applies to the use of deterrents. Using deterrents in some areas may result in flying-foxes shifting closer to or in backyards of other properties, therefore would like just increase impacts at other areas. Deterrents also increase stress to the flying-foxes and may cause more impacts to residents, such as increased noise disturbance and faecal mess. Completely excluding them from the site with deterrents may result in inadvertent colony splintering to highly sensitive sites.
Noise attenuation fencing	Noise attenuation can be installed adjacent to residential properties to reduce noise and potentially odour where the roost is close to residents. Although expensive to install, this option could negate the need for habitat modification, maintaining the ecological values of the site, and may be more cost-effective than ongoing management. Perspex fencing could be investigated to assist fence amenity.	Appraisal: Not suitable. Due to the proximity of tall rooting vegetation to backyards, noise attenuating fencing would have to be as tall as the trees in the Reserve, which is not feasible.
Early intervention before a new roost is established	This management option involves monitoring potentially suitable areas and investigating community feedback for signs of flying-foxes beginning to roost (in the daylight hours) and then managing habitat (e.g. weed removal) or otherwise deterring a permanent roost from establishing.	Appraisal: Not suitable. Not applicable for this site, as this site is an established roost.
Nudging using low intensity disturbance	Noise and other low intensity active disturbance restricted to certain areas of the roost can be used to encourage flying-foxes away from high conflict areas. This technique aims to actively 'nudge' flying-foxes from one area to another, while allowing them to remain at the roost site. Unless the area of the roost is very large, nudging should not be done early in the morning as this may lead to inadvertent dispersal of flying-foxes from the entire roost site. Disturbance during the day should be limited in frequency and duration (e.g. up to four times per day for up to 10 minutes each) to avoid welfare impacts. As with dispersal, it is also critical to avoid periods when dependent young are present (as identified by a flying-fox expert).	Appraisal: Adopt if required. Nudging may be considered in some circumstances, such as if flying-foxes are roosting in backyard/s. This should be limited to no more than a few households to nudge the flying-foxes back to the Reserve. This should not be done on a large scale, as this could nudge flying-foxes into other conflict areas and simply will shift conflict from one location to another.

Management option	Brief description	Suitability for Waratah Reserve
Passive dispersal through vegetation removal	Passive dispersal involves the removal of some or all of the roosting vegetation at a given roost site, with the intention to decommission the roost. To be successful, this often involves removal of a significant amount of vegetation (often >70%). This is often highly expensive, results in a diminishing of the natural and ecological values and is often unacceptable to the community. Passive dispersal is likely less stressful on flying-foxes if done in a staged way compared to active dispersal, but the risks as per active dispersal with additional impacts of losing native vegetation.	Appraisal: Not suitable. Given the risk of the roost splintering into other high conflict areas, and other ecological and amenity values (core koala habitat and high-risk area for protected plants), passive dispersal is not suitable.
Active dispersal through disturbance	Multiple studies show that dispersal is rarely successful, especially without significant vegetation removal (not suitable for this site) or high levels of ongoing effort and significant expenditure (e.g. several years of daily works and over $1M for Sydney Botanic Gardens). Flying-foxes will almost always continue to roost in the area (generally within 600 m, Roberts and Eby 2013), and often splinter into several locations which may result in more widespread impacts.	Appraisal: Not suitable. Active dispersal is very resource intensive and costly, with highly unpredictable outcomes that can often worsen human-wildlife conflict (as demonstrated by previous dispersals across the state). Dispersals are very rarely effective long-term (as demonstrated with previous attempts across the state) and can cause splintering of roosts into other high conflict locations. Active dispersal often requires months of sustained dispersal efforts early in the morning or late at night and can cause increase disturbance to nearby residents. For these reasons, active dispersal is not supported at this site.

Appendix 3 Waratah Reserve action summary table

The below table provides an overview of potential management actions for Council that detailed in Section 4. Note approvals required for some actions. Some land management actions may also apply to private landholders (additional permits/approvals may be required for private property).

Timeframe	Management option	Council action	Permits/approval required	Timeframe
Short-term	Flying-fox roost monitoring	Undertake monitoring in response to increased customer requests. Monitoring should collect data including roost extent, number and species of flying-foxes, breeding status, general behavioural observations and impacts noticed while at the site (e.g. tree damage, excessive odour).	No.	Completed in response to influx February and March 2023. Future potential influxes: Within one week of increase customer requests.
	Education and awareness programs	Develop and distribute fact sheet for residents, outlining impact mitigation options available at a property level and corresponding legislative requirements.	No.	Completed in response to influx February and March 2023. Future potential influxes: Within two weeks of influx.
		Consult with the primary-impacted resident/s and the Hibiscus Noosa Outlook Retirement Village (e.g. via house visit, phone call, email, letter drop), especially prioritised towards residents where flying-foxes are roosting on, or directly adjacent to their property. The level of consultation will depend on the roost dynamics (number, extent etc.) and level of conflict.	No.	Completed in response to influx February and March 2023. Future potential influxes: Within two weeks of influx (if required, see Section 5).

Timeframe	Management option	Council action	Permits/approval required	Timeframe
		Install temporary signage at high-trafficked areas/reserve entrance points during an influx to convey key flying-fox information and promote conservation. This should especially be focused around conveying that large influxes are often temporary. Temporary signage should also be used if areas of the Reserve require closure.	No.	Future potential influxes: Within two weeks of influx (if required, see Section 5).
		Provide guidance for private landholders seeking further clarification regarding management activities on private land (such as vegetation management or nudging).	No.	Ongoing on an ad hoc basis.
	Routine roost maintenance and operational activities	If required (e.g. due to safety risk), prohibit access the Reserve by installing temporary closure signs and access barriers at Reserve entrance points. Scheduled maintenance in/adjacent to the Reserve (such as mowing) should also be temporarily delayed in order to avoid unnecessary disturbance to flying-foxes.	No.	Completed in response to influx February and March 2023. Future potential influxes: ASAP if area is determined to be a safety risk (see Section 5).
	Subsidy program – services and property modifications/items	Distribute, subsidise and/or provide information regarding indoor odour-neutralising pots to primary affected residents to alleviate odour impacts.	No.	Completed in response to influx February and March 2023. Future potential influxes: Provide information for private landholders to purchase or subsidise if required (see Section 5 for details).

Timeframe	Management option	Council action	Permits/approval required	Timeframe
	Buffers through vegetation removal	Undertake understorey weed management in the buffer areas, especially focused on primary-impacted properties and high-trafficked areas of the Reserve (e.g. Reserve entrances). Council should aim to establish a minimum of a 2 m buffer in these areas*. Can be undertaken in conjunction with the below line if weed removal is unlikely to be sufficient in establishing a buffer.	All contractors must comply with the following legislation regulating the use of chemicals for the project: *Agricultural Chemicals Distribution Control Act 1996, Land Protection (Pest and Stock Route Management) Act 2002, Chemical Usage (Agricultural and Veterinary) Control Act 1988.* Weed management activities shall be undertaken as required to control weeds that are listed under the *Biosecurity Act 2014*.	Completed in response to influx March/April 2023. Future potential influxes: Within two weeks of influx (if required, see Section 5).
		Undertake midstorey/canopy vegetation management (e.g. tree trimming/removal) in immediate buffer areas where flying-foxes are currently roosting and are causing a direct impact on private properties and/or public footpaths (e.g. tree trimming/removal along property boundaries where trees are overhanging private properties and areas with trees overhanging footpaths). Council should aim to establish 2 m buffers in these areas *	Vegetation removal in core koala habitat that is not classified as exempt (e.g. essential maintenance, firebreak maintenance, weed management) would require approval under the Planning Regulation and VM Act. Potential Council approval if undertaking tree modification in an 'area of biodiversity significance'. Vegetation removal in an area mapped as a high-risk area under the NC Plants Regulation (which is applicable to the Reserve), a flora survey report is required to identify the presence of protected plant species. Vegetation clearing cannot be	Completed in response to influx March/April 2023. Future potential influxes: Undertake if required, see Section 5 for timing.

Timeframe	Management option	Council action	Permits/approval required	Timeframe
			undertaken if it will impact a protected plant DES notification required for works outside of the Low Impact COP.	
	Nudging using low intensity disturbance	Consider localised nudging if flying-foxes continue to roost in backyards after undertaking buffer works. This should be conducted using low intensity disturbance methods, such as the use of visual or noise deterrents to encourage flying-foxes back to the Reserve. Nudging should be limited to a few select locations at any given time to avoid flying-foxes shifting into other backyards.	Council's 'as-of-right' authority under the Roost Management COP does allow for nudging but should not be very early during in the day to avoid inadvertent dispersal/splintering. DES notification is required prior to nudging activities and an FFRMP may be required for daytime disturbance.	As required (to be undertaken only when dependent young will not be impacted).
	Dispersal	If all other management options have been exhausted and the roost continues to cause significant risk/impacts and is classified as high conflict in accordance with Councils SoMI, dispersal may be considered after undertaking a risk management analysis.	Council's 'as-of-right' authority under the Roost Management COP does allow for nudging in line with the parameters outlined in the Roost Management COP. DES notification is required prior to dispersal activities.	As a last resort if all management options are exhausted.
Post-influx actions	Subsidy program – services and property modifications/items	Provide services subsidies such as high-pressure cleaning of properties for primary impacted residents, with consideration to available budget as part of the establish subsidy program.	Council approval required.	The established subsidy program was expanded in March 2023 for eligible residents impacted by the Reserve roost. Future potential influxes: Undertake within two weeks of flying-foxes

Timeframe	Management option	Council action	Permits/approval required	Timeframe
				vacating the Reserve.
	Routine roost maintenance and operational activities	Continue to undertake regular reserve maintenance of the Reserve (e.g. removal of woody debris, pressure cleaning of footpaths, understorey weed removal), especially following larger influxes*.	No permit required for ongoing maintenance works including weed management and habitat improvement. No notification required if tree trimming complies with the Low Impact COP. Vegetation removal in core koala habitat that is not classified as exempt (e.g. essential maintenance, firebreak maintenance, weed management) would require approval under the Planning Regulation and VM Act. Vegetation removal in an area mapped as a high-risk area under the NC Plants Regulation (which is applicable to the Reserve), a flora survey report is required to identify the presence of protected plant species. Vegetation clearing cannot be undertaken if it will impact a protected plant.	Completed in response to influx April 2023. Future potential influxes: Undertake if required (see Section 5).
	Buffers through vegetation removal	Reassess the need for and undertake (if required) additional vegetation and weed management following a large influx. This could include undertaking weed management where weeds have re-established, trimming trees where trees are overhanging property boundaries etc. Buffer works should aim to establish a minimum of a 2 m buffer adjacent to property boundaries and footpaths*.	Vegetation removal in core koala habitat that is not classified as exempt (e.g. essential maintenance, firebreak maintenance, weed management) would require approval under the Planning Regulation and VM Act.	Complete by November 2023 response to March 2023 influx. Future potential influxes: Assess at least annually, particularly before

Timeframe	Management option	Council action	Permits/approval required	Timeframe
			Vegetation removal in an area mapped as a high-risk area under the NC Plants Regulation (which is applicable to the Reserve), a flora survey report is required to identify the presence of protected plant species. Vegetation clearing cannot be undertaken if it will impact a protected plant. Potential Council approval if undertaking tree modification in an 'area of biodiversity significance'. DES notification required for works outside of the Low Impact COP.	potential seasonal influxes (i.e. prior to winter, late spring/early summer).
Long-term	Flying-fox roost monitoring	Undertake regular monitoring of the Reserve roost to better understand trends of the roost extent, population numbers, species present and timing of occupation on a seasonal basis.	No.	Ongoing.
	Research	Incorporate new flying-fox management research into ongoing management where appropriate.	Research permit and Animal Ethics Committee approval may be required for some research.	Ongoing with detailed review annually.
		Continue sharing learnings with other SEQ Councils.	No.	Quarterly.
	Subsidy program – services and property modifications/items	Undertake a subsidy program review to ensure a transparent and categorical subsidies program to allow for consistent delivery of effective subsidies to primary-impacted residents.	No.	Undertake review before 2025 and reassess as biennially or as required.

Timeframe	Management option	Council action	Permits/approval required	Timeframe
	Education and awareness programs	Education will form an important part of the ongoing management of flying-foxes to alleviate misconceptions and unnecessary fears. Increase engagement with the community (e.g. via social media posts) to ensure access to up-to-date information is available (the low-health risk of living with flying-foxes, ecological importance of flying-foxes etc.), and residents are aware of impact mitigation options available at a property level (e.g. odour-neutralising gel pots, sound-proof curtains, white noise machines) and legislative responsibilities. Investigate potential for facilitating a flying-fox educational program at schools in the region and education programs for the wider community. Facilitate community restoration activities at the Reserve and potentially involve the community in habitat restoration at alternative sites.	No.	Increase community engagement on an ongoing basis. Consider educational program and facilitated community restoration activities by 2025.
	Protocols to manage incidents	Council should respond to HSEs as per the Flying-fox Heat Event Response Guideline for south-east Queensland (Bishop et al. 2019) or consider developing a region-specific HSE document. Council should engage with wildlife carers and nearby residents and park users, particularly during potential mass mortality events such as HSEs and post-storm recovery	Appropriately trained and vaccinated personnel are required to handle and care for injured/sick/deceased flying-foxes.	Ongoing.
	Appropriate land use planning	Incorporate planning controls where possible to avoid new development applications being built on/near known roosts / suitable roosting habitat. This may include requirements for buffers, noise attenuating building materials, covered car parks and clotheslines, bedrooms and outdoor areas positioned furthest from the roost, and lawn or gardens over hard surfaces to reduce cleaning.	Consideration to Council planning scheme required.	Investigate as required.
	Buffers through vegetation removal	Undertake ongoing vegetation and weed management in buffer areas to discourage flying-foxes roosting in high-conflict buffer zones. If weed management occurs across wider areas of the Reserve (i.e. outside of immediate buffer zones), weed removal needs to be undertaken in a staged approach. Reassess vegetation adjacent to property boundaries annually for encroaching vegetation. Vegetation and weed assessments should be undertaken quarterly to ensure adequate buffers between the Reserve and property boundaries. Tree thinning in the Reserve may be considered, however may increase impacts and increase risk of colony splintering*.	Vegetation removal in core koala habitat that is not classified as exempt (e.g. essential maintenance, firebreak maintenance, weed management) would require approval under the Planning Regulation and VM Act. Vegetation removal in an area mapped as a high-risk area under the NC Plants Regulation (which is applicable to the Reserve), a flora survey report is required	Ongoing.

Timeframe	Management option	Council action	Permits/approval required	Timeframe
			to identify the presence of protected plant species. Vegetation clearing cannot be undertaken if it will impact a protected plant. Potential Council approval if undertaking tree modification in an 'area of biodiversity significance'. Consultation with State government to assess potential significant impacts to koala habitat before tree thinning. DES notification required for works outside of the Low Impact COP.	
	Routine roost maintenance and operational activities	Conduct an internal review of the reserve service ranking to determine if changes to the service level is required.	Potential Council approval if changing service ranking.	Annually.
	Alternative habitat creation	Undertake feasibility study to assess alternative suitable habitat the area and investigate the likelihood of success if alternative habitat improvement was undertaken in attracting flying-foxes away from the Reserve.	Study will be undertaken by a suitably qualified and experienced person knowledgeable in the ecology of flying-foxes.	Investigate by 2025.

* Vegetation works should be undertaken as night works if flying-foxes are likely to be impacted. Works should avoid times when crèching young are present, however low impact works (e.g. understorey weed removal) may be undertaken if flying-foxes are not disturbed. In line with Council's tree management policy, consultation with a Council or external consultant arborist is required prior to undertaking vegetation management.

Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	26/05/2023	Waratah Reserve Flying-fox Management Plan draft	Tegan Dinsdale, Fauna Ecologist	Jess Baglin, Senior Environmental Scientist	Jess Bracks, Principal Wildlife Biologist
01	04/07/2023	Waratah Reserve Flying-fox Management Plan draft R1	Tegan Dinsdale, Fauna Ecologist	Jess Bracks, Principal Wildlife Biologist	
02	11/07/2023	Waratah Reserve Flying-fox Management Plan draft R2	Tegan Dinsdale, Fauna Ecologist	Jess Bracks, Principal Wildlife Biologist	
03	22/09/2023	Waratah Reserve Flying-fox Management Plan draft R3	Tegan Dinsdale, Fauna Ecologist	Jess Bracks, Principal Wildlife Biologist	
04	25/10/2023	Waratah Reserve Flying-fox Management Plan	Tegan Dinsdale, Fauna Ecologist	Jess Bracks, Principal Wildlife Biologist	

Distribution List

Copy #	Date	Type	Issued to	Name
1	25/10/2023	Electronic	Noosa Shire Council	David O'Gorman
2	25/10/2023	Electronic	Ecosure	Administration

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