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eurobodalla shire council

Eurobodalla Flying-fox Management Plan

November 2018

EUROBODALLA SHIRE COUNCIL

ecology / vegetation / wildlife / aquatic ecology / GIS

Summary

Flying-foxes are protected in New South Wales under the *National Parks and Wildlife Act 1974*. As a threatened species, the grey-headed flying-fox is also protected under the *Biodiversity Conservation Act 2016* and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* The Eurobodalla Flying-fox Management Plan has been prepared in accordance with this legislation and the New South Wales Flying-fox Camp Management Policy 2015. Additional legislation or approvals apply to other values at camp sites, as outlined within.

Purpose

The purpose of the Plan is to provide a framework to reduce impacts of flying-foxes on people within the Eurobodalla Shire, whilst conserving flying-foxes and the ecosystem services they provide. Objectives of the Plan are to:

- improve Council's ability to respond to changes in the impacts of flying-foxes
- more effectively manage the impacts of flying-foxes on people
- manage impacts of flying-foxes in ways that are economically sustainable
- improve the resilience of the community and infrastructure to flying-fox impacts
- improve community awareness and understanding of flying-fox ecology and behaviour
- improve conservation outcomes for flying-foxes in the Eurobodalla.

Community engagement

Extensive effort was made to engage with our community in the development of this Plan, guided by a specific Community and Stakeholder Engagement Plan, which was prepared in accordance with Council's *Community Engagement Framework*.

This engagement process aimed to:

- understand the community's awareness of and concerns regarding flying-foxes
- gain feedback regarding management actions undertaken by Council to date
- seek feedback from the community to identify the most appropriate management actions at camps and when the most appropriate time is to undertake these actions.

This feedback was used to inform the Plan, including Council's planned approach to managing impacts associated with flying-foxes in the Eurobodalla.

Camp Locations

Eight flying-fox camps are known in the Eurobodalla:

- Water Gardens
- Catalina
- Moruya township
- Moruya Heads
- Narooma
- Nelligen Creek
- Tuross
- Wamban.

The Plan will also apply to newly formed camps on Council-owned and managed land.

Council intentions

Council is committed to:

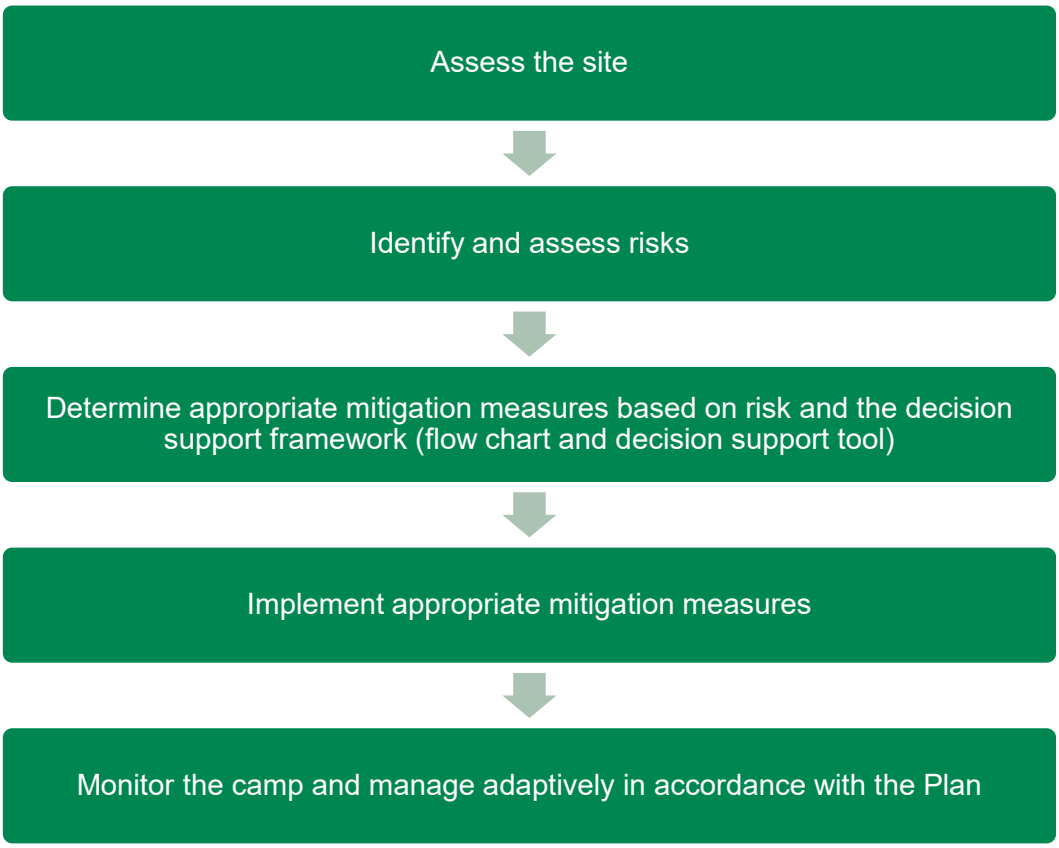
- transparently managing flying-fox camps on Council-owned and managed land (the management of flying-foxes on non-Council land is the responsibility of the landholder, although Council will provide support and information regarding impact mitigation)
- reducing the impacts of roosting flying-foxes through staged management and mitigation options (Council is limited in how it can assist with the impacts of foraging flying-foxes however will provide support and advice about how landholders can reduce these impacts).

Management framework

Council takes a risk-based approach to management, where camp intervention is generally only considered where there is actual risk that cannot be otherwise managed. The level of risk for each known camp has been assessed in this Plan and mitigation actions detailed within.

Managing the impacts of flying-foxes on people is a complex problem and a decision support tool has been developed to guide the most appropriate management response. The support tool is based on assessing impacts of roosting flying-foxes on social, environment or financial factors, then determining the level of mitigation action required.

An overview of Council's response to concerns about roosting flying-fox is shown in the flow chart below.



Management actions

In accordance with the NSW Camp Management Policy, Council will take a hierarchical approach to management, beginning with Level 1 actions and progressing to Level 2 or 3 only if required.

Specific management actions are detailed in the Plan based on assessment of each available option and suitability in the Eurobodalla context.

Council will adopt, or investigate further (e.g. on a site-specific basis) the following general management options in alignment with the Flying-fox Camp Management Policy 2015.

Level 1:

- Adopt – education and awareness programs, odour reducing/masking plants, routine camp management, protocols to manage incidents, research
- Investigate further – property modification / service subsidies, alternative habitat creation, appropriate land-use planning.

Level 2:

- Adopt - Buffers through vegetation removal, buffers without vegetation removal (visual deterrents, canopy mounted sprinklers)

- Investigate further – noise attenuation fencing.

Level 3:

- Investigate further – nudging and dispersal.

Level 3 intervention will generally only be considered in extreme circumstances where justified through Council's management framework and sufficient resources are available. Dispersal is a high risk and expensive management action. If successful, it generally only provides temporary outcomes, with flying-foxes regularly attempting to return to the original site. The community's preference for long-term solutions require long-term and strategic actions such as undertaking and supporting research to inform impact mitigation, land-use planning and development controls, and ensuring flying-fox habitat is available and protected in suitable locations.

Plan implementation

Council is responsible for implementation of the Plan once it has been endorsed by the NSW Office of Environment and Heritage, including but not limited to:

- obtaining licences if required under State legislation for Level 2 or Level 3 actions
- sourcing and allocating resources to implement the Plan
- referring Level 2 or 3 actions to the Australian Government if they have potential to result in a significant impact to species, populations or ecological communities listed under Commonwealth legislation
- ensuring actions are in accordance with relevant conditions of licences, approvals, agreements, and the Plan.

Council will seek advice from state and commonwealth regulators and other flying-fox experts as required during Plan implementation.

Acknowledgements

Eurobodalla Shire Council and Ecosure would like to thank everyone who provided feedback during community consultation, with all comments considered in the development of this Plan and incorporated where possible. Community engagement for the Plan was led by the University of Technology Sydney, Centre for Local Government, and their expertise in facilitating effective engagement was of great benefit to ensure the needs of the community are met in this framework.

We gratefully acknowledge input into the conceptual decision-support tool by the following land managers and regulators experienced in flying-fox management: Mike Roache, Office of Environment and Heritage; Dr John Martin, Royal Botanic Gardens Sydney; Lorraine Oliver, Office of Environment and Heritage; Jason Ferris, Department of the Environment and Energy; Bradley Nolan, Hunter Joint Organisation of Councils; Beth Noel, Sutherland Shire Council; Dr Pia Lentini, University of Melbourne and Kaye Currey, University of Melbourne.

NSW Office of Environment and Heritage assisted the Plan through the provision of data collected as part of the National Flying-fox Monitoring Program, and by developing the Flying-fox Camp Management Plan Template 2016 on which this Plan was based. We also thank Dr Peggy Eby who provided advice.

Acronyms and abbreviations

ABLV	Australian bat lyssavirus
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BDAR	Biodiversity Development Assessment Report
BFF	Black flying-fox (*Pteropus alecto*)
CE	Critically endangered
COP	Draft Code of Practice Authorising Camp Management Actions 2018 (NSW)
Council	Eurobodalla Shire Council
DoEE	Department of the Environment and Energy (Commonwealth)
DPI	Department of Primary Industries (NSW)
E	Endangered
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
the Eurobodalla	Eurobodalla Shire Council area
FF	Flying-fox
GHFF	Grey-headed flying-fox (*Pteropus poliocephalus*)
the guideline	Referral guideline for management actions in grey-headed and spectacled flying-fox camps 2015
HeV	Hendra virus
LEP	Local Environmental Plan
LGA	Local government area
LGNSW	Local Government New South Wales
LRFF	Little red flying-fox (*Pteropus scapulatus*)
MNES	Matters of national environmental significance
NFFMP	National flying-fox monitoring program
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPWS	National Parks and Wildlife Service (NSW)
OEH	Office of Environment and Heritage (NSW)
the Plan	this Flying-fox Management Plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
the Policy	Flying-fox Camp Management Policy 2015 (OEH)
SEPPs	State Environmental Planning Policies
TEC	Threatened ecological community
V	Vulnerable

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1 Introduction

This Flying-fox Management Plan (the Plan) provides a framework to reduce impacts of flying-foxes on people within the Eurobodalla Shire Council area (the Eurobodalla), whilst also conserving flying-foxes and the important ecosystem services they provide.

The primary focus of the Plan is to manage the impacts of roosting flying-foxes on communities within 300 m of a flying-fox camp. Council will provide a supporting role to any community impacted by roosting flying-foxes, however will only consider active management of camps on Council-managed land.

Three species of flying-foxes occur in New South Wales (NSW):

- grey-headed flying-fox (*Pteropus poliocephalus*) (GHFF)
- black flying-fox (*P. alecto*) (BFF)
- little red flying-fox (*P. scapulatus*) (LRFF).

All three species and their habitats are protected under NSW legislation. Only GHFF have been recorded in the Eurobodalla to date. In addition, the GHFF is afforded protection under Commonwealth legislation as a Vulnerable species due to significant population declines in recent decades. Species profiles are available in Appendix 1.

Flying-foxes are highly nomadic, moving across their range between a network of national camps. Camps may be occupied continuously, annually, irregularly or rarely (Roberts 2005), and numbers can fluctuate significantly on a daily/seasonal basis. Flying-foxes may travel up to 100 km a night in search of food resources (nectar, pollen and fruit), and their occurrence within the Eurobodalla is tightly linked to flowering and fruiting of foraging trees. In 2016, an estimated 40% of the national GHFF population were in Batemans Bay (CSIRO 2016); a temporary influx linked to an uncommon (but regular) mass flowering event (Ecosure 2016).

Flying-foxes are increasingly roosting and foraging within urban areas. Factors contributing to this include loss of natural habitat, reliable year-round food resources on residential and public lands, reduced pressure from predators and ease of navigation. Flying-foxes will continue to return to established camps in Eurobodalla, usually in summer and autumn. Favourable habitat and food resources within the Eurobodalla mean that camps may also establish in new locations. It is very difficult to predict how many flying-foxes will return each season or where they will go, and impacts may occur anywhere across the Eurobodalla.

Living near a flying-fox camp can be challenging for communities, with impacts associated with noise, odour, faecal drop, damage to vegetation, property and concern about potential health risks. There are also challenges associated with management. Approval is required under legislation to manage a camp. Attempts to relocate flying-foxes are extremely costly, and often splinter a camp to multiple undesirable locations that are difficult to predict. Flying-foxes will also regularly attempt to recolonise their preferred camp site when resources are available, and it is not appropriate or possible to remove all of the flowering and fruiting trees that attract them to the Eurobodalla.

Eurobodalla Shire Council (Council) is committed to assisting communities affected by flying-foxes, and this Plan has been developed to enable Council to more readily respond to and help reduce these impacts. The Plan sets out how Council will make decisions about managing flying-fox impacts in both the short and longer term, with a transparent framework for assessing new and existing flying-fox camps. There are currently eight known flying-fox camps in the Eurobodalla; Batemans Bay (Water Gardens and Catalina), Buckenbowra (Nelligen Creek), Moruya (Moruya Township), Moruya Heads (Moruya Heads), Narooma (Narooma), Tuross Head (Tuross) and Wamban (Moruya Beashels Trig) (Figure 1). The number of flying-foxes at each camp is seasonally variable, depending on the availability of foraging resources. As shown in Figure 1, some camps are regularly occupied with others rarely used.

The Plan provides an illustrated profile of each known camp within the Eurobodalla including site context, camp history, other ecological values, proximity of sensitive receptors and risk assessment. All these site-specific aspects have been considered in determining appropriate management and conservation actions for each camp.

A Community and Stakeholder Engagement Plan has been implemented in the development of this Plan to ensure the values of the Eurobodalla community are considered, and concerns with communities who have been directly impacted are addressed.

The Plan is an adaptive document that can be updated as situations change or further research improves our understanding of flying-foxes and management of community impacts. The Plan succeeds all previous flying-fox management plans and should be read with referral to other relevant documentation including NSW and Australian government approvals.

1.1 Plan objectives

The Plan has been prepared in accordance with the NSW Flying-fox Camp Management framework, administered by the Office of Environment and Heritage (OEH), to facilitate appropriate and timely responses to manage community impacts from flying-fox camps.

Objectives of the Plan are, within the legislative framework, to:

- improve Council's ability to respond to changes in the impacts of flying-foxes
- more effectively manage the impacts of flying-foxes on people
- manage impacts of flying-foxes in ways that are economically sustainable
- improve the resilience of the community and infrastructure to flying-fox impacts
- improve community awareness and understanding of flying-fox ecology and behaviour
- improve conservation outcomes for flying-foxes in the Eurobodalla.

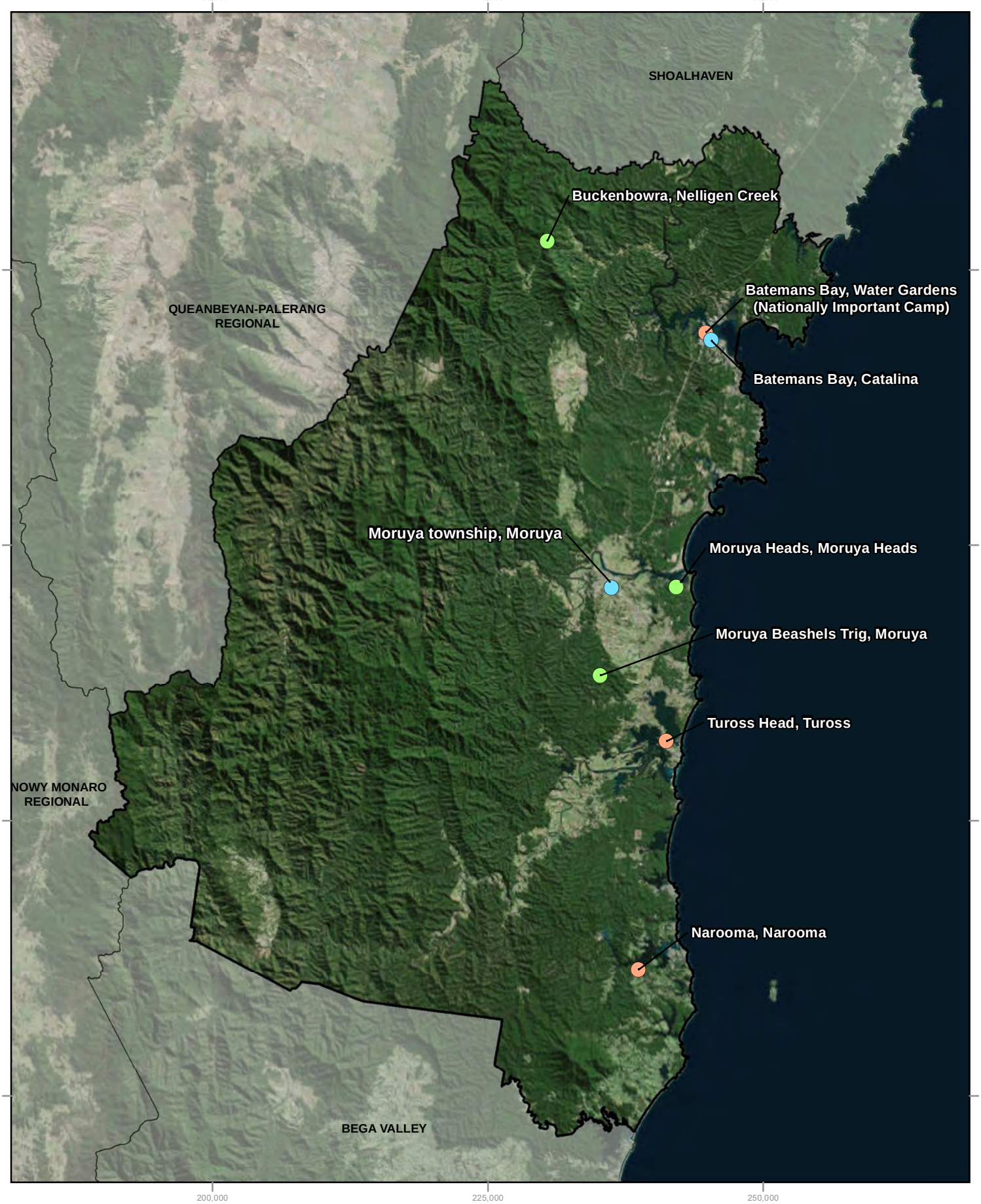

Figure 1: Flying-fox camp locations in the Eurobodalla

Eurobodalla Shire Council

Flying-fox Management Plan

- Annual
- Irregular
- Rare

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 1/08/2018

0 2.5 5 10
Kilometers

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

PR2916_MP1_FlyingFoxLocations
A4

2 Flying-foxes in the Eurobodalla

2.1 Legislation

Flying-foxes are protected native wildlife that provide a critical ecological role in long-distance seed dispersal and pollination (see Appendix 1). As such, there is a range of legislation and policy that governs how flying-foxes and their habitat can be managed. If flying-foxes are being unlawfully and intentionally disturbed please report to NSW Office of Environment and Heritage's Environment Line by calling 131 555.

Key legislation specific to flying-fox camp management is summarised in Table 1, with further detail in Appendix 2. Legislation beyond that discussed in the Plan may apply to some sites.

Table 1 Summary of key legislation

Level	Instrument	Relevance to Plan implementation
Commonwealth	*Environment Protection and Biodiversity Conservation Act 1999*	Approval under the Act may be required for any action likely to impact a Matter of National Environmental Significance (MNES) e.g. nationally threatened species (such as the GHFF) or ecological communities, world heritage sites, wetlands of international importance. The Referral guideline for management actions in GHFF and Spectacled Flying-fox camps (DoE 2015) specifies requirements for camp management, and when referral is required prior to undertaking management. The Guideline defines a nationally important GHFF camp (e.g. the Water Gardens). A National Interest Exemption was granted under the Act for dispersal without referral during the Batemans Bay influx. A condition of the Exemption was that a Conservation Agreement be developed between the Australian Government and Eurobodalla Shire Council (see Appendix 3). A requirement of the Conservation Agreement was that this Plan be developed.
State	Flying-fox Camp Management Policy 2015	The Policy specifies which actions are permissible without OEH approval, with actions categorised as Level 1, Level 2 or Level 3. The Policy, which OEH uses to make regulatory decisions, specifies a hierarchical approach to management based on the principle of using the lowest form of intervention. This Plan is aligned with the Policy.
	Biodiversity Conservation Act 2016 and Draft Code of Practice Authorising Camp Management Actions 2018 (COP)	Camp management activities not specified as 'routine camp management' in the Policy require the landholder (Council or private) to obtain a licence under the Act. If the draft COP is approved, managers of public land (e.g. Council) may be able to undertake some actions on that land without the need for a licence, provided they are done in accordance with the COP. Private landholders will still require a licence. Council currently holds a Biodiversity Conservation Licence for dispersal in Batemans Bay if required, feasible (e.g. resources are available) and appropriate in the future (Appendix 4). A decision to disperse will be determined through the management framework in Section 5. The Act provides for a private land conservation program that provides opportunities for protection and management of flying-fox habitat.
	Local Government Act 1993	Provides a framework for local government to act in an effective, efficient, environmentally responsible and open manner, and

Level	Instrument	Relevance to Plan implementation
		encourages community participation in Council affairs.
	National Parks and Wildlife Act 1974	Provides for the conservation of nature, objects, places or features of cultural value. Approval may be required if impacts are likely to any of these values.
	Prevention of Cruelty to Animals Act 1979	It may be an offence under the Act if there is evidence of animal torment or suffering as a result of management. Compliance with measures in Appendix 5 will ensure compliance with the Act.
	Environmental Planning and Assessment Act 1979	Sets the framework to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment. Local Environmental Plans and development control plans under the Act should include provisions for avoiding and minimising impacts on flying-foxes and their habitat and on people by flying-foxes where development is proposed near a flying-fox camp.
	State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017	The Vegetation SEPP regulates vegetation removal on on-rural land that is not associated with another approval or exemption. A permit from Council is required to cut down, fell, root, kill, poison, ringbark, burn or otherwise destroy prescribed vegetation, or lop or otherwise remove a substantial part of the prescribed vegetation to which the Policy applies. Where proposed vegetation removal exceeds the Biodiversity Offsets Scheme thresholds identified in the Biodiversity Conservation Act landholders would need to prepare a Biodiversity Development Assessment Report (BDAR) and seek approval from the Native Vegetation Panel.
	State Environmental Planning Policy (Coastal Management) 2018	The Coastal Management SEPP defines the coastal zone and establishes development controls for development within the coastal zone. Coastal wetlands, littoral rainforest, coastal environmental areas and coastal use areas are mapped in the SEPP.

2.2 Flying-foxes in urban areas

All flying-foxes are nocturnal, roosting during the day in communal camps. These camps may range in number from a few to hundreds of thousands, with individual animals frequently moving between camps within their range. Typically, the abundance of resources within a 20-50 kilometre radius of a camp site will be a key determinant of the size of a camp (SEQ Catchments 2012). Therefore, flying-fox camps are generally temporary and seasonal, tightly tied to the flowering of their preferred food trees. However, understanding the availability of foraging resources is difficult because flowering and fruiting are not reliable every year and vary between locations (SEQ Catchments 2012). This highlights the need for a multi-faceted approach to management that is continually adapted as situations change or further research improves our understanding of flying-foxes and their management.

Flying-foxes appear to be roosting and foraging in urban areas more frequently. During a study of national flying-fox camp occupation, almost three quarters of the 310 active GHFF camps (72%) were located in urban areas, 22% on agricultural land and only 4% in protected areas (Timmiss 2017). Furthermore, the number of camps increased with increasing human population densities (up to ~4000 people per km^2) (Timmiss 2017).

There are many possible drivers for this urbanising trend, as summarised by Tait et al. (2014):

- loss of native habitat and urban expansion
- opportunities presented by year-round food availability from native and exotic species found in expanding urban areas
- disturbance events such as drought, fires, cyclones
- human disturbance or culling at non-urban camps or orchards
- urban effects on local climate
- refuge from predation
- movement advantages, e.g. ease of manoeuvring in flight due to the open nature of the habitat or ease of navigation due to landmarks and lighting.

These drivers mean that flying-foxes will return to urban areas within the Eurobodalla, and are likely to establish new camps in urban areas in the future. This highlights the need for an adaptive management program to respond to conflict when it arises.

2.3 Community impacts

Flying-foxes in urban areas are commonly the source of conflict with the community. Community concerns reported by the Eurobodalla community include:

- noise, particularly depriving sleep and contributing to other health issues, and reduced amenity
- odour entering homes and reduced lifestyle amenity
- faecal drop on vehicles, washing and outdoor areas
- fear of disease transfer to humans and domestic animals concerns regarding water quality of water tanks, pools and natural waterbodies
- powerline strike and power outages
- damage to vegetation and visual amenity
- flying-foxes excluding or deterring other wildlife from camp sites
- flying-fox/aircraft strike.

This Plan aims to provide Council with a framework and management actions to reduce impacts on members of the community.

2.3.1 Noise

Noise is reported by the Eurobodalla community as one of the most significant impacts associated with flying-fox camps. A highly sociable and vocal animal, the activity heard from flying-foxes at camps includes courting, parenting and establishing social hierarchy. Eurobodalla residents report noise is most disturbing pre-dawn, and most impacting during the breeding season (e.g. during mating March/April, and pup rearing in spring/summer).

Monitoring camp background noise levels and the levels duration and frequency of noise from

flying-fox camps may aid in understanding how and when Council assists in managing intrusive noise levels.

Council engaged specialist consultants to undertake a noise monitoring trial at a camp similar to those located within the Eurobodalla. Results of this trial, and recommendations for future projects to expand these learnings are provided in Appendix 6.

2.3.2 Odour

Flying-foxes use pheromones to communicate with each other, which is the source of the characteristic musky smell around their camps and some foraging trees.

There are a number of factors that will affect odour detectability and intensity, such as the number of flying-foxes at a camp, weather conditions, wind direction, and site characteristics.

Odour may be more intense during the breeding and rearing season as female flying-foxes use scent to find their pups after foraging, and males regularly mark their territories. Likewise, odour is stronger after rain as males remark branches in their territories.

Odour monitoring around problematic camps may assist Council to understand odour occurrence and dispersion and the effects on community amenity. An odour neutralising system trial may be investigated with the aim of providing another option to address nuisance odour issues (see Section 7).

Council engaged specialist consultants to undertake an odour monitoring trial at a flying-fox camp similar to those located within the Eurobodalla. Results of this trial, and recommendations for future projects to expand these learnings are provided in Appendix 6.

2.3.3 Faecal drop

Flying-foxes have an extremely fast digestive process with only 12-30 minutes between eating and excreting (SEQ Catchments 2011). Given that flying-foxes regularly forage 20 km from their camp (Markus & Hall 2004), and that when dispersed establish new camps within 600 m – 6 km (Appendix 7), attempting to relocate a camp will not reduce this impact. As such faecal drop impacts are best managed at an individual property level (see Appendix 8).

As with any animal excrement standard hygiene measures should be adopted, however there is no evidence to suggest that contact with flying-fox faeces or urine poses risk of disease, or water quality issues.

2.3.4 Human and animal health

Noise, odour, faecal drop and other aspects of living near a flying-fox camp can contribute to anxiety, sleep deprivation, and impact people's mental health and wellbeing. This secondary impact is difficult to quantify, and will vary with people's situations and tolerance levels. Council will provide support, and work with affected community members to mitigate impacts causing concern.

Fear of disease is reported as one of the top concerns of the Eurobodalla community regarding flying-foxes. Flying-foxes, like all animals, carry pathogens that may pose human health risks. Many of these do not produce symptoms in flying-foxes but have the potential to cause significant disease in people or other animals. In Australia, diseases of concern are Australian bat lyssavirus (ABLV) and Hendra virus (HeV).

Except for those people whose occupations include close contact with bats or potentially infected domestic animals (such as wildlife carers and veterinarians) human exposure is extremely rare. These diseases are also easily prevented through vaccination, safe flying-fox handling (by trained and vaccinated personnel only) and appropriate horse husbandry. Therefore, despite the fact that human infection with these agents can be fatal, the probability of infection is extremely low and the overall public health risk is also judged to be low (Qld Health 2016).

Transmission of closely related viruses suggests that contact or exposure to bat faeces, urine or blood does not pose a risk of exposure to these viruses, nor does living, playing or walking near bat roosting areas (NSW Health 2013).

2.3.4.1 Australian Bat Lyssavirus

Less than 1% of the flying-fox population is infected with ABLV, and transmission is through a bite or scratch from an infected bat. Effective pre- and post-exposure vaccinations are available.

If a person is bitten or scratched by a bat they should:

- wash the wound with soap and water for at least five minutes (**do not scrub**)
- contact their doctor immediately to arrange for post-exposure vaccinations.

If bat saliva contacts the eyes, nose, mouth or an open wound, flush thoroughly with water and seek immediate medical advice.

No dogs or cats are known to have contracted ABLV (RSPCA 2016), however transmission is possible (McCall et al. 2005). Transmission is directly through a bite or scratch from an infected bat, so as a precaution people should prevent their dogs and cats from contacting bats. This may include keeping pets inside at night, particularly when flying-foxes are foraging on flowering or fruiting trees nearby, and keeping dogs on a lead when walking near a flying-fox camp (RSPCA 2016). If a pet owner is concerned, or suspects their pet has been exposed to ABLV, consultation with a veterinarian should be sought.

2.3.4.2 Hendra virus

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

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

There is an effective vaccination available for horses, and transmission can be prevented by appropriate horse husbandry e.g. covering food troughs, excluding horses from underneath fruiting and flowering trees where flying-foxes may forage. Further detail can be found in the HeV information for horse owners, handlers, competitors and event organisers (DPI 2013).

2.3.4.3 Health and flying-fox management

A study at several camps before, during and after disturbance (Edson et al. 2015) showed no statistical association between HeV prevalence and flying-fox disturbance. However, the consequences of chronic or ongoing disturbance and harassment and its effect on HeV infection were not within the scope of the study and are therefore unknown.

The effects of stress are linked to increased susceptibility and expression of disease in both humans (AIHW 2012) and animals (Henry & Stephens-Larson 1985; Aich et. al. 2009), including reduced immunity to disease. Therefore, it can be assumed that management actions which may cause stress (e.g. dispersal), particularly over a prolonged period or at times where other stressors are increased (e.g. food shortages, habitat fragmentation, etc.), are likely to increase the susceptibility and prevalence of disease within the flying-fox population, and consequently the risk of transfer to humans.

Furthermore, management actions or natural environmental changes may increase disease risk by:

- forcing flying-foxes into closer proximity to one another, increasing the probability of disease transfer between individuals and within the population
- an increase in the rate of abortions and/or dropped young if inappropriate management methods are used during critical periods of the breeding cycle. This will increase the likelihood of direct interaction between flying-foxes and the public, and potential for disease exposure
- adoption of inhumane methods with potential to cause injury which would increase the likelihood of the community coming into contact with injured/dying or deceased flying-foxes.

The potential to increase disease risk should be carefully considered as part of a full risk assessment when determining the appropriate level of management and the associated mitigation measures required. This is integrated into Council's approach in the risk assessment component of the management framework (Section 5), which has been considered for each known camp (Section 6) and used to inform management actions (Section 7). Measures to mitigate risks associated with management are outlined in Appendix 5.

2.3.5 Powerline strike and outages

The 2016 GHFF influx in Batemans Bay resulted in numerous local power outages with a higher than normal incidence of flying-foxes being electrocuted on powerlines during evening foraging (pers. comm. Eurobodalla Council, April 2016). This inconvenienced many residents and created serious health concerns for people relying on medical equipment without back-up power supply. Power outages also interfered with mobile phone reception, which was reported as a concern for health and emergency services.

Council liaised with the energy provider to implement a number of operational changes which has largely addressed this issue, including (Eco Logical 2016):

- re-configuring a section of the electricity network that has been susceptible to outages to supply power from an alternative direction to try to minimise the number of customers affected
- crews patrolling affected powerlines to identify network issues caused by flying-fox activity and complete repairs as necessary
- altering on-call roster arrangements to increase the geographic area covered by its local fault and emergency teams to improve response times to power outages.

Telecommunications providers also improved back up power supplies to sustain mobile phone reception during outages (Eco Logical 2016).

Concerns regarding an increase in dead flying-foxes underneath powerlines have been largely addressed, with OEH working with the power provider to develop safe carcass handling and removal procedures. Note that given flying-foxes regularly forage 20 km from their camp, and this impact is associated with foraging flying-foxes, dispersal to a camp within 20 km will not resolve this issue.

Council will continue to liaise with energy and telecommunications providers to limit issues in the future.

2.3.6 Water quality concerns

Contamination of water supplies by any animal excreta (birds, amphibians and mammals such as flying-foxes) poses health risks to humans. There is no known risk of contracting bat-related viruses from contact with faecal drop or urine.

Household water tanks can be designed to minimise potential contamination, such as using first flush diverters to divert contaminants before they enter water tanks. Tanks should be appropriately maintained and flushed, and catchment areas regularly cleaned of potential contaminants. Trimming vegetation overhanging the catchment area for the tank (e.g. flying-fox foraging vegetation overhanging the roof of a house) will also reduce wildlife activity and associated potential contamination. Tanks in urban areas are not for domestic drinking water supply and these areas are supplied with reticulated town water.

Pool maintenance practices (e.g. filtration, chlorination, skimming, vacuuming) should remove general contamination associated with wildlife droppings.

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

There have also been concerns about water quality in artificial or natural water bodies near a flying-fox camp. In stagnant waterbodies there may be an increase in bacteria and nutrients associated with a large number of animals, including flying-foxes and/or native birds. Note these type of waterbodies, such as the Water Gardens, are generally zoned for passive recreation (i.e. not swimming). Water quality monitoring may address these concerns and trigger management if required.

2.3.7 Perception of exponential growth

The periodic influxes of flying-foxes in Batemans Bay between 2013 to 2016 led to community perception that there will be exponential growth if flying-foxes were not managed.

The GHFF population has declined by up to 30% in the past three decades due to a range of ongoing threats such as habitat loss, deliberate destruction, infrastructure-related mortality and competition with other species. For these reasons it is listed as vulnerable to extinction under NSW and Commonwealth legislation.

This perception is understandable given the high mobility of the species, varies considerably in response to local food availability. During the 2016 influx associated with a mass flowering event, 40% of the entire species' population was in Batemans Bay (Eco Logical 2016).

Understanding foraging resources in the area will help predict future influxes, and provide the community with confidence that any large influx is temporary.

2.3.8 Damage to vegetation and exclusion of other fauna

Large numbers of roosting flying-foxes can damage vegetation. Most native vegetation is resilient and generally recovers well (e.g. casuarina and eucalypts), and flying-foxes naturally move within a camp site allowing vegetation to recover. However, damage can potentially be significant and permanent, particularly in small patches of vegetation. Intervention may be required if permanent damage is likely.

There is also some concern that roosting flying-foxes deter other wildlife (e.g. birds and possums). This may be a short-lived effect of large numbers of roosting flying-foxes, however would only be on a very limited scale (i.e. the immediate camp area) and is unlikely to displace fauna from their territories. Nest boxes in surrounding areas may be considered to provide alternative possum and hollow-nesting bird habitat if displacement is of concern.

Damage to vegetation, and potentially the temporary displacement of wildlife from vegetation flying-foxes are roosting in, should also be considered in the context of the critical ecological services flying-foxes provide and the associated benefits to other species.

2.3.9 Flying-foxes and aircraft

Collisions between wildlife and aircraft in flight (wildlife strikes) are common aviation safety occurrences (McKee et al. 2016) and cost Australian civil aviation an estimated AUD$50M per year. Strikes to aircraft involving large birds or bats and those involving more than one animal (multiple strikes) can be serious, potentially disabling aircraft and resulting in major accidents.

Flying-foxes are large animals that transit in very large flocks at relatively low altitudes. Consequently, in terminal airspace, where aircraft are also operating at low altitudes they may present a significant risk to air safety. Currently, in Australia, flying-foxes are the most common species struck by aircraft and, depending on aircraft type, 13-20% of these collisions cause damage to the aircraft (ATSB 2017).

For any strike reduction program to be effective it is imperative that wildlife congregations in the vicinity of the aerodrome are identified, monitored and managed. Under international (ICAO Annex 14) and national legislation (NASAF-C) airport operators are required to identify potential wildlife hazards in the vicinity and convene a local stakeholder group to help reduce the risk of strike associated with those hazards. National guidelines (NASAF-C), identify a 13 km radius from airports within which strike risk should be jointly managed by land holders and airport managers.

2.4 Management response to date

Flying-foxes have been recorded in Batemans Bay periodically since 2012 and may have been present earlier and unrecorded. The Water Gardens GHFF Management Plan (Eco Logical 2015) was developed to prioritise management options and reduce distress experienced by residents and businesses.

In 2016, more than 270,000 GHFF temporarily migrated to the Batemans Bay area (CSIRO 2016) causing significant conflict with local residents (Eco Logical 2016). Flying foxes counts during the influx were difficult due to the extent, density and mobility of the animals, and as such these numbers are indicative. This temporary influx was estimated to comprise up to 40% of the national population, attracted to plentiful blossom from a mass flowering event of primarily spotted gum (*Corymbia maculata*) and red bloodwood (*Corymbia gummifera*). This was an unprecedented event in the Eurobodalla; no known influxes of this magnitude and impact had been recorded in an urban area in NSW.

The Minister for the Environment granted a National Interest Exemption under s158 of the *Environment Protection and Biodiversity Conservation Act 1999* to allow dispersal and vegetation management, upon the condition that a Conservation Agreement was developed.

The Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019 (Eco Logical Australia 2016) was developed to enact this exemption and guide dispersal.

At its ordinary meeting on 14 June 2016 Council resolved to prepare a Eurobodalla Flying-fox Management Plan. The Plan is a condition of the Conservation Agreement with the Australian Government, in accordance with the National Interest Exemption. The Conservation Agreement, including conditions relevant to flying-fox management, is provided in Appendix 3.

Between June and July 2016 Council carried out approved flying-fox dispersal activities in accordance with conditions set by the Commonwealth Environment Minister's National Interest Exemption, and the NSW flying-fox camp management policy. Since this time, Council also obtained a Biodiversity Licence (under the NSW *Biodiversity Conservation Act 2016*) for dispersal in Batemans Bay (see Appendix 4). These approvals and conditions continue to apply should dispersal from Batemans Bay be required in the future (for the term of the approvals), noting the decision to disperse will be made in line with the management framework of this Plan (Section 5).

Previous engagement with the community, prior to the development of this Plan (see Section 3), has included:

- a Flying-fox Engage survey and decision-support system was used to consult with the community on management options (September 2015)
- letters to the community (March 2015) including invitation to join the steering committee for the Batemans Bay Camp Management Plan
- community meetings (June 2015) (May 2016) and stalls at shopping centres and markets (September 2015)
- media releases, radio interviews, Council's website, online newsletter and Facebook page provides information on flying-foxes and updates on management
- survey to Water Gardens and Catalina residents (August 2016)
- direct responses to telephone calls or letters from residents
- media releases, SMS broadcasts and signage were used to alert residents during dispersal periods
- exhibition and invite to comment on dispersal plan and whether to disperse.

To date, Council has assisted the community to deal with some of the impacts by:

- providing relief to impacted residents through subsidies
- clearing and maintaining buffers between camps and affected properties
- participating in flying-fox monitoring and research
- consulting with energy providers to improve resilience of infrastructure
- undertaking flying-fox dispersal where necessary and in accordance with approval conditions
- employing a dedicated part-time Natural Resources Officer for Flying-Foxes.

3 Community engagement

Council is committed to including its community and stakeholders in decisions that affect them. Community engagement during development of the Plan, as detailed in this section, was consistent with Council's Community Engagement Charter (Figure 2).

Figure 2 Council's Community Engagement Charter

3.1 Stakeholders

There are a range of stakeholders who could be directly or indirectly affected by management of flying-foxes in the Eurobodalla or who are interested in its management (Table 2).

Table 2 Stakeholders

Stakeholder group	Stakeholder	Interest/reported impacts
Community	Residents and business owners	Residents and businesses located near camps are primarily affected by smell, noise and faecal drop.
	Schools and education facilities	Schools with camps immediately adjacent may be affected by noise, smell, faecal drop and the potential for injured flying-foxes on school grounds. There is also an opportunity to teach students about the ecological value of flying-foxes and appropriate behaviour around flying-foxes and other wildlife.
	Indigenous community	Traditional owners have a general interest in flying-foxes, including the ecological services they provide and the potential for sustainable harvesting for food or medicinal purposes.
	Visitors and tourists	The Eurobodalla is a popular tourist destination. Opportunities exist for potential ecotourism (Targeted workshop results).
	Recreation and sports clubs	Flying-foxes have occupied vegetation in golf courses in the Eurobodalla. Managers may require advice regarding permissible maintenance activities around flying-foxes.
	Veterinarians, horse owners and equine facilities	Horse owners, equine facility managers and local veterinarians should be aware that Hendra virus risk is associated with foraging flying-foxes (e.g. risk is present across the entire flying-fox range), and appropriate mitigation measures.

Stakeholder group	Stakeholder	Interest/reported impacts
Industry	Orchardists and fruit growers	Fruit growers may be impacted by flying-foxes raiding orchards, and should have access to safe-netting guidelines.
	Airports /Air ambulance	Airport managers have a responsibility to reduce the risk of wildlife-aircraft strike. Moruya Airport is located 2.8 km to the west of the Moruya Heads camp, and should be consulted regarding any management that may influence flying-fox movements or behaviour. Any hospital near a camp that accepts medical flights must also be aware of flying-fox movements.
	Hospitals	Hospitals and medical centres may stock or provide lyssavirus vaccinations. Hospitals should be notified of dispersal activities.
Government	Eurobodalla Shire Council	Council has a responsibility to act in the interests of its community, and for administering local laws, plans and policies, and appropriately managing assets (including land) for which it is responsible.
	Neighbouring councils	Shoalhaven, Queanbeyan-Palerang, Bega Valley Councils will be informed of management actions and share information on flying-foxes.
	Office of Environment and Heritage	OEH is responsible for administering legislation relating to (among other matters) the conservation and management of native plants and animals, including threatened species and ecological communities.
	Commonwealth Department of the Environment and Energy (DoEE)	DoEE is responsible for administering Commonwealth legislation relating to matters of national environmental significance, such as the grey-headed flying-fox
	Local Government NSW (LGNSW)	LGNSW is an industry association that represents the interests of councils in NSW. LGNSW also administered funds under the NSW Flying-fox Grants Program.
Service providers	Energy providers	A number of power supply interruptions have been caused by flying-foxes contacting electricity power lines. Issues to date have been resolved but Council will continue to engage with energy providers as required.
	Telecommunications providers	Power outages have interrupted mobile phone reception. Issues to date have been resolved but Council will continue to engage with energy providers as required.
Non-government organisations	Wildlife carers and landcare organisations	Wildlife carers and conservation organisations have an interest in flying-fox welfare and conservation of flying-foxes and their habitat e.g. Mogo zoo, RSPCA, WIRES
	Researchers/universities/CSIRO	Researchers have an interest in flying-fox behaviour, biology and conservation.

3.2 Engagement for the Plan

Extensive effort has been made to engage with the community in the development of this Plan (Table 3), guided by a specific Community and Stakeholder Engagement Plan (Appendix 9). The Engagement Plan was prepared in accordance with Council's *Community Engagement Framework*.

This engagement process aimed to:

- understand the community's awareness of and concerns regarding flying-foxes
- gain feedback regarding management actions undertaken by Council to date
- seek feedback from the community to identify the most appropriate management actions at camps and when the most appropriate time is to undertake these actions.

Table 3 Engagement methods used to incorporate the community's feedback into the Plan

Engagement method	Key dates	Outcomes	Engagement type
Media release	March 2018	Provided dates for the engagement process.	Inform
Newsletter	March 2018	Article about the Plan and flying-foxes delivered to all residents via the Living in Eurobodalla newsletter	Inform
Website updates and social media	March-May 2018	Facebook posts and Eurobodalla online news	Inform
Online survey	March-April 2018	492 fully completed surveys of which 93% were Eurobodalla residents (results in Appendix 10)	Involve
Drop-in sessions	April 2018	Council held 12 pop up stalls throughout the Eurobodalla to answer questions about the Plan and hear about the community's experiences with flying-fox	Consult
Land manager interviews	May 2018	Eight land managers experienced in flying-fox conflict (local and state governments, research organisation) were interviewed on the proposed Decision Support Tool including constraints and opportunities for improvement	Consult
Four focus groups	19-20 June 2018	Two resident workshops with participants randomly selected from survey, including people who have been affected by roosting flying-foxes in the past One stakeholder workshop with managers of sensitive receptors who have been affected by flying-foxes (e.g. airports, hospitals, schools, golf courses etc.) One Council committee workshop	Involve and collaborate
Public exhibition	September-October 2018	Public submissions and feedback considered in the final Plan	Consult

3.2.1 Survey results

The online survey conducted in March and April 2018, produced 492 responses from 38 suburbs across the Eurobodalla. Detailed results are provided in Appendix 10. In summary, the results of the online survey indicated that:

- 95% of respondents understand flying-foxes are protected species, 65% had recently seen information from Council regarding flying-foxes
- 80% are aware that flying-foxes are ecologically important
- 82% are aware that diseases can be avoided by not handling flying-foxes and appropriate animal husbandry, however fear of disease was still high (particularly closer to camps)
- 34% of respondents thought flying-foxes should be permanently removed from Eurobodalla; however 50% of respondents disagreed with this statement.

- Over half respondents indicated flying-fox impacts are experienced by the community in summer (29%) and autumn (29%).
- 15% of survey respondents lived within 300 m of a camp (55% lived further than 300 m and 30% were unsure)
- residents living within 300 m of a camp tend to have a more negative view of flying-foxes
- for respondents within 300 m of a camp the top three concerns were faecal drop (79%), smell (77%) and noise (65%) (Figure 3)
- for respondents further than 300 m of a camp (or unsure of proximity) the top three concerns were noise (68%), faecal drop (54%) and smell (53%) (Figure 3)
- 33% of respondents enjoy watching flying-foxes at their camps or flying overhead (15% neutral, 53% disagreed)
- with regards to flying-fox management, the community was in favour of management to reduce the noise and odour impacting residents and business (72%) and the impact of faecal drop (70%).

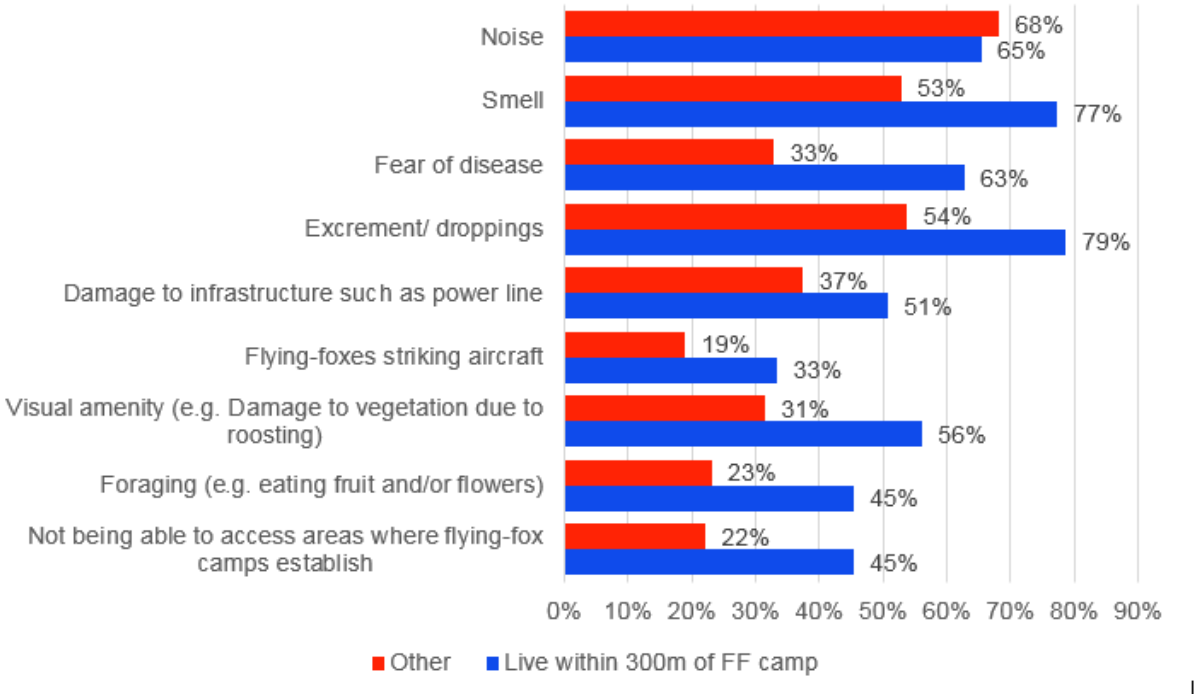

Figure 3 Difference in percentage of very and extremely concerned between respondents who live 300 m or less from a flying-fox camp compared to those further away or unsure of proximity (UTS 2018 Appendix 4)

3.2.2 Targeted workshops

Four targeted workshops were undertaken with community members and stakeholders across two days in June 2018. The workshops aimed to provide further insights into the survey findings, seek feedback on Council's current and future approach to impact management and test some of the key issues identified.

Key findings included:

- Participants expressed the need for Council to build community resilience and capacity to manage future flying-fox impacts in the short term through education, whilst also working towards long term management and land use planning solutions
- Participants indicated they strongly value the ecosystem services and natural spectacle flying-foxes provide and would prefer they remain in Eurobodalla, though not close to urban areas.
- Whilst few respondents to the online survey indicated flying-foxes are a tourism asset for the area, workshop participants identified several nature-based tourism opportunities, as well as other initiatives with local community and environmental organisations, such as a flying-fox hospital or centre of excellence for flying-fox research
- The impacts of most concern are community health and odour, and there is general uncertainty and a feeling of helplessness over how these could be managed. Participants indicated that odour impacts are experienced more intensely during periods of rain or high humidity. Whilst the online survey found noise was the impact of most concern, workshop participants indicated noise is generally confined to the fly in and fly out periods at dusk and dawn and can be managed more easily than odour.

3.2.3 Public exhibition period

The draft Plan went on public exhibition between 26 September and 31 October 2018 and was made available for download or in hard copy at Council libraries, administration building and Batemans Bay Community Centre.

Invitation for submissions on the draft Plan was promoted via:

- direct emails to community groups and organisations
- a media release
- Living in Eurobodalla Council newsletter
- notification in the local newspaper
- Council e-news
- Facebook post.

Six submissions on the draft Plan were received, five from community members and one from the Commonwealth Department of the Environment and Energy (DoEE). Submissions were brief and with only a few points requiring extra clarification. Key points received in the submissions included:

- regards for the important ecological role of flying-foxes and ensuring their migration and movements are not limited
- concerns for the unlawful disturbance of flying-foxes and their camps and the delegated authority to manage that disturbance

- seeking clarity with regards to authorised nudging practices and protecting the best interest of flying-foxes.
- ensuring all ecological values are considered before flying-fox management actions proceed
- the duration of the public exhibition period
- the definition of a camp
- clarity around the adaptive nature of the plan

The DoEE acknowledged that the Plan reflects information contained in the *EPBC Act* Conservation Agreement and previous management plans for the area.

All submissions were acknowledged and addressed through minor editorial changes to provide clarification.

4 Camp management options analysis

Appendix 8 provides an overview of management options commonly used throughout NSW and Australia which were considered in the development of the Plan. These are categorised as Level 1, 2 or 3 in accordance with the NSW Flying-fox Camp Management Policy (OEH 2015):

- Level 1 actions: Routine camp management actions (approval for actions specified in the Policy not required)
- Level 2 actions: Creation of buffers (approval required)
- Level 3 actions: Camp disturbance or dispersal (approval required).

Table 4 provides an analysis of the camp management options described in Section 4 and the appropriateness of these actions to the Eurobodalla. Note that not all options will be suitable at all locations, and suitable options will be informed by site values, level of impact and the management framework. An appraisal, based on this analysis, is provided for options to be either adopted, investigated further or disregarded within this Plan.

The Eurobodalla community reported a preference for long-term options during consultation in developing this Plan. Based on this feedback, and the issues associated with dispersal (see Appendix 7 and 8), Level 1 and Level 2 actions that contribute to a long-term solution will generally be preferred over Level 3 actions which generally have only temporary outcomes.

Table 4 Analysis of camp management options

Management options	Relevant impacts	Cost $-$$$ low-high	Advantages	Disadvantages	Suitability in Eurobodalla.
Level 1 options					
Education and awareness programs	Fear of disease Noise Smell Faecal drop Water contamination	$	Low cost, increasing awareness will help the community understand the ecology of flying-foxes, providing options for landholders to reduce impacts. This is an effective long-term solution, can be undertaken on an ongoing basis and based on community concerns.	Education and advice itself will not mitigate all issues, and on its own would not be acceptable to the community.	Survey results indicate the community is well informed of flying-fox ecology and participates in Council's engagement programs. However the community reported an ongoing fear of disease, which may be improved by additional targeted information. Due to the dynamic nature of flying-fox movements and impacts, the community should continue to be updated and involved in flying-fox matters Appraisal: Adopt
Property modification	Noise Smell Faecal drop Health/wellbeing	$$-$$$	Property modification is one of the most effective ways to reduce amenity impacts of a camp, promotes conservation of flying-foxes, is a long-term option, can be undertaken quickly, will not impact on the site and may add value to the property. Property modification, such as glazing windows or installing noise attenuating insulation, will greatly assist with noise impacts inside residences and businesses. Installing shade sails, carport or covering other affected areas will reduce the impacts of faecal drop. Respondents also found air fresheners provided some relief from odour.	May be cost-prohibitive for private landholders, however subsidies would assist.	Long-term options such as this were reported as favoured by the Eurobodalla community. Appraisal: Investigate

Management options	Relevant impacts	Cost $-$$$ low-high	Advantages	Disadvantages	Suitability in Eurobodalla.
Service subsidies	Noise Smell Faecal drop Health/wellbeing	$-$$	Council has provided a range of items such as free pressure cleaner hire, car covers, clothes line covers and Cocos palm removal for some affected residents. 75% of subsidy recipients believed this assistance was helpful.	Many survey respondents commented that car and clothes line covers were difficult to get on and off, difficult to manage in the wind, ripped easily and they needed to be regularly washed and faecal drop would transfer onto hands and clothes while using them.	A program will be investigated for communities affected by a flying-fox camp. This will also consider support with other items such as plant swap, ear plugs, outdoor furniture covers, pool covers, indoor deodorisers, indoor clothes lines, water tank filters, and contributions towards property modification (e.g. car sails/port, double-glazing). Appraisal: Adopt distance-based subsidies program for communities affected by flying-fox camps (see Appendix 11 for example Subsidy Expression of Interest form)
Odour reducing / screening, masking plants	Noise Smell Health/wellbeing	$	Planting dense screens and fragrant plants to assist with odour and noise and trim tall trees to less than 5 metres high and/or use wildlife friendly netting to prevent occupation by flying-foxes.	May take time for plants to provide the desired effect, and unlikely to mitigate odour during large influxes.	Residents could be encouraged to modify properties by planting dense screens and fragrant plants. This information can be provided in an education program. Appraisal: Adopt
Routine camp management	Health/well-being	$	While this action is not aimed at managing flying-foxes, it allows landholders to undertake routine maintenance at or near flying-fox camps (in line with the Policy). Examples of routine camp management actions are provided in the Flying-fox Camp Management Policy 2015 (OEH). Weed removal has the potential to reduce roost availability and reduce numbers of roosting FFs.	Will not generally mitigate amenity impacts for nearby landholders.	Council will continue to build on protocols in Appendix 12 and 13. Any weed removal should be staged and mindful of causing inadvertent dispersal constituting a Level 3 action. Appraisal: Adopt

Management options	Relevant impacts	Cost $-$$$ low-high	Advantages	Disadvantages	Suitability in Eurobodalla.
Alternative habitat creation	Noise Smell Faecal drop Health/wellbeing	$$-$$$	If successful in attracting FFs away from high conflict areas, dedicated habitat in low conflict areas will mitigate all impacts and helps FF conservation. Rehabilitation of degraded habitat that is likely to be suitable for FF use could be a more practical and faster approach than habitat creation. Improving potential alternative camp habitat should be part of a medium-long term plan.	Generally costly, long-term approach so cannot be undertaken quickly, previous attempts to attract FFs to a new site have not been known to succeed.	Long-term options such as this were reported as favoured by the Eurobodalla community. Council will conserve known flying-fox camps in low conflict locations, and identify potential habitat which may be improved/restored, or low conflict locations where habitat may be created. Habitat protection and conservation will also benefit other species and communities, and synergies with other conservation programs will be sought. Appraisal: Adopt and investigate further
Provision of artificial roosting habitat	Noise Smell Faecal drop Health/wellbeing	$-$$	Artificial roosting habitat could be considered to supplement vegetation damaged by large numbers of flying-foxes.	No guarantee that flying-foxes would use artificial habitat, but collaborating with a researcher on varying design options would increase the likelihood of success.	Not enough evidence at this stage to adopt and habitat quality not currently an issue at Eurobodalla camps. Appraisal: Disregard
Protocols to manage incidents	Health/wellbeing Fear of disease	$	Low cost, will reduce actual risk of negative human/pet–FF interactions, promotes conservation of FFs, can be undertaken quickly.	Will not mitigate amenity impacts, but will reduce fear of disease.	Council will build on existing procedures and guidelines (Appendices 12-14) as required, including standard internal procedures for engaging carers to respond to heat stress events and other incidents related to influxes. Appraisal: Adopt
Research	Noise Smell Faecal drop Health/wellbeing Water contamination	$	Support research that improves understanding and more effectively mitigates impacts. Develop understanding of native flowering events in area.	Generally cannot be undertaken quickly, management trials may require cost input.	Council is involved in state and national flying-fox monitoring programs, and regularly supports research projects. Council will continue this involvement, and stay up to current research, particularly projects that inform effective management of flying-fox impacts (e.g. odour-neutralising systems, better understanding of camp site selection to attract flying-foxes

Management options	Relevant impacts	Cost $-$$$ low-high	Advantages	Disadvantages	Suitability in Eurobodalla.
					away from high conflict areas). These findings will be incorporated into the Plan as they arise. Appraisal: Continue
Appropriate land-use planning	Noise Smell Faecal drop Health/wellbeing	$	Suitable planning for future development will reduce potential for future conflict. Identification of degraded sites that may be suitable for long-term rehabilitation for FFs could reduce impacts.	Will not generally mitigate current impacts.	Council may consider including buffer zones and recommendations for appropriate mitigation provisions (in reviewing applications for development around flying-fox camps. Appraisal: Investigate further
Property acquisition	All for specific property owners Nil for broader community	$$$	Will reduce future conflict with the owners of acquired property.	Owners may not want to move, only improves amenity for those who fit criteria for acquisition, very expensive.	Cost prohibitive and not feasible for Eurobodalla Council. Appraisal: Disregard
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and would not be considered acceptable by impacted members of the community.	Not appropriate. Appraisal: Disregard
Level 2 options					
Buffers through vegetation removal	Noise Smell Health/wellbeing	$–$$	Creates a buffer between roosting flying-foxes and sensitive sites to reduce associated impacts.	Removing vegetation can also increase visibility into the camp and noise issues for neighbouring residents which may create further conflict. Removing high value vegetation is not desirable. Vegetation removed too quickly could cause inadvertent dispersal.	This was reported by the community as one of the most effective measures at mitigating conflict at the Water Gardens and Catalina. Management of buffers should be maintained for affected residents in Batemans Bay and considered where necessary at other camps affected by influxes on Council managed lands. Appraisal: Adopt
Buffers without vegetation	Noise Smell	$$	Successful creation of a buffer will reduce impacts, promotes FF conservation, can be undertaken	May impact the site, buffers will not generally eliminate impacts, maintenance costs may be	Residents who would prefer to retain vegetation should be consulted to determine where buffering using sprinklers

Management options	Relevant impacts	Cost $-$$$ low-high	Advantages	Disadvantages	Suitability in Eurobodalla.
removal – visual deterrents, canopy mounted sprinklers	Health/wellbeing Damage to vegetation		quickly, options without vegetation removal may be preferred by the community.	significant, often logistically difficult, limited trials so likely effectiveness unknown.	and other means may be appropriate. Appraisal: Investigate further.
Noise attenuation fencing	Noise Smell Health/wellbeing	$$	Noise attenuation fencing is intended to alleviate amenity issues for residents. Advice from an acoustic consultant may provide site-specific alternatives (see 6.2.2).	Noise attenuation fencing is costly and can be considered unsightly for property fencing. Fencing will also not reduce noise from foraging flying-foxes.	This option can be considered where site topography and number of receptors in relation to camp makes noise attenuation fencing effective. Appraisal: Investigate on a site-by-site basis if required.
Level 3 options					
Nudging	All	$$–$$$	Can encourage flying-foxes to shift away from high conflict areas next to residential areas.	May lead to inadvertent dispersal if not done at the correct time, frequency or duration.	Where camp characteristics allow, nudging may be a viable option to move flying-foxes away from residents and sensitive receptors. Appraisal: Investigate further on a site-by-site basis if required.
Active dispersal	All at that site but not generally appropriate for amenity impacts only	$$$	If successful can mitigate all impacts at that site. It is important to note that the outcomes of dispersal are generally temporary, and repeat dispersal is likely to be required as flying-foxes attempt to re-establish the camp. This may be seasonally, annually, or more regularly.	Dispersal is rarely successful without significant vegetation removal or ongoing effort and substantial expenditure, flying-foxes will almost always continue to roost in the area (generally within 600m), and may splinter into several locations nearby (including many remaining at the original site). Requirements for dispersal, approval, and animal welfare are resource intense and specialist expertise is needed.	This option will only be considered in extreme circumstances (such as the influx in April 2016) where justified through Council's management framework and sufficient resources are available. Appraisal: Investigate further on a site-by-site basis if required

Management options to be adopted, investigated further (in general or on a site-specific basis) or disregarded are summarised in Table 5. The proposed management approach considers community responses received to date. Camp management options to be adopted or investigated further are included in Section 7, with consideration to Council's management framework detailed in Section 5 and site-specific values outlined for known camps in Section 6.

Table 5 Camp options summary

Continue / adopt	Investigate further	Disregard
Level 1 Management		
Education and awareness programs	Property modification / service subsidies	Provision of artificial roosting habitat
Odour reducing / masking plants	Alternative habitat creation	Property acquisition
Routine camp management	Appropriate land-use planning	Do nothing
Protocols to manage incidents		
Research		
Level 2 Management		
Buffers through vegetation removal	Noise attenuation fencing	
	Buffers without vegetation removal – visual deterrents, canopy mounted sprinklers	
Level 3 Management		
	Nudging	
	Dispersal	

5 Management framework

The primary focus of the Plan is to manage the impacts of roosting flying-foxes on communities within 300 m of a flying-fox camp (SEQ Catchments 2012). Council is limited in how it can assist with the impact of foraging flying-foxes given the large distances flying-foxes travel on a daily and seasonal basis to forage, and the abundance of foraging resources in the Shire. Camp management options must also consider the ecological values of each site, which are detailed for known camps in Section 6.

Given the unpredictable outcomes and expense associated with actively managing flying-fox camps, Council intends to focus management on reducing the impacts of flying-foxes on the community. It is acknowledged however that there will be some situations where camp intervention is necessary. Council's decision to undertake camp intervention, and/or increase the level of management, will be informed by:

1. Land tenure. Council will provide a supporting role to any community impacted by roosting flying-foxes, however will only consider active management of camps on Council-managed land.

2. Risk assessment (Section 5.1)

3. A Decision Support Tool to assist with assessing impacts (Section 5.3) (for Council-managed land)

4. Other values of the site e.g. ecological values to inform appropriate management (outlined for known camps in Section 6).

An overview of Council's process for camp assessment and impact management is shown in Figure 4. A flow chart outlining the approach to assessing and managing camps in the Eurobodalla is illustrated in Figure 5. This is the process that has been followed in developing the Plan when assessing known camps (Section 6) and determining appropriate management actions (Section 7).

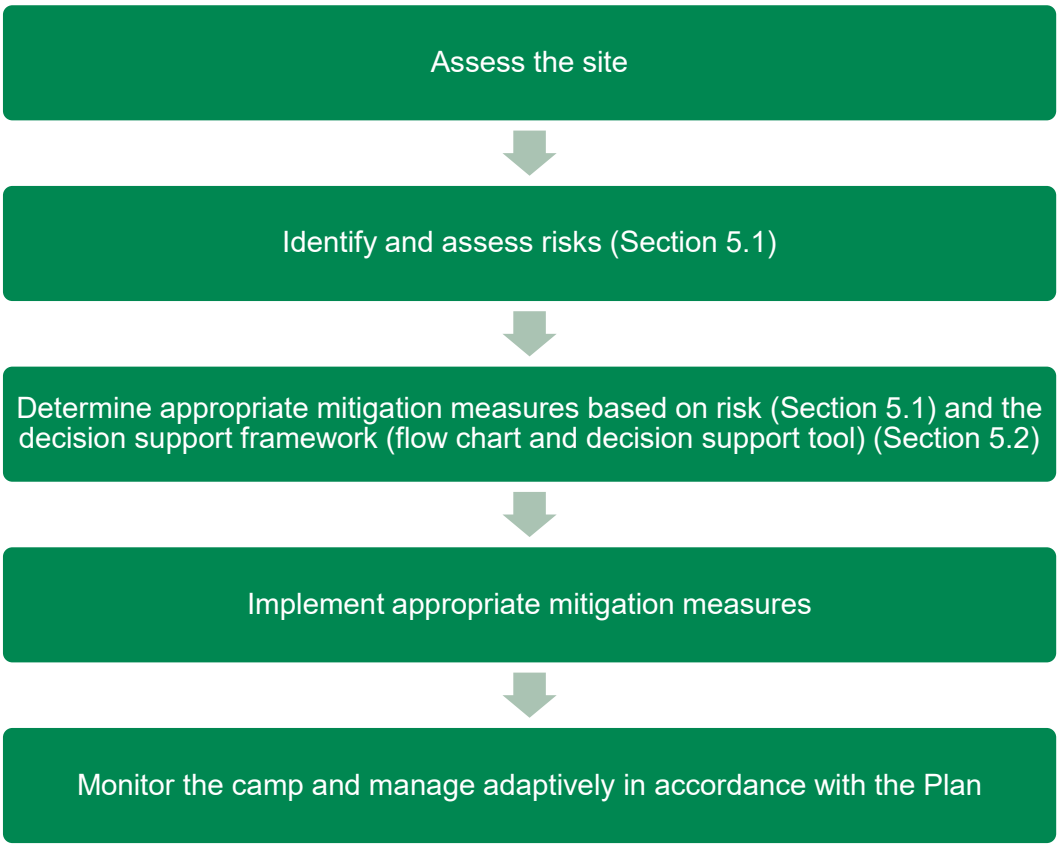

Figure 4 Overview of Council's process in responding to community concerns about flying-foxes

5.1 Risk assessment

Council takes a risk-based approach to management, where camp intervention is generally only considered where there is actual risk that cannot be otherwise managed. The level of risk associated with a nearby flying-fox camp was assigned to each sensitive receptor based on land use type and proximity to the camp. 'Risk' is defined as actual risk to human/animal health, safety or economic loss. Risk assignment was based on the following:

- Very low risk = negligible risk associated with the camp.
- Low risk = flying-fox camp unlikely to influence risk.
- Moderate risk = flying-fox camp may create some level of risk.
- High risk = flying-fox camp causes significant risk.

Categories have been assigned to sensitive receptors in Table 6. Risk will be re-evaluated if there have been changes with the camp or surrounding land uses that may change the risk (see Figure 5).

Table 6 Risk categories for sensitive sites

Sensitive receptor	Proximity	Risk level	Applicable management level
Residential, aged care, school / child care, hospital, equine centres	<5 m (overhanging)	High	Level 1 actions required (e.g. education, developing protocols to avoid incidents), Level 2 actions likely required to increase buffers to at least 5m (i.e. not overhanging). If Level 1 and 2 actions do not address risk, Level 3 actions considered.
	5-100 m	Moderate	Level 1 actions required, Level 2 actions potentially required.
	100-300 m	Low	Level 1 actions may be required.
	>300 m	Very low	Level 1 actions beneficial but no action required.
Public park or access	<50 m	Low	Level 1 actions likely required, Level 2 actions may be required.
	>50 m	Very low	Level 1 actions beneficial but no action required.
Aerodromes	<3 km	High	Level 1 actions required, Level 2 likely required (and in extreme cases, Level 3 actions considered).
	3-8 km	Moderate	Level 1 actions required, Level 2 actions potentially required.
	8-13 km	Low	Level 1 actions may be required.
	>13 km	Very low	Level 1 actions beneficial but no action required.

5.2 Decision support tool

Council's process to assess and manage impacts from flying-fox camps, subseqent to the initial risk assessment, is detailed in Figure 5. Council will revisit the level of impact and potential need for impact mitigation:

- in response to community concerns regarding a flying-fox camp
- seasonally when flying-foxes return to established camps in Eurobodalla, usually in summer or autumn
- if flying-foxes are identified roosting in a new location
- there have been changes associated with a camp that may change the level of impact and management required e.g. a large influx of flying-foxes, land use change, etc.

Managing the impacts of flying-foxes on people is a complex problem and a decision support tool has been developed to guide the most appropriate management response (Table 7). The support tool is based on assessing impacts of roosting flying-foxes on social, environment or financial factors, then determining the level of mitigation action required. The decision support tool groups impact mitigation options into Level 1, Level 2 and Level 3 management in accordance with the NSW Flying-fox Camp Management Plan Policy (Sections 2 and 4).

It is acknowledged that this is a support tool only and there may be circumstances where Council implements management outside this framework if deemed necessary and within legislative requirements.

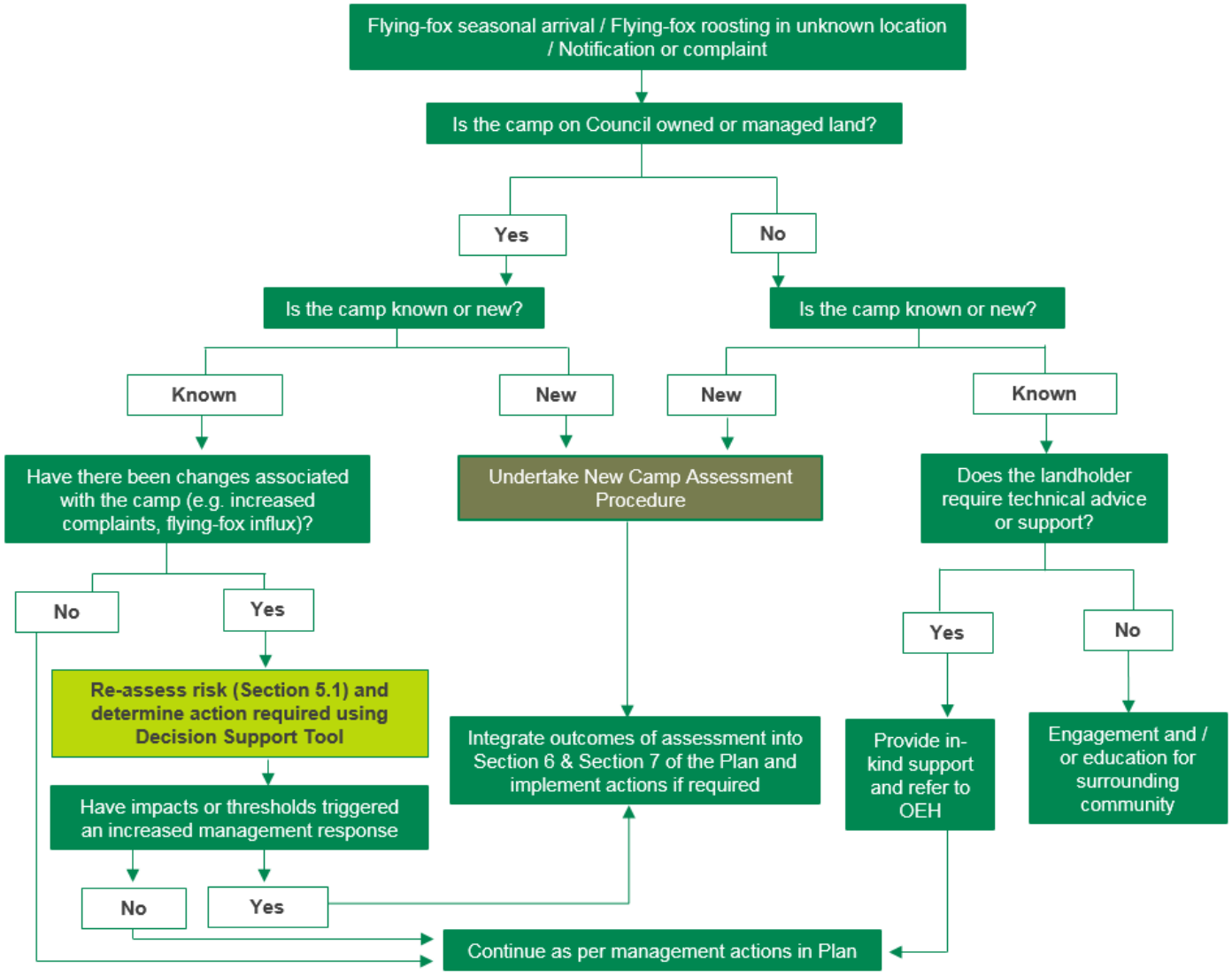

Figure 5 Camp assessment and impact management flow chart

Table 7 Decision support tool

		Consequences/Considerations				
AFFECT		Insignificant	Minor	Moderate	Serious	Very Serious
People affected - consider: • Sensitive receivers • Proximity to camp • Extent of impacts		Slight effect	Contained area, limited impacts	Major onsite	Major onsite and moderate offsite	Major onsite and major offsite
Environment - consider • Cultural • Ecological • Amenity		Slight effect	Contained area, limited environmental harm	Major onsite	Major onsite and moderate offsite	Major onsite and major offsite
Financial cost		Less than $5,000	$5,000 - $20,000	$20,000 - $100,000	$100,000 - $500,000	More than $500,000
Likelihood of impact	**Very high** *Almost certain to / currently occurring and likely to continue in the mid-long term*	**M**	**M**	**H**	**E**	**E**
	High *Known to have occurred - likely*	**M**	**M**	**H**	**H**	**E**
	Medium *Could occur - possible*	**L**	**M**	**H**	**H**	**H**
	Low *Not likely to occur - unlikely*	**L**	**L**	**M**	**M**	**H**
	Very low *No incidents – rare.*	**L**	**L**	**M**	**M**	**H**

KEY

IMPACT CATEGORY	ACTIONS
E (Extreme- RED)	Level 3 Actions Immediate controls required. Provided legislative requirements met, consider dispersal if adequate and appropriate resources are available. Seek management advice. Implement education and communication strategy Implement subsidies program if appropriate Identify and implement mechanisms to reduce impacts e.g. buffers Monitor impacts
H (High – AMBER)	Level 2 Actions Implement education and communication strategy Implement subsidies program if appropriate Identify and implement mechanisms to reduce impacts e.g. buffers Monitor impacts
M (Medium – YELLOW)	Level 1 Actions Implement education and communication strategy Approval to proceed required by Manager to implement subsidises program if appropriate Monitor impacts.
L (Low – GREEN)	Level 1 Actions Generally no action required Continue to monitor the impacts

Considerations:

- Legislation and approval requirements
- Tenure
- Risks of management and likelihood of success.

Figure 6 New camp assessment procedure

6 Assessment of known camps in the Eurobodalla

Camp context, history, ecological values and sensitive receptors are provided for each flying-fox camp within the Eurobodalla. Management options for each camp, with consideration to this site-specific detail, are outlined in Section 7 in accordance with the legislative framework (Section 2) and Council's management framework (Section 5).

Camps appear in this section in alphabetical order by suburb i.e. Batemans Bay (Water Gardens and Catalina camps); Buckenbowra (Nelligen Creek camp); Moruya (Moruya Township camp), Moruya Heads (Moruya Heads camp); Narooma (Narooma camp); Tuross Head (Tuross camp); and Wamban, (Moruya Beashels Trig camp). Desktop assessment of ecological values around the camp have excluded marine and migratory species (e.g. turtles and sea birds) unlikely to use the site. Note that for all camps a site assessment, including fauna and flora survey, will be required prior to any management occurring.

Camps have been classified (in accordance with Roberts 2012) as:

- Continuous – occupied year-round i.e. at least once in each season in every year since first recorded
- Annual – occupied at least once in 80% of years, but not continuously
- Irregular – occupied in 20-80% of years since first recorded
- Rare – occupied less than 20% of years since first recorded.

6.1 Batemans Bay: Water Gardens

6.1.1 Camp description

The Water Gardens camp is centred in Crown Street, Water Garden Town Park, Batemans Bay on land zoned as Environmental Conservation (Table 8). The maximum known camp extent is shown in Figure 7 and covers 6.2 hectares.

The Water Gardens is dominated by casuarina which provides core roosting habitat for the GHFF. Camp vegetation is mapped Swamp Oak Floodplain Forest EEC (Figure 8). This mapped EEC patch potentially meets the size and condition thresholds required for listing under the EPBC Act.

Table 8 Water Gardens camp context

Criteria	Attribute
Location	-35.713997, 150.179014
Lot and plan	7/DP261619 (Freehold - Council Operational) 100/DP1001026 (Freehold) 101/DP1001026 (Freehold - Council Operational) 334/DP720903 (Crown – Council control) 333/DP720903 (Crown) 332/DP720903 (Freehold) 1/DP518783 (Freehold) 31/37507 (Private)
Land zone	E2 Environmental Conservation R3 Medium Density Residential
Current land use	Parkland
Maximum confirmed camp extent	6.2 ha
Flying-fox usage	Annual

The Water Gardens camp meets the criteria for a Nationally Important camp. Nineteen threatened species are known to occur or have been recorded within 1 km of the camp. Table 9 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 9 Ecological values within 1 km of Water Gardens camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site meets criteria
	Protected Matters Search Tool (DoEE 2018)	Threatened species	Swift parrot (*Lathamus discolor*) (E) Eastern curlew (*Numenius madagascariensis*) (CE) Greater glider (*Petauroides volans*) (V)	3 species (2 birds, 1 mammals) known to occur within the area
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Flesh-footed Shearwater (*Ardenna carneipes*) (V) Gang-gang cockatoo (*Callocephalon fimbriatum*) (V) Glossy black cockatoo (*Calyptorhynchus lathami*) (V) Sooty oystercatcher (*Haematopus fuliginosus fulinginosus*) (V) White-bellied sea-eagle (*Haliaeetus leucogaster*) (V) Pied oystercatcher (*Haematopus longirostris*) (E) Little eagle (*Hieraaetus morphnoides*) (V) Square-tailed kite (*Lophoictinia isura*) (V) Swift parrot (*Lathamus discolor*) (E)	17 species (13 birds, 4 mammals) have been recorded within 1 km of camp

Protection level	Source	Category	Values/significance	Details
			Powerful owl (*Ninox strenua*) (V) Sooty tern (*Onychoprion fuscata*) (V) Eastern osprey (*Pandion cristatus*) (V) Yellow-bellied glider (*Petaurus australis*) (V) Sooty owl (*Tyto tenebricosa*) (V) Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) (V) Eastern freetail-bat (*Mormopterus norfolkensis*) (V) Southern Myotis (*Myotis macropus*) (V)	

Figure 7: Water Gardens camp extent

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Maximum known extent (April 2016)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

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

PR2916_MPX_CampExtents
A4

Figure 8: Water Gardens vegetation communities

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Maximum known extent (April 2016)

Buffer created through vegetation removal and deterrents

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 6/09/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

6.1.2 History of camp

Flying-foxes have been recorded at the Water Gardens camp periodically since 2012. The Water Gardens GHFF Management Plan (Eco Logical 2015) was developed to prioritise management options and reduce impacts on residents and businesses. As part of implementing this Water Gardens Plan, Council provided a range of subsidies to affected residents.

In 2016 an influx of more than 270,000 GHFF (approximately 40% of the entire species population counted in May 2016) congregated within 20 km of Batemans Bay, attracted by an unusual mass flowering event of spotted gum (*Corymbia maculata*) and red bloodwood (*Corymbia gummifera*). During this influx GHFF occupied the Water Gardens and Catalina camps, and residential areas surrounding these camps (Section 6.2.2) and spilled over into many neighbouring streets. This caused significant conflict with local residents, many of whom had not been affected by flying-foxes previously.

Following extensive community engagement, Council requested approval to manage the camp, and the Minister for the Environment granted a National Interest Exemption under s158 of the *Environment Protection and Biodiversity Conservation Act 1999* to allow dispersal and vegetation management. This exemption was conditional on a Conservation Agreement (see Appendix 3) being developed, which in turn led to development of this Plan.

The Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019 (Eco Logical 2016) was developed in 2016. Between June and July 2016 Council carried out approved flying-fox dispersal activities in accordance with conditions set by the Commonwealth Environment Minister's National Interest Exemption, and the NSW flying-fox camp management policy. Since this time, Council also obtained a Biodiversity Licence for dispersal in Batemans Bay (see Appendix 4). These approvals and conditions continue to apply should dispersal from Batemans Bay be required in the future (for the term of the approvals), noting the decision to disperse will be made in line with the management framework of this Plan (Section 5). 5.3 ha of vegetation was also removed to provide buffers for affected residents in the Batemans Bay area in 2015 and 2016. Removal of Cocos palms to reduce disturbance from night time foraging and mess from faecal drop was undertaken in the area. In 2017, weed removal, mulching and planting of native shrubs and grasses was undertaken to restore the appearance and condition of the Water Gardens.

In accordance with the EPBC Act Referral Guideline, no additional vegetation removal is possible at the Water Gardens without referral to the Australian Environment Minister.

Council continues to assist the community to deal with some of the impacts when required including:

- providing relief to residents through subsidies
- maintaining buffers between camps and affected properties
- participating in flying-fox monitoring and research
- undertaking flying-fox dispersal where necessary and in accordance with approval conditions

- employing a dedicated part time Natural Resources Officer for Flying-Foxes.

The camp has been monitored on a quarterly basis since November 2012 as part of the National Flying-fox Monitoring Program (NFFMP) and by Council staff since 2016. Flying-foxes occupy this camp on annual basis. This camp experienced an influx of 40,222 GHFF in May 2016, numbers at the camp have reduced to between zero and 2,200 in 2018 (Figure 9).

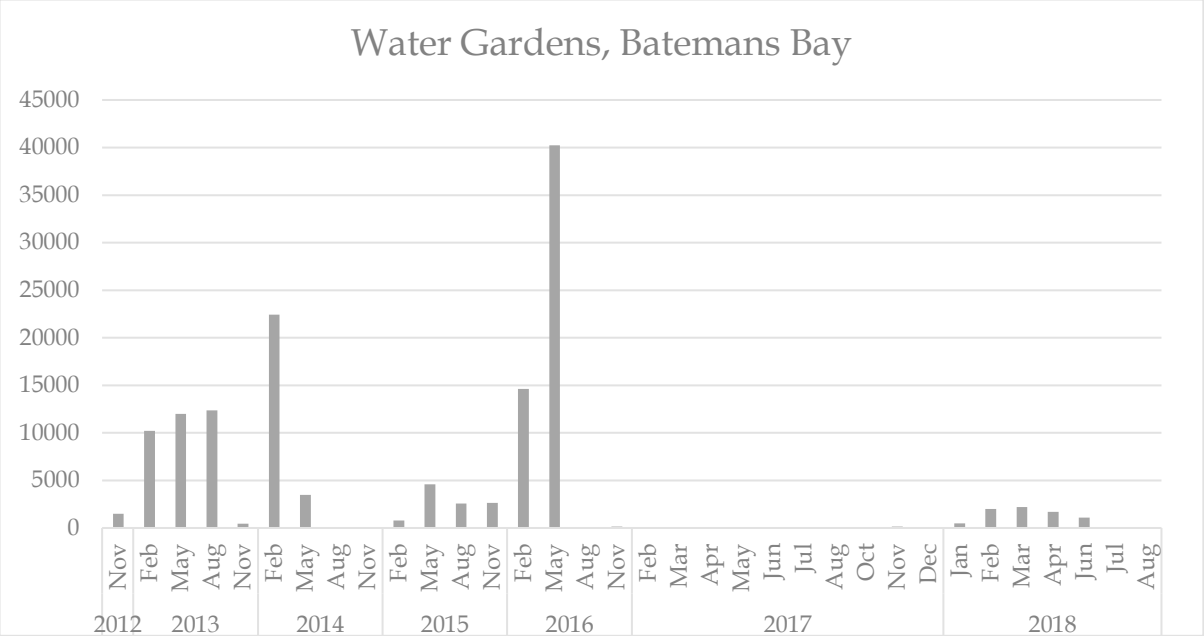

Figure 9 Water Gardens GHFF numbers between 2012 and 2018 (Source NFFMP; ESC 2018)

6.1.3 Sensitive receptors

Sensitive receptors around the Water Gardens (or within 13 km for aerodromes) are detailed in Table 10 and Figure 10. There are 138 properties within 300 m of the average known camp extent.

Table 10 Water Gardens camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Aged care	260 m	IRT Crown Gardens is located 260 m west of the camp's historic extent	Low
Hospital	130 m	The Batemans Bay hospital is located 130 m east of the camp's historic extent.	Low
Public park or access	0 m	The camp is located within a public park that contains walking tracks, seating and a picnic table.	Low
Residential	10 m	Residential houses surround the Water Gardens on the eastern, southern and western boundaries.	Medium
School / child care	1.5 km	There are no schools or child care within 1 km of the camp. The nearest schools are Batemans Bay Public School (1.5 km) and Northside Early Learning Centre (2.4 km).	Very low

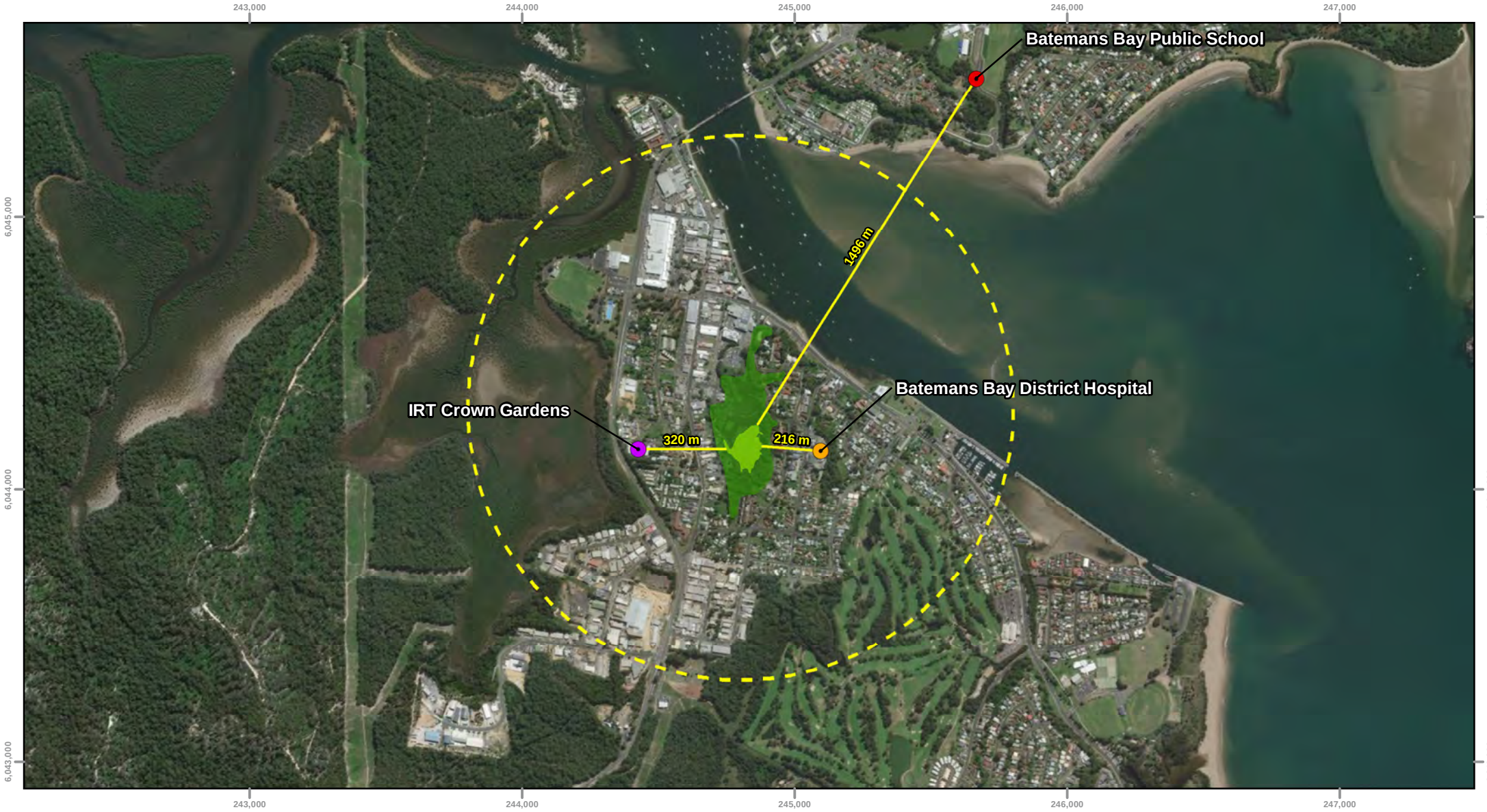

Figure 10: Water Gardens camp sensitive receptors

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Maximum known extent water

1 km buffer

Sensitive receptors

Aged care

Hospital

School

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/07/2018

0 125 250 500
Metres

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

PR2916_MPX_SensitiveReceptors
A4

6.2 Batemans Bay: Catalina

6.2.1 Camp description

The Catalina camp is located within Catalina Country Club Golf Course and on land zoned as Environmental Conservation along Hanging Rock Creek in Batemans Bay (Table 11). The combined maximum known camp extent has covered 18.74 hectares (ha) and is shown in Figure 11. Vegetation for the average known extent of the camp is Swamp Sclerophyll Forest on Coastal Floodplain EEC (Figure 12). This community is also listed as the Endangered Coastal Swamp Oak Forest under the EPBC Act. The vegetation communities for the maximum known extent comprise:

- Freshwater Wetlands on Coastal Floodplains EEC
- Swamp Oak Floodplain Forest EEC
- Lowland Grassy Woodland EEC
- Spotted Gum – White Stringybark – Burrawang Shrubby Open Forest on Hinterland Foothills
- Spotted Gum – Grey Ironbark – Woollybutt Grassy Open Forest on Coastal Flats.

Table 11 Catalina camp context

Criteria	Attribute
Location	-35.719661, 150.184465
Lot and plan (tenure)	344/DP821436 (Crown) 384/DP248840 (Freehold) 386/DP248840 (Freehold) 388/DP248840 (Freehold) 1/DP723086 (Crown) 1/DP723088 (Crown) 1/DP1036103 (Freehold) 7020/DP1019608 (Council) 7311/DP11641142 (Council)
Land zone	E2 Environmental Conservation RE2 Private Recreation
Current land use	Golf Course/Reserve
Maximum confirmed camp extent	187,524 m^2
Flying-fox usage	Irregular (but regularly used since 2016)

Twelve threatened species have been known to occur or recorded within 1 km of Catalina camp. Table 12 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 12 Ecological values within 1 km of Catalina camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	Swift parrot (*Lathamus discolor*) (CE) Eastern curlew (*Numenius madagascariensis*) (CE)	2 species (2 birds) known to occur within the area
		Threatened ecological communities	Coastal Swamp Oak Forest (E)	Occurs in the area
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Flesh-footed Shearwater (*Ardenna carneipes*) (V) Gang-gang cockatoo (*Callocephalon fimbriatum*) (V) Sooty oystercatcher (*Haematopus fuliginosus fuliginosus*) (V) Pied oystercatcher (*Haematopus longirostris*) (E) Swift parrot (*Lathamus discolor*) (E) Powerful owl (*Ninox strenua*) (V) Sooty tern (*Onychoprion fuscata*) (V) Long-nosed bandicoot (*Perameles nasuta*) (E) Yellow-bellied glider (*Petaurus australis*) (V) Twining glycine (*Glycine clandestine*) (E) White stringybark (*Eucalyptus globoidea*) (E)	11 species (7 birds, 2 mammals, 2 plants) have been recorded within 1 km of camp

Figure 11: Catalina camp extent

Eurobodalla Shire Council

Flying-fox Management Plan

- Average known extent (Nov17 - May18)
- Maximum known extent (April 2016)
- Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

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

PR2916_MPX_CampExtents
A4

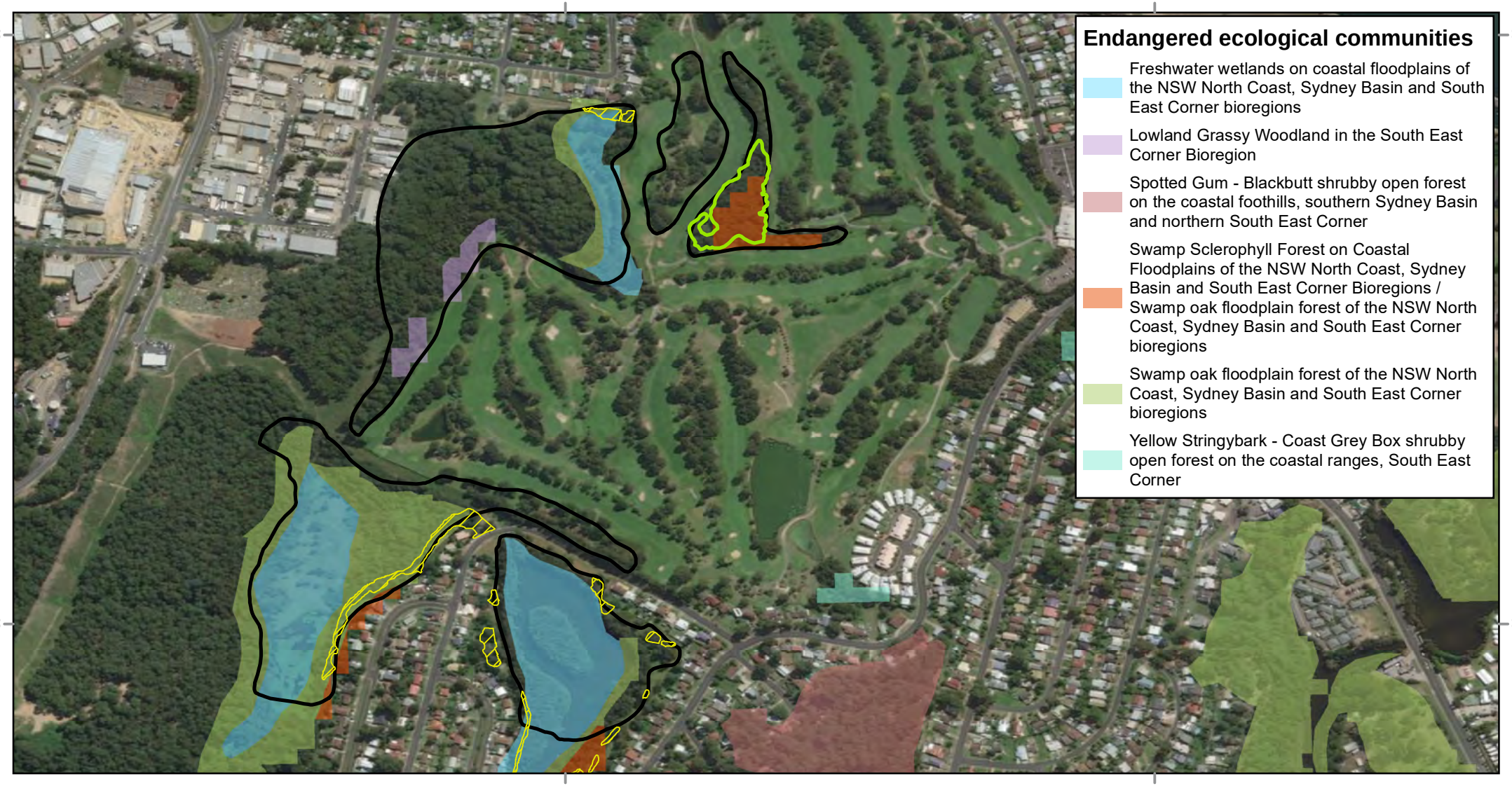

Figure 12: Catalina vegetation communities

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Maximum known extent (April 2016)

Buffer created through vegetation removal and deterrents

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 6/09/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

6.2.2 History of camp

The camp has been monitored on a quarterly basis since November 2012 as part of the National Flying-fox Monitoring Program (NFFMP). Flying-foxes irregularly occupy this camp, having been present in 2013, 2016, early 2017 and early 2018, though were absent in 2014 and 2015. This camp experienced an influx of more than 120,000 GHFF in May 2016 during the influx of GHFF to Batemans Bay (see also Section 6.1.2).

In response to the 2016 GHFF influx, Council carried out approved flying-fox dispersal activities between June and July 2016 in accordance with conditions set by the Commonwealth Environment Minister's National Interest Exemption, and the NSW OEH guidelines and policies. Since this time, Council has entered a Conservation Agreement with the Australian Government (Appendix 3), and obtained a Biodiversity Licence under NSW legislation should dispersal be required in Batemans Bay again in the future (refer to Section 6.1.2 and Appendix 4).

Eligible residents in close proximity to Catalina and Water Gardens camps were offered car and washing line covers, deodorises and gurney hire

The population has ranged between 126 and 2,420 flying-foxes during other monitoring events (Figure 13).

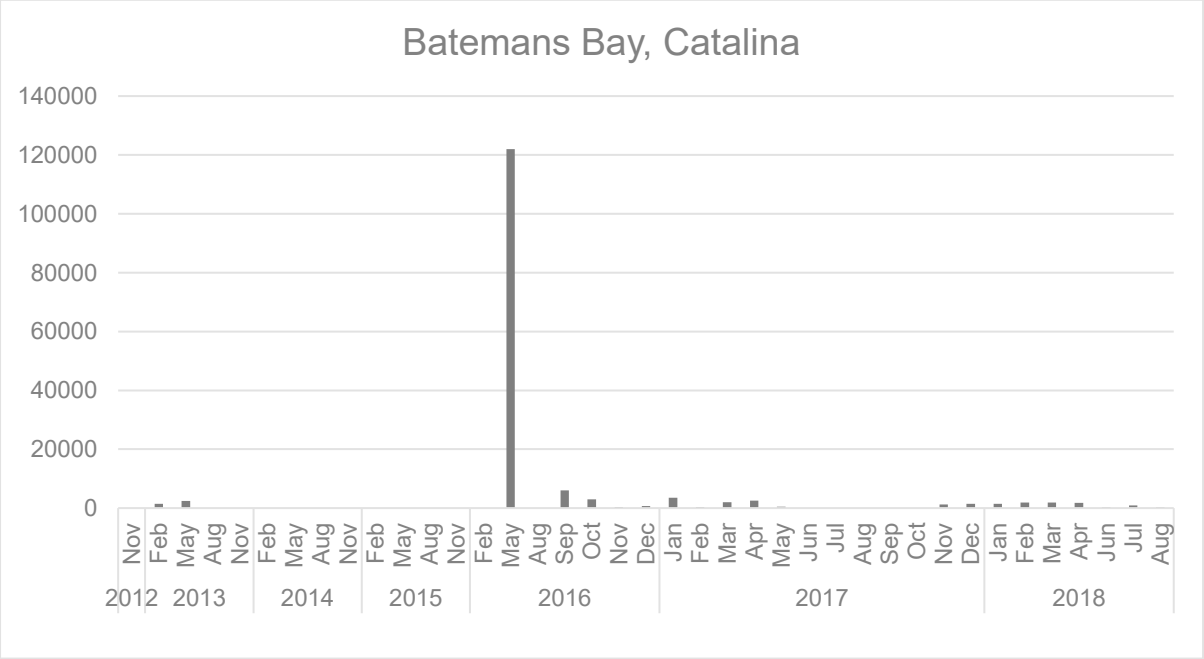

Figure 13 Catalina GHFF numbers between 2012 and 2017 Source NFFMP; ESC 2018

6.2.3 Sensitive receptors

Sensitive receptors around the Catalina camp (or within 13 km for aerodromes) are detailed in Table 13 and Figure 14. There are 40 properties within 300 m of the average known camp extent.

Table 13 Catalina camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Public park or access	0 m	The camp is located within Catalina Country Club golf course that is accessed by the pubic on a daily basis	Low
Residential	156 m	Residential homes are adjacent to the golf course, approximately 150 m from the average known camp extent. There are 40 properties within 300m of the average extent of camp.	Low
Hospital	230m	The Batemans Bay hospital is located 230m north of the camp's historic maximum extent and 500m from the average camp extent	Low
Aged care	650m 575m	IRT Crown Gardens is located 650m north west of the camp's historic northern maximum extent The Glen Residential Care Services is located 575m south of Catalina South	Very low
School / child care	1 km	Batemans Bay High School is 1 km to the south east	Very low

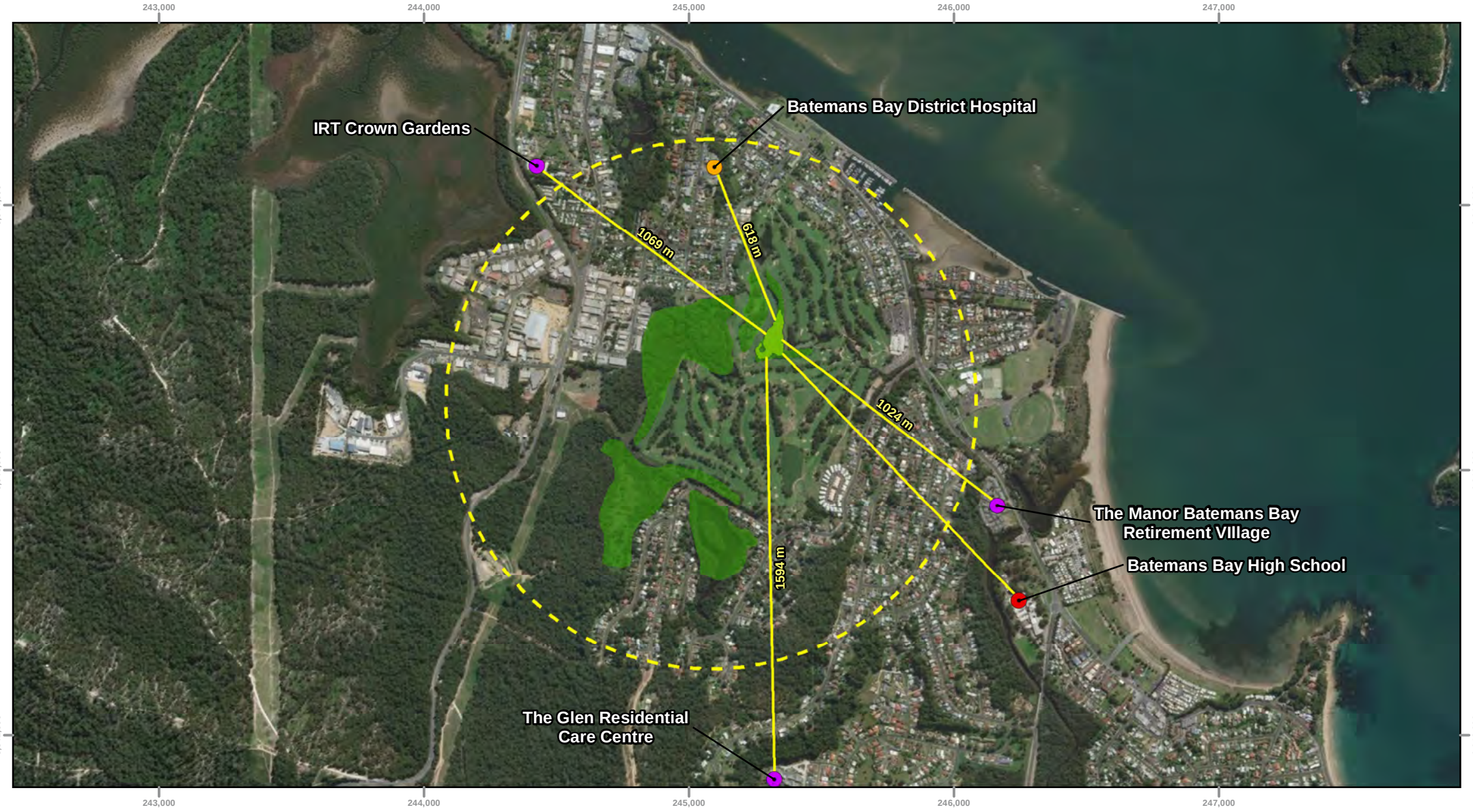

Figure 14: Catalina camp sensitive receptors

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Maximum known extent

1 km buffer

Sensitive receptors

Aged care

Hospital

School

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/07/2018

0 125 250 500
Metres

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

PR2916_MPX_SensitiveReceptors
A4

6.3 Buckenbowra: Nelligen Creek

6.3.1 Camp description

The Nelligen Creek camp is located near Old Bolaro Road and Misty Mountain Road, Buckenbowra on land zoned as National Park (Monga NP) (Table 14). The maximum camp extent is not known, the approximate camp centre is shown in Figure 15. Camp vegetation does not contain EEC vegetation although state mapping shows Araluen Ecotonal Granite Dry Rainforest in this location (OEH 2015) (Figure 16).

Table 14 Nelligen Creek camp context

Criteria	Attribute
Location	-35.6336498, 150.0228845
Lot and plan (tenure)	Crown
Land zone	Monga National Park
Current land use	Conservation
Maximum confirmed camp extent	Not recorded
Flying-fox usage	Rare

Nine threatened species are known to or have been recorded within 1 km of Nelligen Creek. Table 15 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 15 Ecological values within 1 km of Nelligen Creek camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meets criteria
	Protected Matters (DoEE 2018)	Threatened species	Greater glider (Petauroides volans) (V) Koala (*Phascolarctos cinereus*) (V)	2 species (2 mammals) known to occur within the area
State	Atlas of Living Australia (ALA) and Bionet (OEH 2018)	Threatened species	Glossy-black cockatoo (*Calyptorhynchus lathami*) (V) White stringybark (*Eucalyptus globoidea*) Twining glycine (*Glycine clandestine*) (E) Powerful owl (*Ninox strenua*) (V) Greater glider (*Petauroides volans*) (E) Yellow-bellied glider (*Petaurus australis*) (V) Masked owl (*Tyto novaehollandiae*) (V) Sooty owl (*Tyto tenebricosa*) (V)	8 species (3 birds, 2 mammals, 2 plants) have been recorded within 1 km of camp

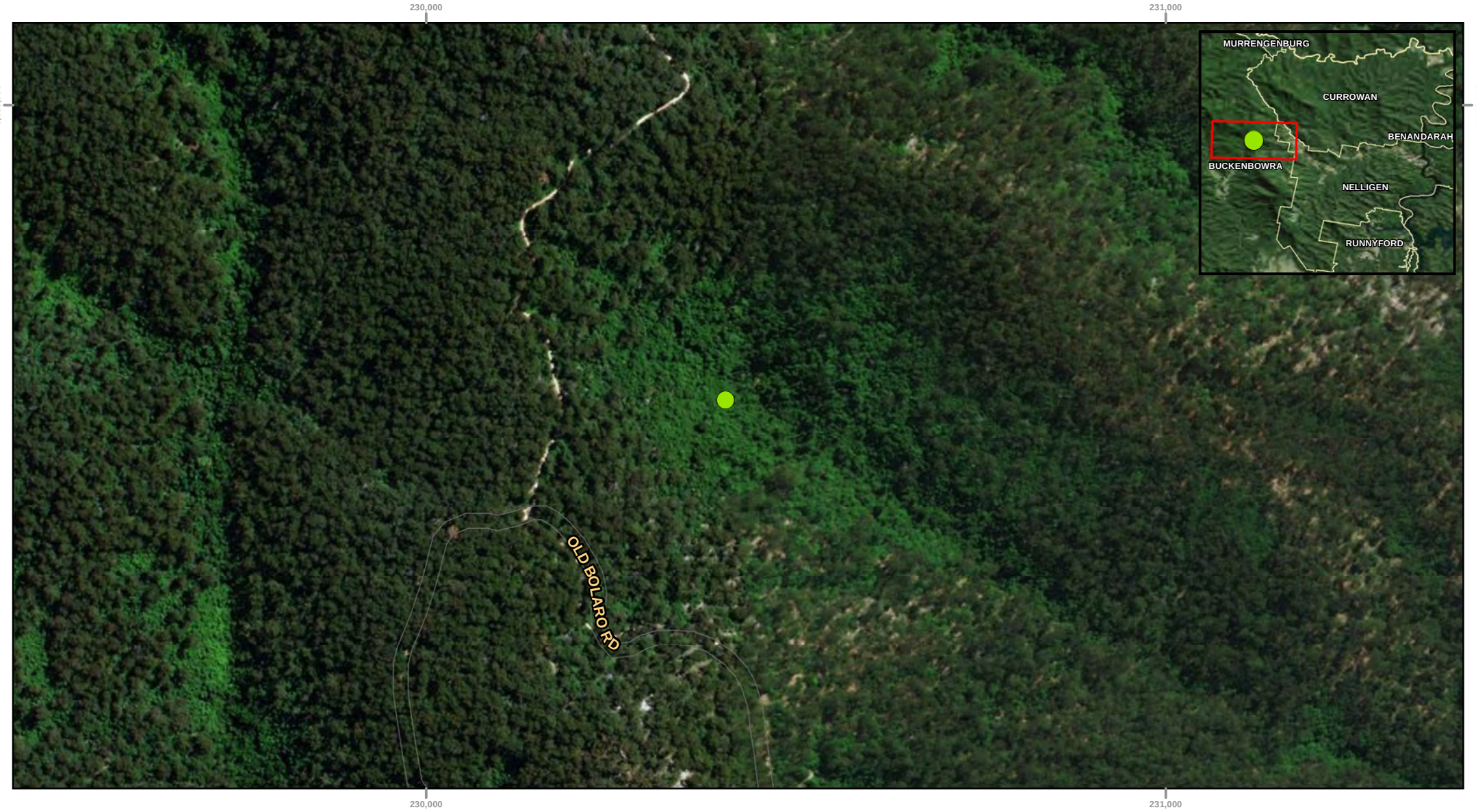

Figure 15: Nelligen Creek camp location

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

GCS WGS 1984
Datum: WGS 1984
Units: Degree

PR2916_MPX_CampExtents_Other
A4

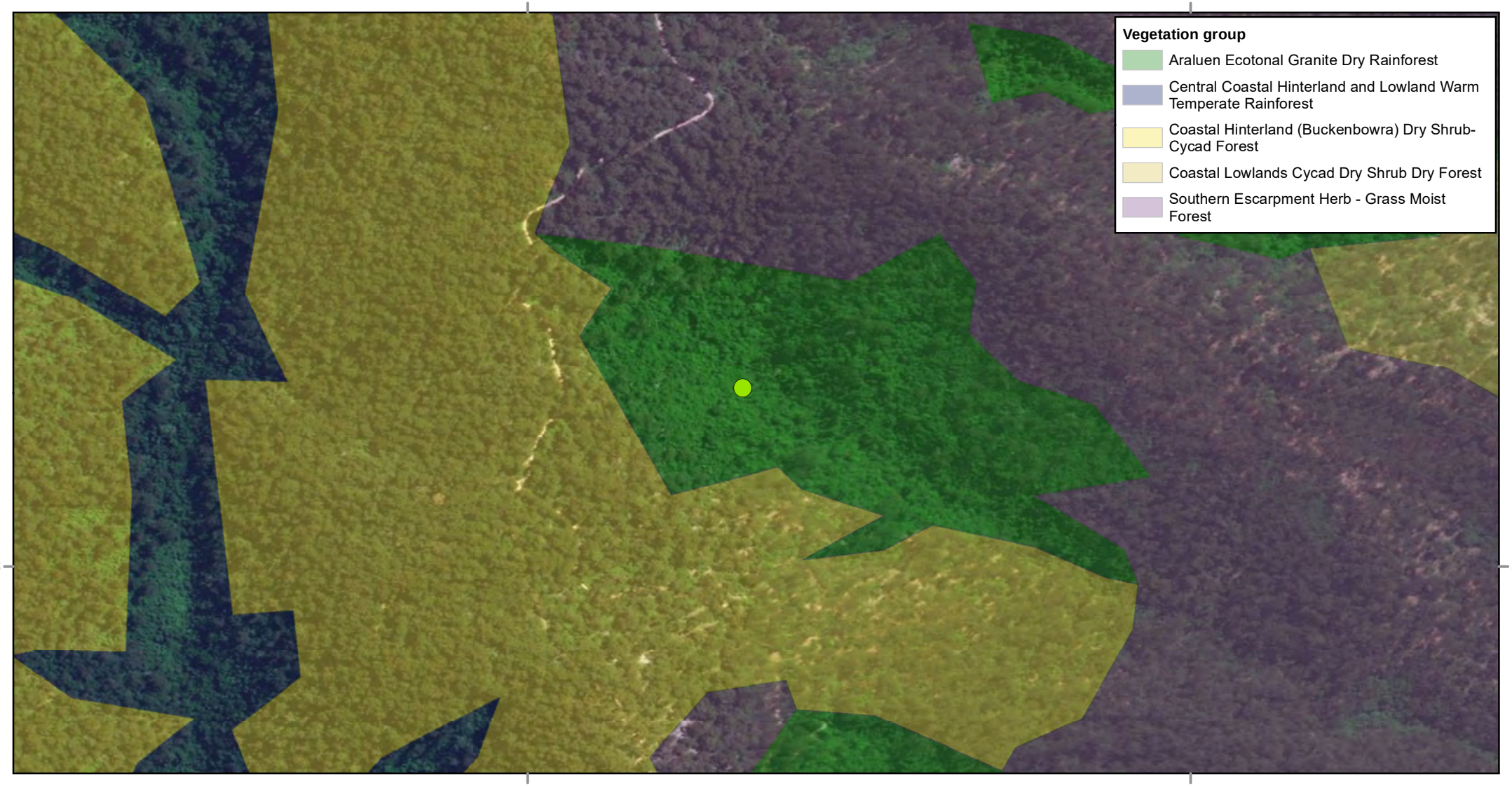

Figure 16: Nelligen vegetation communities

Camp location (extent unknown)

Eurobodalla Shire Council

Flying-fox Management Plan

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/07/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

PR2916_MPX_Vegetation_SpeciesRecords
A4

6.3.2 History of the camp

The camp was monitored as part of the NFFMP in 2012 and 2013 with no flying-foxes recorded during this period.

6.3.3 Sensitive receptors

There are no sensitive receptors within 300m of Nelligen Creek Camp (Table 16). The camp exists within a National Park and the nearest resident is 3.5 km away.

Table 16 Nelligen camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Residents	within 300 m	0 properties	Very low

6.4 Moruya: Moruya Township

6.4.1 Camp description

The Moruya Township camp is located on Moruya Street road reserve, on land zoned as Environmental Conservation (Table 17). The maximum camp extent is not known, the approximate camp centre is shown in Figure 17. Camp vegetation is not mapped at this location because it is mostly non-native such as willow, privet and blackberry surrounding a small patch of native vegetation including casuarina, eucalypts and pittosporum.

Table 17 Moruya township camp context

Criteria	Attribute
Location	-35.918746, 150.07678
Lot and plan (tenure)	504/DP1113193
Land zone	Environmental Conservation
Current land use	Vacant lot
Maximum confirmed camp extent	Not recorded
Flying-fox usage	Irregular

Thirteen threatened species are known to or have been recorded within 1 km of Moruya Township. Table 18 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 18 Ecological values within 1 km of Moruya Township camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	Regent Honeyeater (*Anthochaera phrygia*) (CE) Red knot (*Calidris canutus*) (E) Fairy prion (*Pachyptila turtur subantarctica*) (V)	3 species (3 birds) known to occur within the area
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Regent Honeyeater (*Anthochaera phrygia*) (CE) Pied oystercatcher (*Haematopus longirostris*) (E) Square-tailed kite (*Lophoictinia isura*) (V) Eastern osprey (*Pandion cristatus*) (V) Freckled duck (*Stictonetta naevosa*) (V) Superb fruit-dove (*Ptilinopus superbus*) (V) Black bittern (Ixobrychus flavicollis) (V) Glossy black-cockatoo (*Calyptorhynchus lathami*) (V) Swift parrot (*Lathamus discolour*) (E) Olive whistler (*Pachycephala olivacea*) (V) Dusky woodswallow (*Artamus cyanopterus cyanopterus*) (V)	13 species (13 birds) have been recorded within 1 km of camp

Figure 17: Moruya township camp location

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 25/07/2018

0 50 100 200
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

PR2916_MPX_CampExtents
A4

6.4.2 History of camp

The camp not been monitored as part of the NFFMP, however Council has monitored flying-foxes at this location since 2016 (ESC 2018). Flying-foxes irregularly occupy this camp.

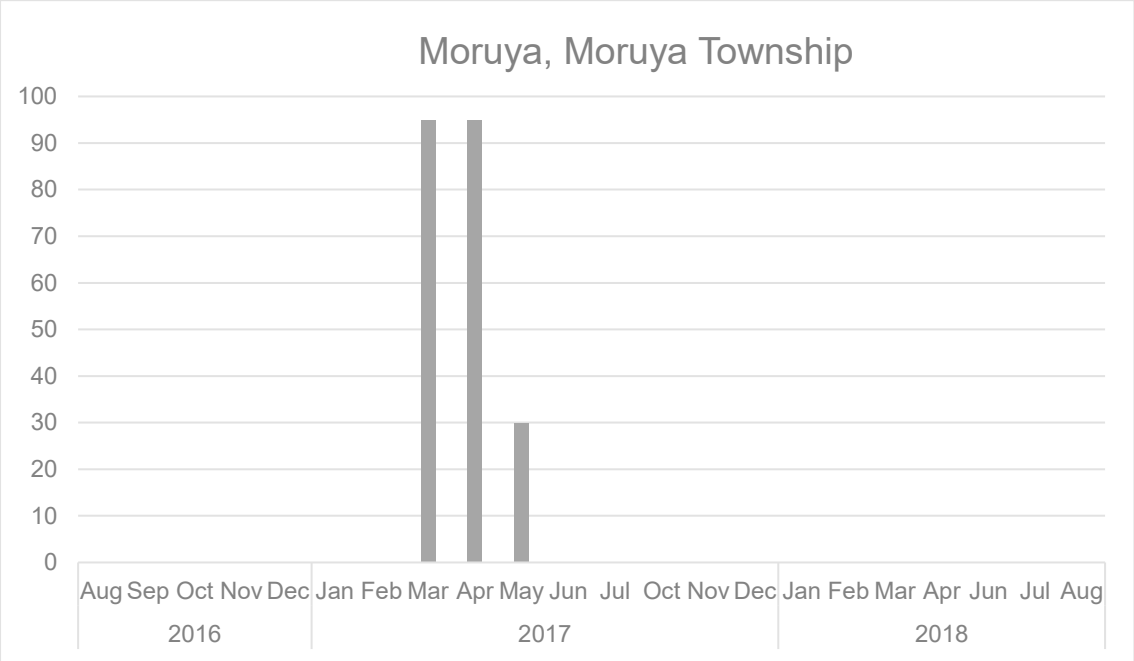

Figure 18 Moruya GHFF numbers 2017 (ESC 2018)

6.4.3 Sensitive receptors

Sensitive receptors around Moruya Township camp (or within 13 km for aerodromes) are detailed in Table 19 and Figure 19. Moruya Airport on the northern side of Moruya River is owned and operated by Council.

Table 19 Moruya Township camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Airport	5.9 km	Moruya Airport is 1.2 km north of the camp. The risk of flying-fox strike must be appropriately managed (see Section 2.3.9).	Medium
School	338 m	Moruya High School	Very Low
School	714 m	Moruya Early Learning Centre	Very Low
School	197 m	Premier Early Learning Centre	Low
School	680 m	Moruya Public school	Very Low
School	925 m	Murray Street Preschool	Very Low

Category	Proximity to camp	Details	Risk of direct impact from camp
School	1062 m	Moruya Preschool Kindergarten	Very Low
School	1047 m	St Mary's Primary school	Very Low
Public park	376 m	Moruya showground	Very Low
Public park	545 m	Moruya golf club	Very Low
Hospital	1724 m	Moruya District Hospital	Very Low
Aged care	1432 m	IRT residential aged care	Very Low
Residential	60 m	The closest residents are on Haslingden Street and Moruya Street. There are a 105 properties within 300m of the camp	Moderate

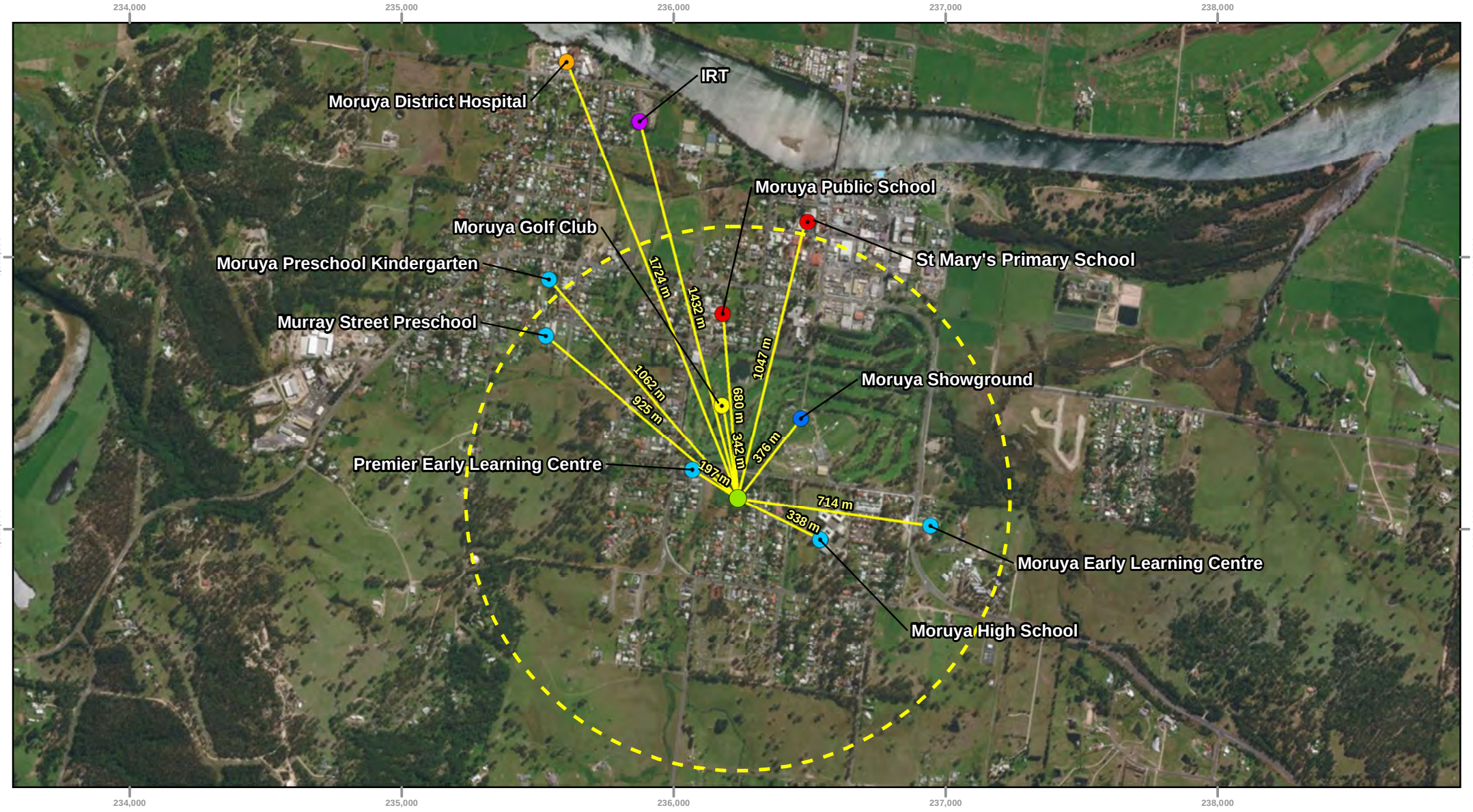

Figure 19: Moruya township sensitive receptors

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

1 km buffer

Sensitive receptors

- Aged care
- Childcare
- Golf club
- Hospital
- School
- Showground

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 26/07/2018

0 125 250 500
Metres

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

PR2916_MPX_SensitiveReceptors
A4

6.5 Moruya Heads: Moruya Heads

6.5.1 Camp description

The Moruya Heads camp is located near Renee Crescent, Moruya Heads on land zoned as Environmental Conservation (Table 20). The maximum camp extent not known; the approximate camp centre is shown in Figure 20. Camp vegetation is mapped as Swamp Oak Floodplain Forest EEC (Figure 21).

Table 20 Moruya Heads camp context

Criteria	Attribute
Location	-35.919704, 150.14212
Lot and plan (tenure)	103/DP806080 (Freehold)
Land zone	E2 Environmental Conservation
Current land use	Reserve
Maximum confirmed camp extent	Not recorded
Flying-fox usage	Rare

Nineteen threatened species are known to occur or have been recorded within 1 km of Moruya Heads camp. Table 21 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 21 Ecological values within 1 km of Moruya Heads camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	Regent Honeyeater (*Anthochaera phrygia*) (CE) Red knot (*Calidris canutus*) (E) Spotted-tailed quoll (*Dasyurus maculatus maculatus*) (E) Eastern curlew (*Numenius madagascariensis*) (CE) Fairy prion (*Pachyptila turtur subantarctica*) (V) Greater glider (*Petauroides volans*) (V)	6 species (4 birds, 2 mammals) known to occur within the area
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Regent Honeyeater (*Anthochaera phrygia*) (CE) Great knot (*Calidris tenuirostris*) (V) Sooty oystercatcher (*Haematopus fuliginosus fuliginosus*) (V) Pied oystercatcher (*Haematopus longirostris*) (E) White-bellied sea-eagle (*Haliaeetus leucogaster*) (V) Square-tailed kite (*Lophoictinia isura*) (V)	14 species (14 birds) have been recorded within 1 km of camp

Protection level	Source	Category	Values/significance	Details
			Barking owl (*Ninox connivens*) (V) Powerful owl (*Ninox strenua*) (V) Eastern osprey (*Pandion cristatus*) (V) Pink robin (*Petroica rodinogaster*) (V) Little shearwater (*Puffinus assimilis*) (V) Freckled duck (*Stictonetta naevosa*) (V) Hooded plover (*Thinornis rubricollis*) (CE) Terek sandpiper (*Xenus cinereus*) (V)	

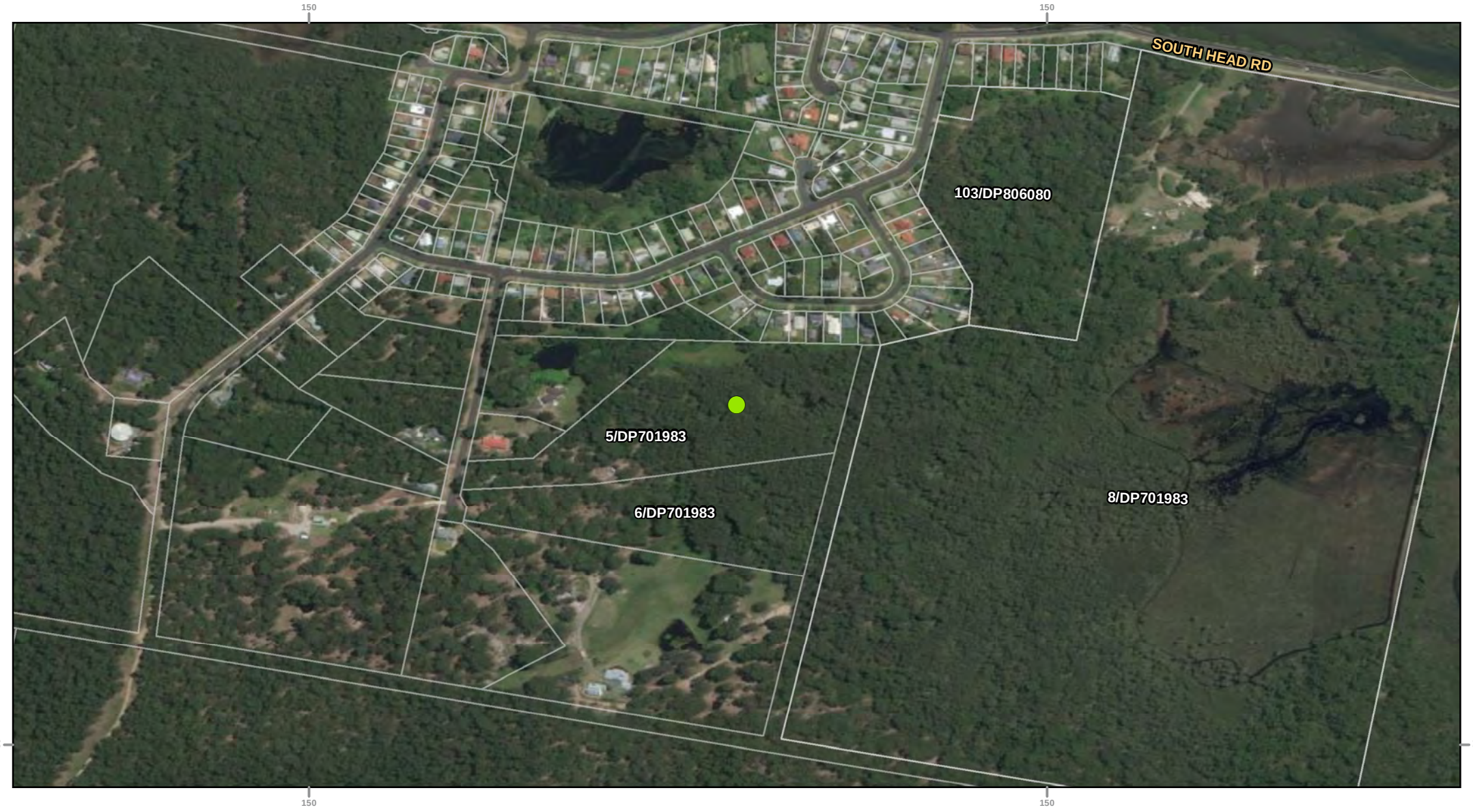

Figure 20: Moruya Heads camp location

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 25/07/2018

0 50 100 200
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

PR2916_MPX_CampExtents
A4

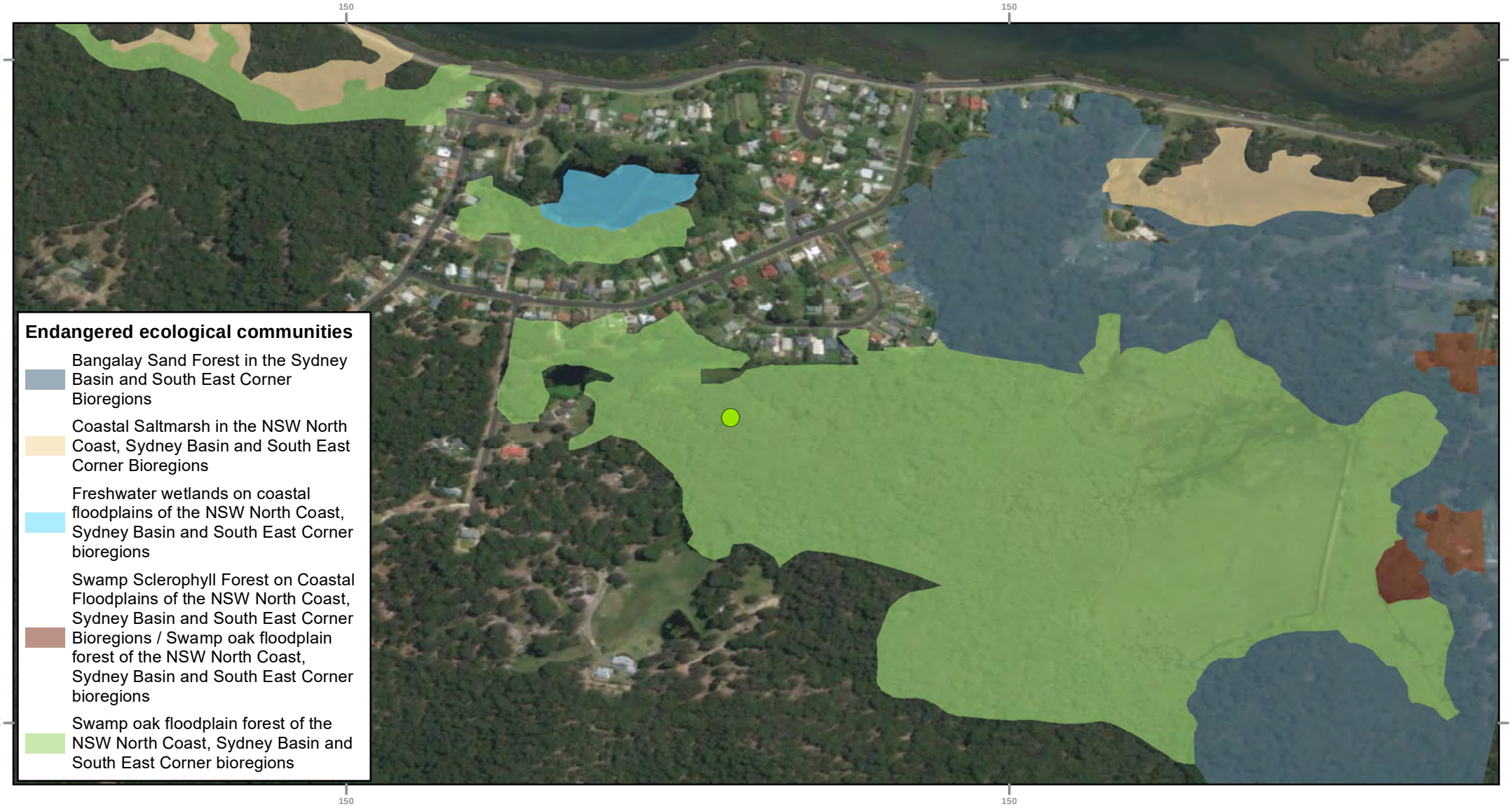

Figure 21: Moruya Heads vegetation communities

Camp location (extent unknown)

Eurobodalla Shire Council

Flying-fox Management Plan

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 26/07/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

6.5.2 History of camp

Flying-foxes rarely occupy the camp at Moruya Heads, having been recorded in the NFFMP in 2013 and 2015 (Figure 22). Council has monitored this camp since 2016 with no flying-foxes recorded.

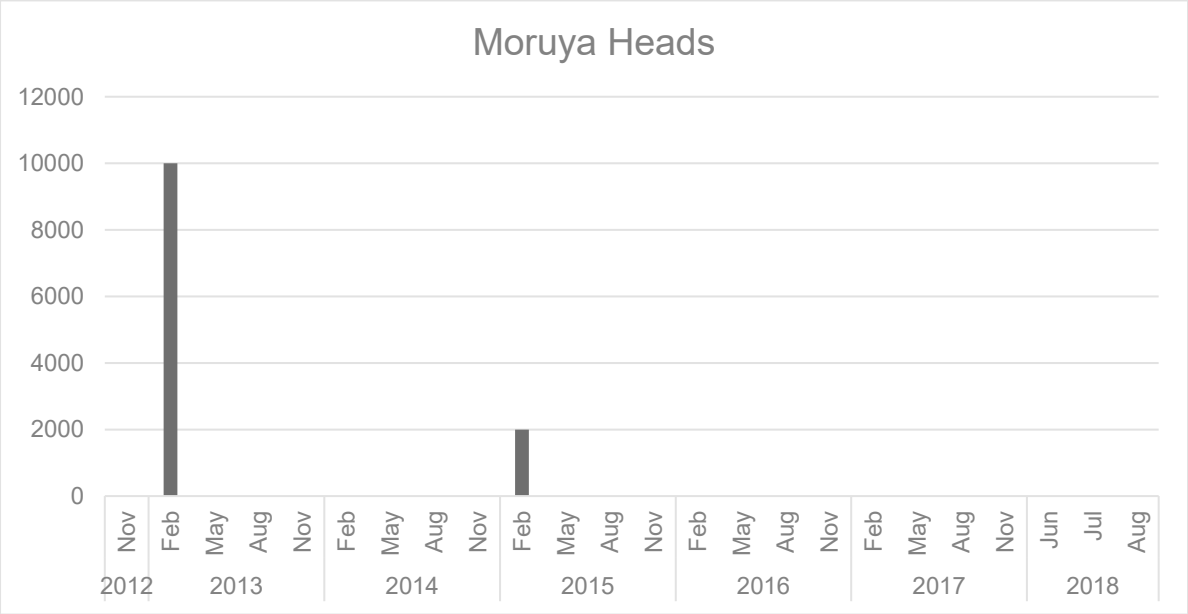

Figure 22 Moruya Heads GHFF numbers between 2012 and 2017 Source NFFMP; ESC 2018

6.5.3 Sensitive receptors

Sensitive receptors around Moruya Heads camp (or within 13 km for aerodromes) are detailed in Table 22 and Figure 23. Moruya Airport on the northern side of Moruya River is owned and operated by Council.

Table 22 Moruya Heads camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Airport	1.2 km	Moruya Airport is 1.2 km north of the camp. The risk of flying-fox strike must be appropriately managed (see Section 2.3.9).	High
Residential	90 m	The closest residents are on Renee Crescent. There are 66 properties within 300m of camp	Moderate

Figure 23: Moruya Heads camp sensitive receptors

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

1 km buffer

Sensitive receptors

Airport

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 26/07/2018

0 125 250 500
Metres

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

PR2916_MPX_SensitiveReceptors
A4

6.6 Narooma: Narooma

6.6.1 Camp description

The Narooma camp is located on Flying-fox Road, Narooma on land zoned as Environmental Conservation (Table 23). The average known camp extent is shown in Figure 24 and covered 2.8 hectares. Camp vegetation (Figure 25) is mapped as Lilly Pilly – Sassafras warm temperate rainforest in moist sheltered gullies, Sydney Basin and South East Corner EEC.

Table 23 Narooma camp context

Criteria	Attribute
Location	-36.231115, 150.091409
Lot and plan (tenure)	22/DP865887 (Freehold)
Land zone	E2 Environmental Conservation
Current land use	Reserve
Maximum confirmed camp extent	Not recorded
Flying-fox usage	Annual

Six threatened species are known to occur or have previously been recorded within 1 km of Narooma camp. Table 24 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 24 Ecological values within 1 km of Narooma camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	Regent honeyeater (*Anthochaera phrygia*) (CE) Red knot (*Calidris canutus*) (E) Eastern curlew (*Numenius madagascariensis*) (CE) Koala (*Phascolarctos cinereus*) (V) Wingless Raspwort (*Haloragis exalata subsp. exalata*) (V)	5 species (3 birds, 1 mammal, 1 plant) known to occur within the area
State	Atlas of Living Australia (ALA) and Bionet	Threatened species	Square-tailed kite (*Lophoictinia isura*) (V) Koala (*Phascolarctos cinereus*) (V) Wingless Raspwort (*Haloragis exalata subsp. exalata*) (V)	3 species (2 mammals, 1 plant) have been recorded within 1 km of camp

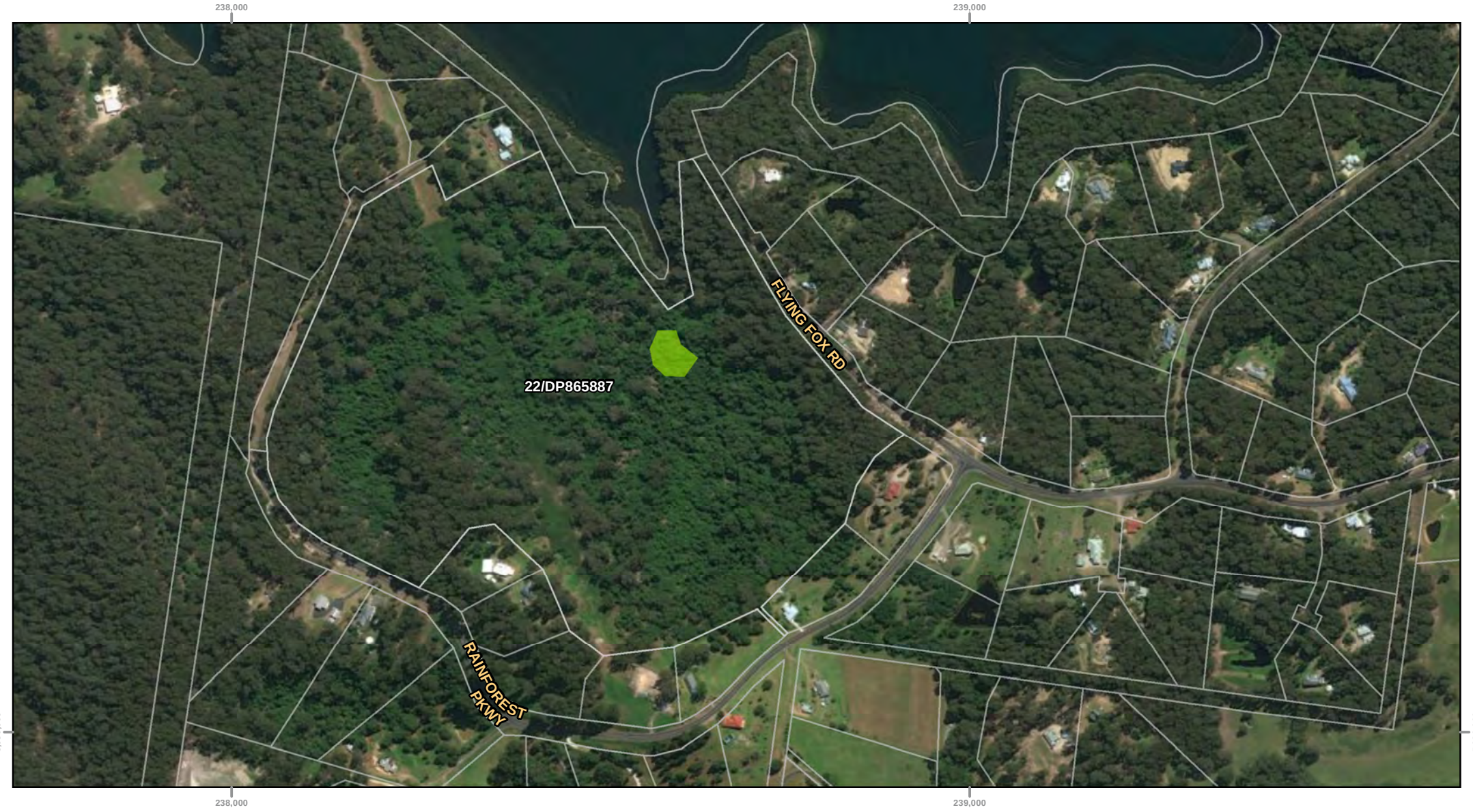

Figure 24: Narooma camp extent

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

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

PR2916_MPX_CampExtents
A4

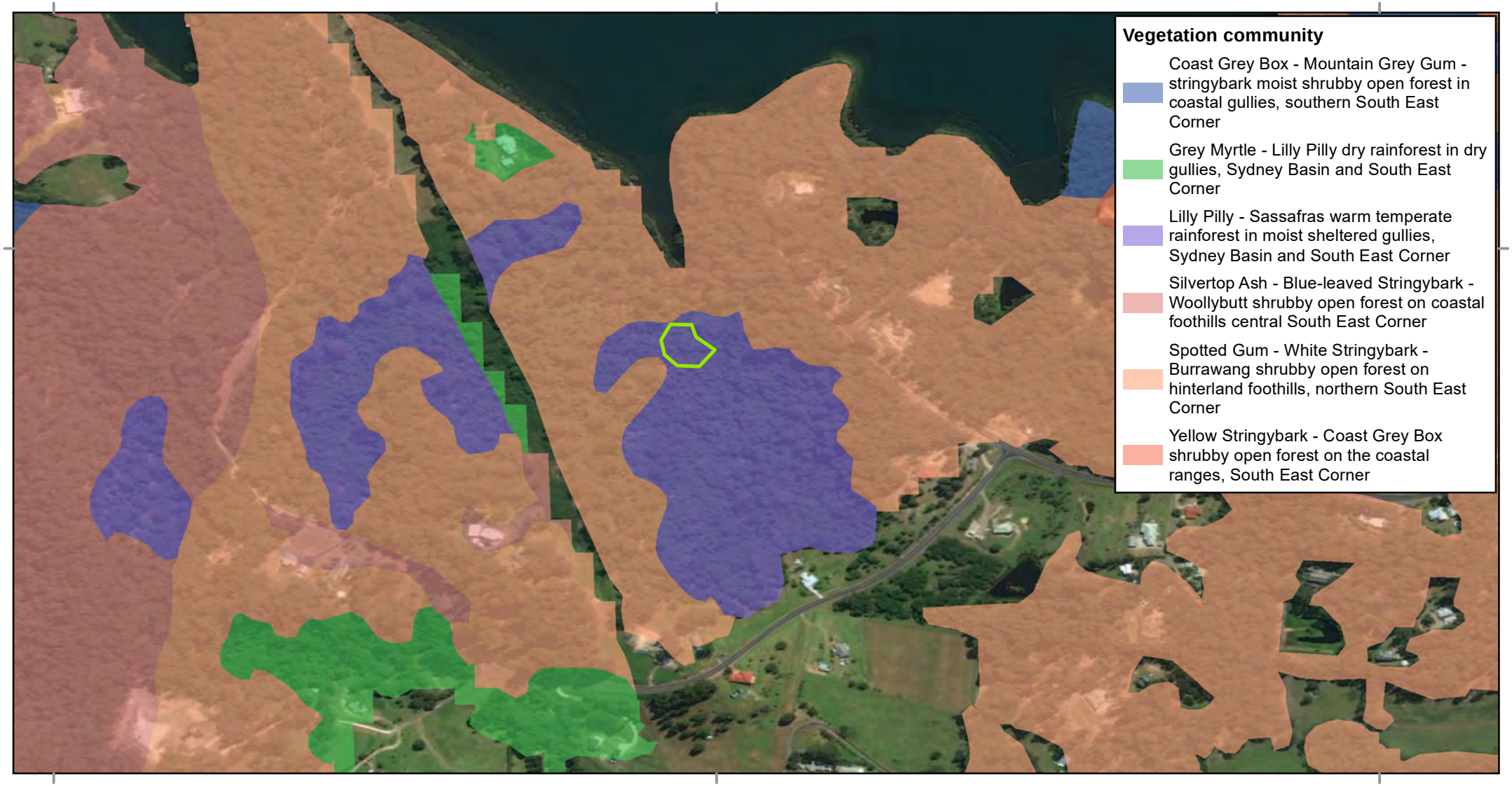

Figure 25: Narooma vegetation communities

Average known extent (Nov17 - May18)

Eurobodalla Shire Council

Flying-fox Management Plan

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 26/07/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

6.6.2 History of the camp

This irregularly occupied camp was monitored as part of the NFFMP in February and May 2013 and December 2017 with no records of flying-foxes recorded. However, Council monitored this camp since 2016 with flying-fox numbers equal to or below 400 in the autumn of 2017 and 2018 (Figure 26).

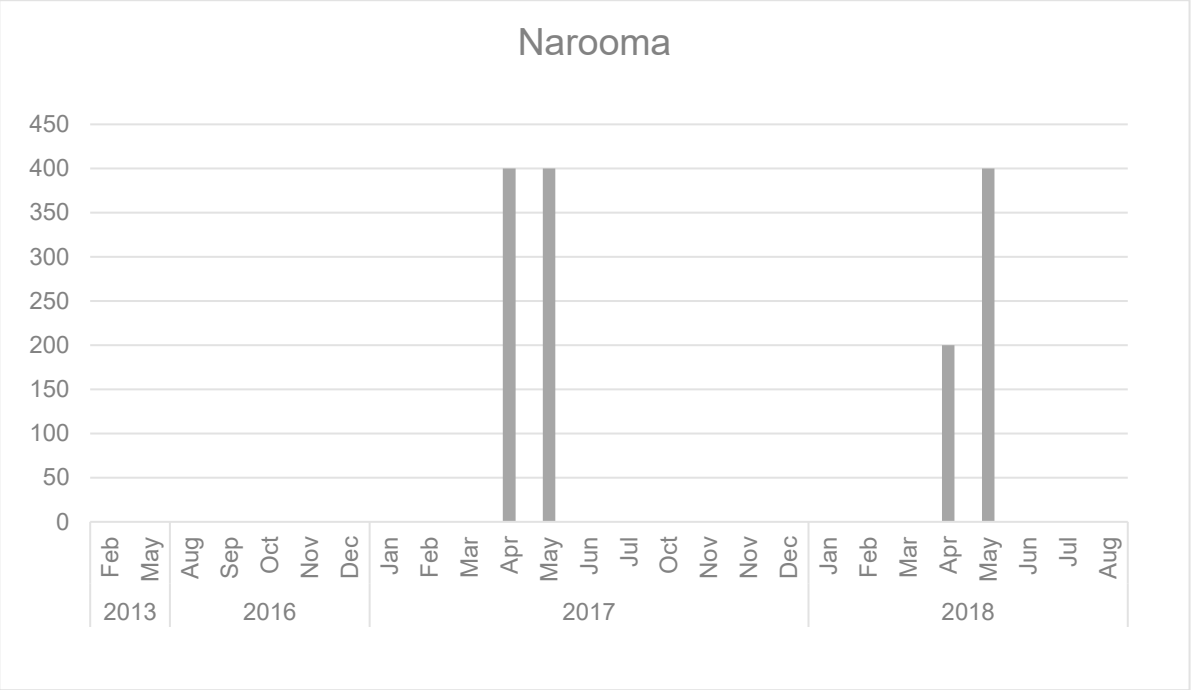

Figure 26 Narooma GHFF numbers between 2017 and 2018 (Source: ESC 2018)

6.6.3 Sensitive receptors

There are no sensitive receptors around Narooma camp (or within 13 km for aerodromes). The number of properties within 300 m are provided in Table 25.

Table 25 Sensitive receptors around Narooma camp

Category	Proximity to camp	Details	Risk of direct impact from camp
Residents	175 m	10 properties are within 300 m of the camp	low

6.7 Tuross Head: Tuross

6.7.1 Camp description

The Tuross camp is located on Hector McWilliam Drive, Tuross Head (Table 26). The average known camp extent is shown in Figure 27 and covered 1445 m^2. Camp vegetation is mapped as Yellow Stringybark – Coast Grey Box shrubby open forest on coastal ranges, South East Corner (Figure 28) but littoral rainforest listed in NSW and the Commonwealth in in the vicinity.

Table 26 Tuross camp context

Criteria	Attribute
Location	-36.044981, 150.121603
Lot and plan (tenure)	5/DP1040408 (Freehold) 4/DP1040408 (Freehold)
Land zone	R2 Low density residential E4 Environmental living
Current land use	Vacant lot
Maximum confirmed camp extent	175 m^2
Flying-fox usage	Annual

Nine threatened species are known to occur or have been recorded within 1 km of Tuross camp. Table 27 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 27 Ecological values within 1 km of Tuross camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	Regent honeyeater (*Anthochaera phrygia*) (CE) Red knot (*Calidris canutus*) (E) Curlew sandpiper (*Calidris ferruginea*) (CE) Eastern curlew (*Numenius madagascariensis*) (CE) Wingless Raspwort (*Haloragis exalata subsp. exalata)* (V)	5 species (4 birds, 1 plant) known to occur within the area (SPRAT data not mapped)
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Gang-gang cockatoo (*Callocephalon fimbriatum*) (V) White-fronted chat (*Epthianura albifrons*) (V) Pied oystercatcher (*Haematopus longirostris*) (E) Little tern (*Sternula albifrons*) (E) Wingless Raspwort (*Haloragis exalata subsp. exalata*) (V)	5 species (4 birds, 1 plant) have been recorded within 1 km of camp (Figure 27)

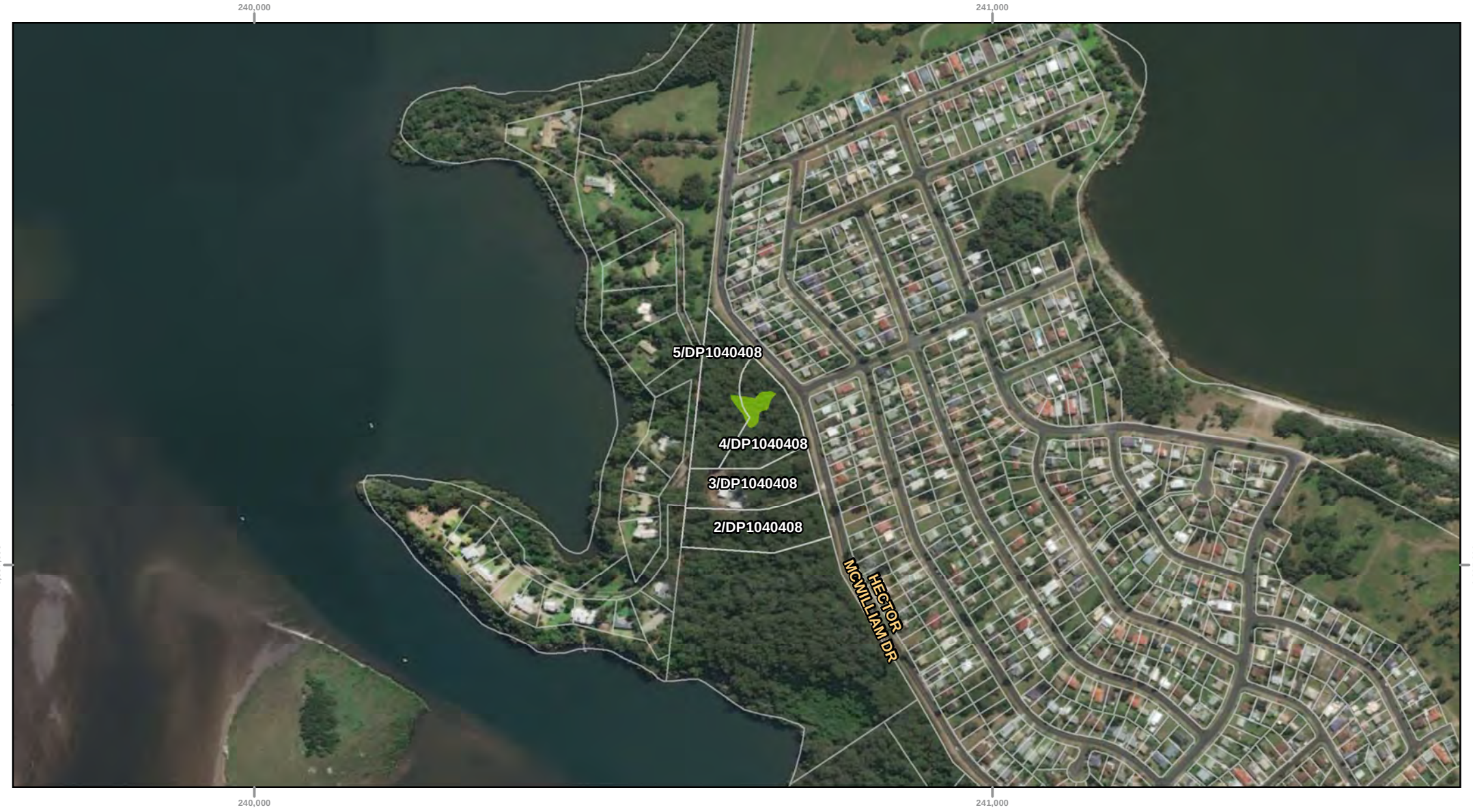

Figure 27: Tuross camp extent

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

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

PR2916_MPX_CampExtents
A4

Figure 28: Tuross vegetation communities

Average known extent (Nov17 - May18)

Eurobodalla Shire Council

Flying-fox Management Plan

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 26/07/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

PR2916_MPX_Vegetation_SpeciesRecords
A4

6.7.2 History of camp

Flying-foxes have occupied this camp annually since it was identified in 2017. It was monitored as part of the NFFMP with only one record (100: February 2017) recorded. Council has monitored this camp regularly since 2017 with numbers of flying-fox ranging from 80 to 500 (Figure 29).

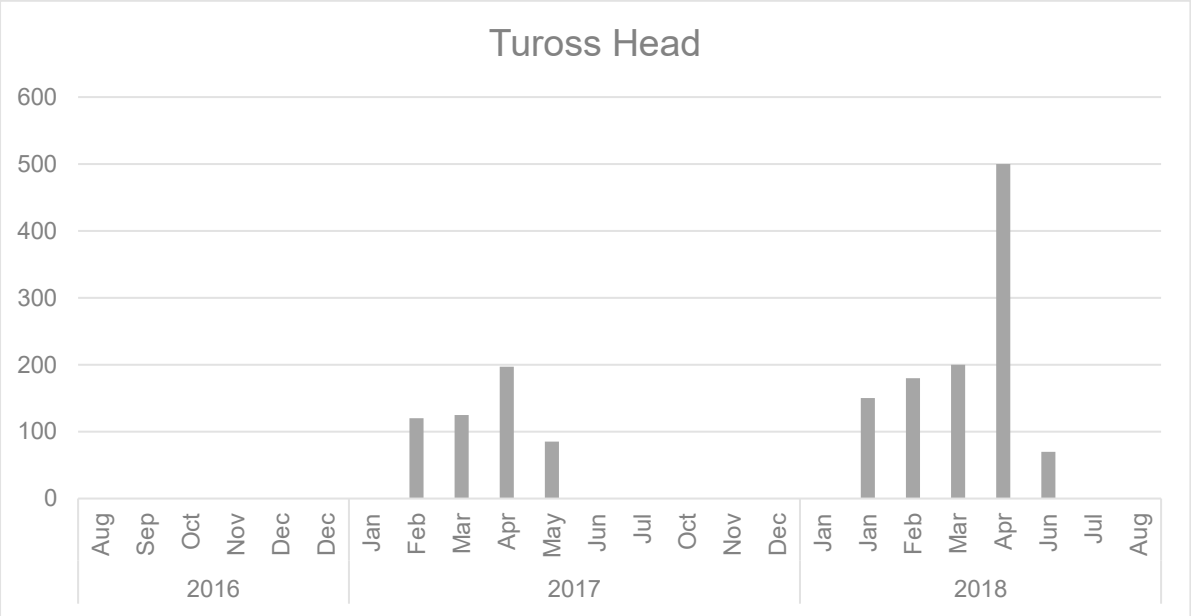

Figure 29 Tuross GHFF numbers recorded by Council staff between 2017 and 2018 (ESC 2018)

6.7.3 Sensitive receptors

Sensitive receptors around Tuross camp (or within 13 km for aerodromes) are detailed in Table 28 and Figure 30.

Table 28 Tuross camp sensitive receptors

Category	Proximity to camp	Details	Risk of direct impact from camp
Public park or access	625 m	Kyla Park sports field is 625 m from the camp Tuross Head Country Club golf course is 648 m to the south	Very low
Residential	30 m	The nearest residence across is 30 m away. There are 180 properties within 300m of camp	Moderate

Figure 30: Tuross camp sensitive receptors

Eurobodalla Shire Council

Flying-fox Management Plan

Average known extent (Nov17 - May18)

1 km buffer

Sensitive receptors

Childcare

Golf club

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/07/2018

0 125 250 500
Metres

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

PR2916_MPX_SensitiveReceptors
A4

6.8 Wamban: Moruya Beashels Trig

6.8.1 Camp description

The Moruya Beashels Trig camp is located on Beashels Trig Road, Moruya on land zoned as Deferred Matter (Table 29). The combined maximum camp extent is not known, approximate camp centre is shown in Figure 31. Vegetation likely to be occupied by flying-foxes at this location includes Dry Gully Rainforest (Figure 32).

Table 29 Moruya Beashels Trig camp context

Criteria	Attribute
Location	-35.9899698,150.0625781
Lot and plan	45/DP752129 (Freehold)
Land zone	RU1
Current land use	Rural
Maximum confirmed camp extent	not known
Flying-fox usage	Rare

Two threatened species are known to occur or have been recorded within 1 km of Moruya Beashels Trig camp. Table 30 provides a preliminary assessment of ecological values found around the camp, however a flora and fauna assessment should be undertaken to ground truth desktop findings before any works occur on site.

Table 30 Ecological values known to occur or recorded within 1 km on Moruya Beashels Trig camp

Protection level	Source	Category	Values/significance	Details
Commonwealth	NFFMP (DoEE 2018)	Nationally important camp	See definition Appendix 2	Site does not meet criteria
	Protected Matters (DoEE 2018)	Threatened species	nil	No threatened species known to occur within the area
State	Atlas of Living Australia (ALA 2018) and Bionet (OEH 2018)	Threatened species	Barking owl (*Ninox connivens*) (V) Powerful owl (*Ninox strenua*) (V)	2 species (2 birds) have been recorded within 1 km of camp

Figure 31: Moruya Beashels Trig camp location

Eurobodalla Shire Council

Flying-fox Management Plan

Camp location (extent unknown)

Property boundary

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/05/2018

0 50 100 200
Metres

GCS WGS 1984
Datum: WGS 1984
Units: Degree

PR2916_MPX_CampExtents_Other
A4

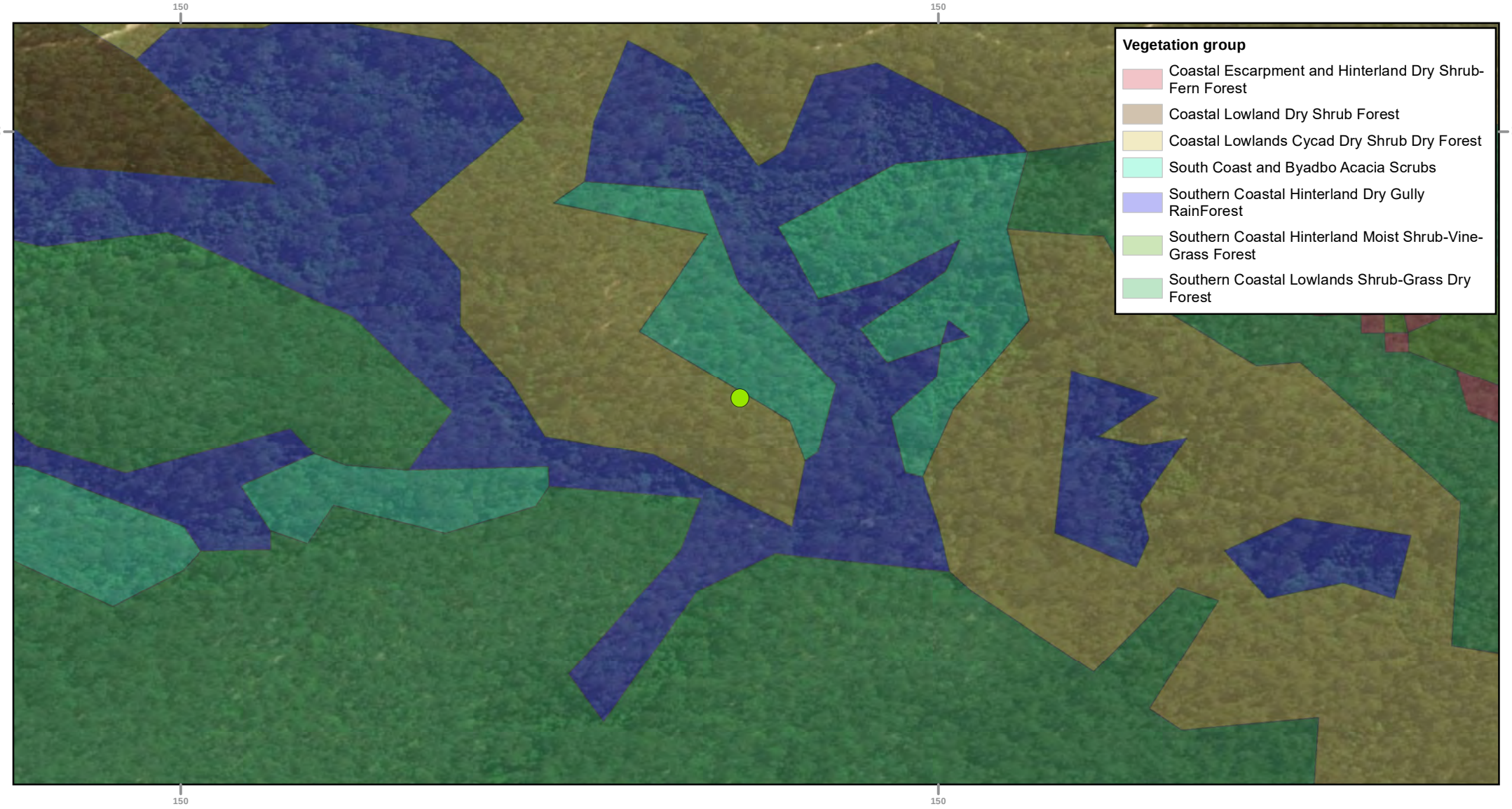

Figure 32: Moruya Beashel Trig vegetation communities

Camp location (extent unknown)

Eurobodalla Shire Council

Flying-fox Management Plan

ecosure

Job number: PR2916
Revision: 0
Author: KF
Date: 31/07/2018

0 125 250 500
Metres

GCS GDA 1994
Datum: GDA 1994
Units: Degree

PR2916_MPX_Vegetation_SpeciesRecords
A4

6.8.2 History of camp

The camp has been monitored on a biannual basis since February 2013 as part of the NFFMP with zero flying-foxes recorded in summer, autumn and winter of 2013, 2015, and 2017.

6.8.3 Sensitive receptors

There are no sensitive receptors around Moruya Beashels Trig camp (Table 31). The Moruya Airport is 11.2 km from the camp.

Table 31 Sensitive receptors around Moruya Beashels Trig camp

Category	Proximity to camp	Details	Risk of direct impact from camp
Airport	11.2 km	Moruya Airport is 11.2 km north of the camp. The risk of flying-fox strike must be appropriately managed (see Section 2.3.9).	Low
Residential	NA	There are 2 vacant properties within 300m of Moruya Beashels Trig camp	Low

7 Planned management actions

Planned Council actions to reduce impacts associated with flying-foxes in the Eurobodalla are summarised in Table 32. These actions, in line with legislation (Section 2.1) and Council's Management Framework (Section 5), are based on community engagement results (Section 3) and camp assessment (Section 6). Implementation of management actions must be considerate of relevant legislation (including regulatory approvals as required) (Section 2.1), site values, and be done in accordance with measures to avoid impacts (Appendix 5).

Evaluation measures are provided for each action which will be used to evaluate action progress and success. Detail of how the Plan and actions below will be implemented are in Section 8.

N.B: This Plan does not endorse the community to undertake flying-fox management. Private landholders will need to comply with the NSW Policy or apply to OEH for a licence. If flying-foxes are being unlawfully and intentionally disturbed please report to NSW Office of Environment and Heritage's Environment Line by calling 131 555.

Table 32 Planned management actions. Detailed descriptions of management strategies is provided in Appendix 8.

Strategy	Action	Details	Applicable locations	Timeframe / Progress	Evaluation measure
Level 1 management					
Community engagement and awareness programs	Ensure clear and up-to-date information available regarding legislation and human and animal health	Develop a communications strategy for education and awareness, and review for future management actions. Ensure the community is aware of legislation around flying-foxes, and that management affecting flying-foxes is illegal without relevant approvals. Education material includes up-to-date information on simple measures to mitigate risk of disease, which is still a concern for the community. Council will liaise with relevant government agencies (e.g. NSW Health) to ensure information is available to the community, for example regarding best practice water tank management and measures to protect people and pets. Continue to engage with the community to inform education and engagement programs.	Eurobodalla-wide	Short-term and ongoing	Education program; community informed and engaged.

Strategy	Action	Details	Applicable locations	Timeframe / Progress	Evaluation measure
	Keep community informed of flying-fox numbers, monitoring trials and up-coming management	Engagement platforms including Facebook, websites, media release and digital/hard copy mail utilised to maintain awareness and keep the community updated and informed.	Eurobodalla-wide	Ongoing	Up to date information readily available for the community
	Develop education material regarding odour masking plants	Potentially suitable native species which are unlikely to attract flying-foxes are listed in Appendix 8. Council will also consult with the Regional Botanic Gardens to review this list.	All known camps and Eurobodalla-wide	Short-term	List of locally-suitable odour masking plants available for the community
	Provide ongoing community engagement and support	Allocate annual budget for a dedicated Council Flying-fox Officer.	Eurobodalla-wide	Ongoing	Part-time Flying-fox Officer role continued.
Impact mitigation	Investigate property modification /service subsidies	Investigate distance-scaled subsidies program for communities affected by flying-fox camps.	All known camps	Short-term	Subsidies program investigated and implemented if feasible
	Maintain buffers where required on Council-managed land	Buffers through vegetation management on Council-managed lands to be maintained for affected residents (initial works completed under licence).	Water Gardens, Catalina	Ongoing	Buffers maintained when flying-foxes are absent
	Camp monitoring	Ensure regular (at least quarterly) monitoring of all active flying-fox camps within the Eurobodalla as part of the National Flying-fox Monitoring Program, including records of camp spatial extents. Determine whether National Flying-fox Monitoring Program data could be expanded to inform the decision support tool.	All known camps	Ongoing	Regular monitoring undertaken at all Eurobodalla camps as part of the NFFMP managed by CSIRO and local counts undertaken by NSW Office of Environment and Heritage and used to inform management
	Trial and refine the decision support tool	Consult with relevant experts and other land managers as required (e.g. for camps outside the Eurobodalla) refine the decision support tool. Seek opportunities to enhance and improve the decision support tool.	Catalina Water Gardens Occupied camps	Underway	Baseline monitoring locations and stakeholders identified, support tool informed by monitoring data and refined as required

Strategy	Action	Details	Applicable locations	Timeframe / Progress	Evaluation measure
			outside the Eurobodalla		
	Liaise with relevant authorities to provide advice and further research	Consult with and seek further information from NSW and Commonwealth governments on topics outlined in Section 7.1.	Eurobdoalla-wide	Underway	Updates on relevant topics shared with the community and incorporated into management as relevant.
Impact mitigation and conservation	Alternative habitat creation	Identify suitable camp locations and protect/improve/restore these sites to avoid future conflict.	All known camps	Medium term	Alternative habitat locations identified
	Notify Moruya Airport	Moruya Airport is aware of the Moruya camps and manages strike risk. The Office of Environment and Heritage will ensure airport managers are aware of any changes that may change the flying-fox strike hazard (e.g. Eurobodalla influxes, camp management).	All camps within 13km	Completed	Airport managers notified by the NSW Office of Environment and Heritage
Avoiding future conflict	Appropriate land use planning	Measures to avoid future conflict between camps and the community will be considered when assessing development applications. Identify potential buffers areas to zone as flying-fox management areas to mitigate impacts to residents. Consider habitat protection measures (zoning, Biodiversity Agreements) for flying-fox camps.	All known camps and Eurobodalla-wide	Long term	Flying-fox camp management areas incorporated into planning instruments
	Participate in flying-fox monitoring and research	Support research, particularly projects which will assist in understanding local flying-fox movements and ways to mitigate impacts on the community. See Section 7.1 for priority research projects to assist flying-fox management in Eurobodalla.	Eurobodalla-wide	Ongoing	Council up-to-date on contemporary research and relevant outcomes incorporated into the management framework
	Identify areas with high potential for future conflict	Ground-truth and refine mapped favourable flying-fox camp habitat and sensitive receptors across the Eurobodalla to identify areas with high potential for future conflict.	Eurobodalla-wide	Medium-term	Results used to inform proactive management / engagement / preparation where required (but not native vegetation removal) and to identify low conflict locations nearby suitable for flying-fox camps if required

Strategy	Action	Details	Applicable locations	Timeframe / Progress	Evaluation measure
Avoiding future conflict, conservation	Protocols to manage incidents	Continue to build on current protocols (Appendix 12 and 13). Collaborate with wildlife rescue and care organisations to monitor potential heat stress events during predicted hot weather. Encourage wildlife groups to adopt industry recognised best practices during heat stress events (Appendix 14).	All known camps	Every summer	Heat Stress Event Response Plan finalised
	Consult with energy and telecommunications providers as required	Council will continue to consult with energy and telecommunication providers when required to implement measures as required to minimise the potential for flying-fox to strike infrastructure.	All known camps	Medium-term	Flying-fox mortality and associated interruptions to power/mobile reception maintained at a low level
Conservation	Undertake routine camp management with consideration to flying-fox habitat and welfare	Ensure all management actions at camps is considerate of flying-fox habitat and welfare requirements (including mid-storey for protection during extreme weather, weed treatment and removal and appropriate mowing regimes when flightless young are present).	All known camps	Ongoing	All camps to have mid-storey vegetation for protection during extreme weather and flying-fox welfare is maintained during works.
Level 2 management					
Impact mitigation	Buffers through vegetation management (trimming/removal)	Liaise with landholders regarding the potential for buffers on Council-managed land, or support in obtaining approval for activities on private land. Arborist advice for tree trimming on private land.	Any camp creating conflict	ASAP and then determined by decision support framework	Advice provided to affected residents
	Canopy-mounted sprinklers	Continue trial of canopy-mounted sprinklers at the Water Gardens and assess the feasibility for use at other camps.	Water Gardens	Underway	Trial completed and feasibility for other camps assessed as required.
	Odour neutralising trial	Investigate odour neutralising system with experts. Misting systems such as those used at landfills and abattoirs allow for the control of large or diffuse odours. Odour management systems work by diluting an active ingredient then either misting or vaporising the solution into the air to reach the nuisance odour. Untested and innovative trials may constitute Level 2 actions so licence from Office of Environment and Heritage required.	Water Gardens	Medium-term	Trial undertaken

Strategy	Action	Details	Applicable locations	Timeframe / Progress	Evaluation measure
	Determine whether camp fly-in/out can be influenced to reduce faecal drop	Investigate whether flying-foxes route of transiting in and out of a camp can be slightly altered to avoid high conflict areas e.g. by trialling lights or other deterrents at sensitive receptors.	Catalina Water Gardens	Medium-term	If considered feasible, trial undertaken
Conservation	Consider the values of a site prior to undertaking Level 2 or Level 3 management	An up-to-date assessment of all values of a site (cultural, ecological and amenity) will be undertaken prior to any camp management, and results used to inform appropriate management options.	All known camps	Prior to any Level 2 or Level 3 management action	Cultural, ecological and amenity values of camp sites are protected.
Level 3 Management					
Impact mitigation	Nudging	Nudging may be considered, as informed by the decision support tool. Level 3 management options require state and potentially Commonwealth approval, and will be dependent on sufficient Council resources being available.	Eurobodalla-wide	As required	Nudging assessed if required.
	Dispersal	Dispersal may be considered, as informed by the decision support tool. Early intervention dispersal may also be considered if a new camp appears to be forming in an undesirable location. Level 3 management options require state and potentially Commonwealth approval, and will be dependent on sufficient Council resources being available.	Eurobodalla-wide	As required	Dispersal assessed if required.

7.1 Consultation and required research topics

Council will continue to liaise with the NSW and Australian Governments on flying-fox management, including on topics below.

Research and opportunities to improve suitability of flying-fox camps such as:

- understanding why flying-fox camps are increasingly located in urban areas
- understanding flying-fox camp habitat preferences to improve the likelihood of attracting flying-foxes to low conflict locations
- ways to encourage flying-foxes outside of urban areas and to low conflict areas
- agreements that protect flying-fox camps in low conflict areas e.g. private land conservation agreements under the *Biodiversity Conservation Act 2016*.

Improving our knowledge and understanding of perceived or potential impacts of flying-foxes on human health such as:

- water quality (e.g. faecal drop)
- respiratory health complaints (e.g. odour of flying-foxes or associated with pollen from foraging resources)
- mental health including anxiety or stress (e.g. from noise or odour).

Identifying opportunities for more proactive management such as:

- real time monitoring of flying-fox movements and communications to land managers across Australia
- improving capacity of land managers to recognise and predict availability of foraging resources to prepare for potential influxes of flying-foxes
- encouraging further research to expand preliminary findings of Council's recent noise and odour monitoring trial (see Appendix 6 for summary)
- enhancing the decision support tool in the Plan
- practical solutions to remove faecal drop
- conducting State and national flying-fox education programs to increase community understanding of flying-foxes and resilience to their impacts
- providing ongoing advice about best practice flying-fox management to land managers.

8 Plan evaluation and review

8.1 Plan administration

The Plan will be reviewed regularly including ongoing evaluation of the strategies in Table 33. The following may also trigger a review of the Plan:

- completion of a significant action (Level 2 or above)
- changes to relevant legislation
- any negative incident associated with roosting or foraging flying-foxes.

8.2 Monitoring

Council will monitor and keep internal records to allow the effectiveness of each management action to be evaluated and inform future planning. Monitoring will be done in accordance with measures in Appendix 5 and the OEH fact sheet on Monitoring, evaluating and reporting.

8.2.1 Adaptive management

The Plan is an adaptive document that can be updated as situations change or further research improves our understanding of flying-foxes and management of community impacts. Flying-foxes will return to urban areas within the Eurobodalla, and are likely to establish new camps in urban areas in the future. An adaptive management plan allows Council to respond to unforeseen conflicts or changes when they arise. Council will consult with OEH and DoEE regarding any proposed changes that may affect directly affect flying-foxes or other ecological values.

8.3 Reporting

Reports for Level 1 actions that comply with this Plan are not required to be submitted to OEH. Reports for Level 2 and Level 3 actions will be submitted to OEH one month after commencement of works and then quarterly in periods where works have occurred. Each report is to include:

- results of pre- and post-work population monitoring
- any information on new camps that have formed in the area
- further management actions planned to include a schedule of works
- an assessment of how the community responded to the works, including details on the number and nature of complaints before and after the works
- detail on any compensatory planting
- expenditure and contributors
- outcomes from evaluation and review.

8.4 Responsibilities

Council is responsible for implementation of the Plan once it has been endorsed by OEH, licences have been obtained for Level 2 or Level 3 actions and resources have been allocated for implementation. Additional approvals (licence application or works in line with the COP if approved) will be required for Level 2 or 3 actions outside these prior approvals. Council will seek advice from OEH and other flying-fox experts as required during Plan implementation.

8.5 Funding commitment

Implementation of the Plan requires substantial ongoing funds. Council has been the recipient of NSW Government funds to assist with managing the impacts on residents and business during 2016. Once these funds are exhausted (anticipated August 2019), Council will need to ascertain a budget for implementing actions associated with the Plan.

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Appendices

Appendix 1 Flying-fox ecology and behaviour

Ecological role

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

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

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

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

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

Camp preferences

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

- closed canopy >5 m high

- dense vegetation with complex structure (upper, mid and understorey layers)
- within 500 m of permanent water source
- within 50 km of the coastline or at an elevation <65 m above sea level
- level topography (<5° incline)
- greater than one hectare to accommodate and sustain large numbers of flying-foxes.

Species profiles

Black flying-fox (Pteropus alecto)

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

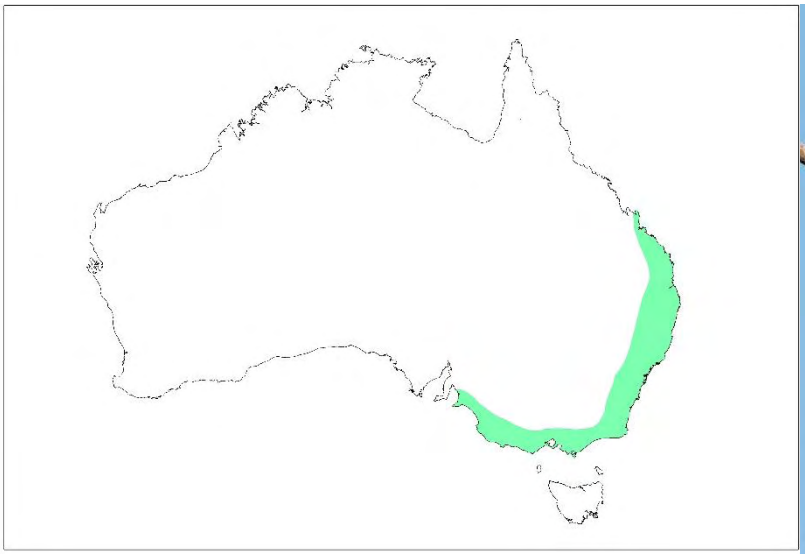
The black flying-fox (BFF) has traditionally occurred throughout coastal areas from Shark Bay in Western Australia, across Northern Australia, down through Queensland and into NSW (Churchill 2008; OEH 2015a). Since it was first described there has been a substantial southerly shift by the BFF (Webb &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

They forage on the fruit and blossoms of native and introduced plants (Churchill 2008; OEH 2015a), including orchard species at times.

BFFs are largely nomadic animals with movement and local distribution influenced by climatic variability and the flowering and fruiting patterns of their preferred food plants. Feeding commonly occurs within 20 km of the camp site (Markus & Hall 2004).

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

Grey-headed flying-fox (Pteropus poliocephalus)



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

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

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

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

There is evidence the GHFF population declined by up to 30% between 1989 and 2000 (Birt 2000; Richards 2000 cited in OEH 2011a). There is a wide range of ongoing threats to the

survival of the GHFF, including habitat loss and degradation, deliberate destruction associated with the commercial horticulture industry, conflict with humans, infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.) and competition and hybridisation with the BFF (DECCW 2009). For these reasons it is listed as vulnerable to extinction under NSW and Commonwealth legislation.

Little red flying-fox (Pteropus scapulatus)

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

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

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

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

Throughout its range, populations within an area or occupying a camp can fluctuate widely. There is a general migration pattern in LRFF, whereby large congregations of over one million individuals can be found in northern camp sites (e.g. Northern Territory, North Queensland)

during key breeding periods (Vardon & Tidemann 1999). LRFF travel south to visit the coastal areas of south-east Queensland and NSW during the summer months. Outside these periods LRFF undertake regular movements from north to south during winter–spring (July–October) (Milne & Pavey 2011).

Reproduction

Black and grey-headed flying-foxes

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

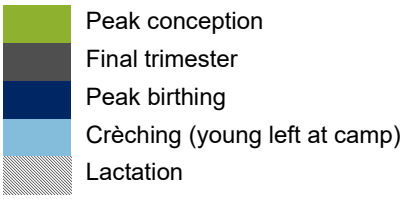
Young are highly dependent on their mother for food and thermoregulation. Young are suckled and carried by the mother until approximately four weeks of age (Markus & Blackshaw 2002). At this time they are left at the camp during the night in a crèche until they begin foraging with their mother in January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

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

Little red flying-fox

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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GHFF												
BFF												
LRFF												



Indicative flying-fox reproductive cycle.

Note that LRFF rarely birth and rear young in NSW. The breeding season of all species is variable between years and location, and expert assessment is required to accurately determine phases in the breeding cycle and inform appropriate management timing.

Appendix 2 Legislation

Local

Council has a responsibility to act in the interests of its community, and for administering local laws, plans and policies (including the Eurobodalla Local Environmental Plan), and appropriately managing assets (including land) for which it is responsible.

State

Flying-fox Camp Management Policy 2015

The Flying-fox Camp Management Policy 2015 (OEH 2015) (the Policy) has been developed to empower land managers, primarily local councils, to work with their communities to manage flying-fox camps effectively. It provides the framework within which OEH will make regulatory decisions. In particular, the Policy strongly encourages local councils and other land managers to prepare Camp Management Plans for sites where the local community is affected.

Development and content of the Eurobodalla Flying-fox Management Plan is aligned with the Policy.

Biodiversity Conservation Act 2016 and Draft Code of Practice Authorising Camp Management Actions 2018

The purpose of the *Biodiversity Conservation Act 2016* (BC Act) is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development including conserving biodiversity, maintaining the diversity and quality of ecosystems, regulating human interactions with wildlife, and supporting conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature.

The Act provides for a private land conservation program that provides opportunities for protection and management of flying-fox habitat.

The Grey-headed Flying-fox is listed as a threatened species under the BC Act, as is the vegetation of some camps.

It is an offence under the BC Act to do any of the following unless authorised under a licence, exemption, or approved code of practice:

a. harm or attempted harm to any animal that is of a threatened species or is part of threatened ecological community
b. harm or attempted harm, dealing in, or liberating a protected animal
c. the picking of any plant that is of a threatened species or is part of threatened ecological community

d. picking or dealing in protected plants
e. damage to declared areas of outstanding biodiversity value
f. damage to any habitat of a threatened species or threatened ecological community.

At the time of developing the Eurobodalla Flying-fox Management Plan, the NSW Code of Practice Authorising Camp Management Actions 2018 (COP) was in Draft. If approved, the COP will authorise managers of public land (e.g. council) to carry out flying-fox camp management actions reasonably necessary to reduce the impacts of flying-foxes on nearby settlements in accordance with terms of the COP. This will limit the need for licences under the BC Act, which are currently required for Level 2 and Level 3 actions.

Part 7 of the BC Act also provides for the biodiversity assessment and approvals required under the *Environmental Planning and Assessment Act 1979* for development other than complying development, activities and state significant development and infrastructure.

Camp management activities not specified as 'routine camp management' in the Policy require the landholder (Council or private) to obtain a licence under the Act.

If the draft COP is approved, managers of public land (e.g. Council) may be able to undertake some actions on that land without the need for a licence, provided they are done in accordance with the COP. Private landholders will still require a licence.

Council currently holds a Biodiversity Conservation Licence for dispersal in Batemans Bay if required, feasible (e.g. resources are available) and appropriate in the future.

Note: that the definition of 'harm' includes kill, injure or capture the animal, but does not include harm by changing the habitat of the animal, and attempt to harm an animal includes hunting or pursuing, or using anything, for the purpose of harming the animal. The definition of 'pick' includes to gather, take, cut, remove from the ground, destroy, poison, crush or injure the plant or any part of the plant. The definition of habitat includes an area periodically or occasionally occupied by a species or ecological community and the biotic and abiotic components of an area.

Local Government Act 1993

The primary purpose of this Act is to provide the legal framework for an effective, efficient and environmentally responsible, open system of local government. Most relevant to flying-fox management is that it encourages local community participation in the affairs of local government, and sets out guidance on the use and management of community land.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the conservation of nature, objects, places or features of cultural value and the management of land reserved under this Act. The Act protects Aboriginal objects and declared Aboriginal Places. Council will search the Aboriginal Heritage Impact Management System prior to any camp management, and avoid impacts wherever possible. If potential impacts are identified which cannot be avoided,

Council will consult with the Aboriginal community and apply for an Aboriginal Heritage Impact Permit.

Prevention of Cruelty to Animals Act 1979

It may be an offence under this Act if there is evidence of unreasonable/unnecessary torment associated with management activities. Adhering to welfare and conservation measures provided in Appendix 5 will ensure compliance with this Act.

Environmental Planning and Assessment Act 1979

The objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act) are to encourage proper management, development and conservation of resources, for the purposes of the social and economic welfare of the community and a better environment. It also aims to share responsibility for environmental planning between different levels of government and promote public participation in environmental planning and assessment.

The EP&A Act is administered by the NSW Department of Planning and Environment.

Development control plans under the EP&A Act should consider flying-fox camps so that planning, design and construction of future developments is appropriate to avoid future conflict.

Development given consent under Part 4 or activities assessed under Part 5 of the EP&A Act do not require licensing under the BC Act. Consent and determining authorities are required to consider the impacts of such proposals on threatened species, threatened ecological communities, and their habitats in accordance with Part 7 of the BC Act.

Where development consent under Part 4 or assessment under Part 5 of the EP&A Act is not required, a licence under the BC Act may be required to authorise the doing of an act that harms protected animals, threatened species, or threatened ecological community, or which damages the habitat of a threatened species or ecological community. This includes the doing of an act likely to harm any flying-fox, or damaging the habitat of grey-headed flying-foxes.

Where a proposal to manage a flying-fox camp involves the cutting down, destruction, lopping or removal of a substantial part of a tree or other vegetation that is not covered by a development consent or assessment under Part 5 it may still require authorisation. Depending on the land on which the vegetation occurs and the character of the vegetation, it may require an approval or a permit under the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 or an approval under the *Local Land Services Act 2013*.

Where flying-fox camps occur on or impact private land, private landowners are advised to contact council to explore management options and the appropriate approval processes for addressing arising issues. Council may include criteria in the tree preservation code for a permit. Where vegetation is mapped on the Biodiversity Values Map, landholders would need to prepare a Biodiversity Development Assessment Report (BDAR) and seek approval from the Native Vegetation Panel.

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

This policy aims to protect the biodiversity, and amenity values of trees, and other vegetation in non-rural areas of the State. A person must not cut down, fell, up root, kill, poison, ringbark, burn or otherwise destroy the vegetation, or lop or otherwise remove a substantial part of the vegetation to which this Policy applies without a permit granted by council for prescribed vegetation, or in the case of vegetation clearing exceeding the biodiversity offset thresholds (as stated in Part 7 of the *Biodiversity Conservation Regulation 2017*), approval by the Native Vegetation Panel.

Commonwealth

Environment Protection and Biodiversity Conservation Act 1999

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

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

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

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

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

- contained ≥10,000 GHFF in more than one year in the last 10 years, or
- been occupied by more than 2,500 GHFF permanently or seasonally every year for the last 10 years.

Provided that management at nationally important camps follows the mitigation standards below, DoEE has determined that a significant impact to the population is unlikely, and referral is not likely to be required.

Referral will be required if a significant impact to any other MNES is considered likely as a result of management actions outlined in the Plan. Self-assessable criteria are available in the Significant Impact Guidelines 1.1 (DoE 2013) to assist in determining whether a significant impact is likely; otherwise consultation with DoEE will be required.

Mitigation standards

The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependent young that cannot fly on their own.

The action must not occur during or immediately after climatic extremes (heat stress event, cyclone event), or during a period of significant food stress.

Disturbance must be carried out using non-lethal means, such as acoustic, visual and/or physical disturbance or use of smoke.

Disturbance activities must be limited to a maximum of 2.5 hours in any 12 hour period, preferably at or before sunrise or at sunset.

Trees are not felled, lopped or have large branches removed when flying-foxes are in or near to a tree and likely to be harmed.

The action must be supervised by a person with knowledge and experience relevant to the management of flying-foxes and their habitat, who can identify dependent young and is aware of climatic extremes and food stress events. This person must make an assessment of the relevant conditions and advise the proponent whether the activity can go ahead consistent with these standards.

The action must not involve the clearing of all vegetation supporting a nationally-important flying-fox camp. Sufficient vegetation must be retained to support the maximum number of flying-foxes ever recorded in the camp of interest.

These standards have been incorporated into mitigation measures detailed in Appendix 5. If actions cannot comply with these mitigation measures, or if there is likely to be a significant impact on another MNES, referral to the commonwealth is required.

Appendix 3 Conservation Agreement

CONSERVATION AGREEMENT

Conservation Agreement for the protection and conservation of the Grey-headed Flying-fox (*Pteropus poliocephalus*) at Batemans Bay NSW

Minister for the Environment on behalf of the Commonwealth of Australia

Eurobodalla Shire Council

Table of contents

Details

Parties

1. Minister for the Environment and Energy (**Minister**) on behalf of the Commonwealth (**Commonwealth**)
2. Eurobodalla Shire Council (**Council**)

Recitals

A. Section 305(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) provides that the Minister may, on behalf of the Commonwealth, enter into a conservation agreement for the protection and conservation of biodiversity in the Australian jurisdiction.

B. Pursuant to Section 305(1A) of the EPBC Act, the purpose of this Agreement is to:

   (a) provide for the protection and conservation of the **Grey-headed Flying-fox** (*Pteropus poliocephalus*) and its **Habitat** at Batemans Bay, NSW, in the Eurobodalla Shire Council Local Government Area (**LGA**); and

   (b) provide for the abatement of processes, and the mitigation or avoidance of actions, that might adversely affect the Grey-headed Flying-fox and its Habitat at Batemans Bay, NSW in the Eurobodalla Shire Council LGA.

C. The Minister, on behalf of the Commonwealth, has agreed to enter into this Agreement with the Council under section 305(1) of the EPBC Act to give effect to the purpose described in Recital B.

D. Section 306A of the EPBC Act provides that the Minister may include in a conservation agreement a declaration to the effect that actions in a specified class of actions do not need approval under Part 9 for the purposes of a specified provision of Part 3.

E. The Minister makes such a declaration in this Agreement and, for the purposes of section 306A(2) of the EPBC Act, is satisfied that actions in the specified Class of Actions are not likely to have a significant impact on the **Grey-headed Flying-fox**.

F. For the purposes of section 305(2) of the EPBC Act, the Minister is satisfied that:

   (a) the implementation of this Agreement will result in a net benefit to the conservation of biodiversity; and

   (b) this Agreement is not inconsistent with any recovery plan, threat abatement plan or wildlife conservation plan.

G. Pursuant to section 307 of the EPBC Act, this Agreement is binding on the Commonwealth and the Council.

Agreed terms

1. Definitions and interpretation

1.1 Definitions

In this Agreement, except where the contrary intention is expressed, terms have the meaning they are given in the EPBC Act and otherwise the following definitions are used:

Agreement	this agreement between the Minister and the Council including its Schedules and Annexures, as amended from time to time in accordance with section 308 of the EPBC Act or clause 9.3 of this Agreement.
Agreement Details	Schedule 1 of this Agreement.
Business Day	in relation to the doing of any action in a place, any day other than a Saturday, Sunday or public holiday in that place.
Class of Actions	the class of actions specified in clause 5.2 of this Agreement.
Commonwealth	the Commonwealth of Australia.
Council	the Eurobodalla Shire Council.
Council Representative	the person identified in Item 4 of the Agreement Details, or other person notified to the Department by the Council.
Department	the Commonwealth agency responsible for administering the EPBC Act, currently the Department of the Environment.
Department Representative	the person identified in Item 2 of the Agreement Details or other person notified to the Council by the Department.
Electronic Communication	has the same meaning as in the *Electronic Transactions Act 1999* (Cth).
EPBC Act	The *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPBC Act Flying-fox Guidelines	the Department's *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* September 2015.
FFMP	the Flying-fox Management Plans for Grey-headed Flying-fox at Batemans Bay, NSW, comprising the three plans as developed by or for the Eurobodalla Shire Council to address concerns relating to the management and conservation of flying-fox in urban areas of

	Batemans Bay, and attached at Schedule 2 of this Agreement: • Water Gardens Grey-headed Flying-fox Camp Management Plan 2015 • Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019 • Batemans Bay Grey-headed Flying-fox Management Plans: Supplement August 2016
Grey-headed Flying-fox	The Grey-headed Flying-fox (*Pteropus poliocephalus*) listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
Habitat	vegetation supporting the roosting of Grey-headed Flying-foxes at, or within 5km of, the Batemans Bay Flying Fox Camp as shown in Appendix A to the *Batemans Bay Grey-headed Flying-fox Management Plans: Supplement August 2016* and is not an EPBC Act listed threatened species or ecological community.
LGA	Eurobodalla Shire Local Government Area as defined by the Australian Statistical Geography Standard, January 2014. The Eurobodalla Shire LGA map is available at the NSW Office of Local Government website.
Minister	the Minister administering the EPBC Act or a delegate of the Minister pursuant to section 515(1) of the EPBC Act.
Period of significant population stress	a period during which events place significant stress on a national population of the Grey-headed flying-fox as outlined in the EPBC Act Flying-fox Guidelines.
Report	the report that the Council is required to produce and provide to the Department in accordance with clause 7.2.
Review	the review the parties agree to undertake in accordance with clause 7 of this Agreement.

1. Interpretation

In this Agreement, except where the contrary intention is expressed:

(b) the singular includes the plural and vice versa, and a gender includes other genders;

(c) another grammatical form of a defined word or expression has a corresponding meaning;

(d) the meaning of general words is not limited by specific examples introduced by meaning of, for example or similar expressions;

(e) a reference to a clause, paragraph, Schedule or Annexure is to a clause or paragraph of, or Schedule or Annexure to, this Agreement;

(f) a reference to a document or instrument includes the document or instrument as novated, altered, supplemented or replaced from time to time;

(g) a reference to AUD, A$, $A, dollar or $ is to Australian currency;

(h) a reference to time is to the time in the place where the obligation is to be performed;

(i) a reference to a party is to a party to this Agreement and includes the party's executors, administrators, successors and permitted assignees and substitutes;

(j) a reference to a person includes a natural person, partnership, body corporate, association, governmental or local authority or agency or other entity; and

(k) a reference to a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re-enactments or replacements of any of them; and

(l) a rule of construction does not apply to the disadvantage of a party because the party was responsible for the preparation of this Agreement or any part of it.

2. Agreement Period

(a) This Agreement commences on the date of execution by the last party.

(b) This Agreement ends and ceases to be of any effect on the date the Agreement is terminated under clause 9.

3. Priority of documents

If there is any inconsistency between any of the documents forming part of this Agreement those documents will be interpreted in the following order of priority to the extent of the inconsistency:

(a) the 'Agreed terms' of this Agreement (being clauses 1 through to 11);

(b) Schedule 2 – FFMP;

(c) Schedule 1 - Agreement Details;

(d) any Annexure(s) in their order of appearance; and

(e) documents incorporated by reference in this Agreement.

4. Grey-headed Flying-fox management

(a) The declaration in clause 6(a)6(a) only applies where the Council, in the taking of an action that affects the Grey-headed Flying-fox and its Habitat, acts in accordance with:

(i) the FFMP; and

(ii) the EPBC Act Flying-fox Guidelines;

(b) The parties acknowledge:

(i) this Agreement does not require the Council to act in accordance with the FFMP in all circumstances; and

(ii) where the Council proposes not to act in accordance with the FFMP, the Council (as the person proposing to take the action) should consider whether the proposed action needs to be referred for a decision on whether assessment and approval under the EPBC Act is required before it can proceed.

5. Activity

5.1 Activity Description

(a) Where the Council makes a decision in relation to actions that may affect the Grey-headed Flying-fox and its habitat and the Council decides to apply the FFMP, it must:

(i) act in accordance with the FFMP; and

(ii) impose the relevant mitigation standards described in the EPBC Act Flying-fox Guidelines.

(b) The Council and the Department will also pursue a range of actions at Batemans Bay, NSW, to support the conservation and recovery of the Grey-headed Flying-fox, either independently or in collaboration.

(i) The Council must:

(A) deliver the following benefits by implementing the conservation management actions (however described) in the FFMP:

- enhanced habitat for biodiversity
- reduced impacts to flying-foxes
- regional conservation of flying-foxes and their ecosystem services
- reduced impacts to people living near a flying-fox camp

- improved public perception of flying-foxes

(B) consult with the Department on any proposed amendments to the Class of Actions identified in the FFMP and obtain the approval of the Minister before incorporating those amendments into the FFMP;

(C) undertake monitoring of the Grey-headed Flying-fox camp as set out in the FFMP;

(D) support quarterly surveys by NSW OEH of the Grey-headed Flying-fox for the National flying-fox monitoring program; and

(E) participate in research to improve knowledge of Grey-headed Flying-fox ecology.

(ii) The Department will:

(A) finalise and publish the National Recovery Plan for the Grey-headed Flying-fox.

(iii) Both Council and the Department must:

(A) develop and publish information to improve community understanding of, and capacity to manage the Grey-headed Flying-fox and its habitat.

(iv) Council and the Department will pursue options for:

(A) supporting research into the ecology and management of the Grey-headed Flying-fox; and

(B) identifying and promoting the protection of key foraging and roosting habitats used by the Grey-headed Flying-fox.

5.2 Class of Actions

The Class of Actions is any action in relation to the management of Grey-headed Flying-fox and its Habitat:

(a) that is identified in the FFMP; and

(b) that is carried out in accordance with the mitigation standards described in Part 3 of the EPBC Act Flying-fox Guidelines.

Note: If Council wishes to undertake actions that fall outside the Class of Actions described above, Council should consider the need to refer the actions to the Department for a decision under the EPBC Act.

6. Declaration

(a) Pursuant to section 306A of the EPBC Act and subject to clause 4(a)4(a), the Minister declares that actions in the Class of Actions do not require approval under Part 9 of the EPBC Act for the purposes of sections 18 and 18A of the EPBC Act.

7. Review and reporting of this Agreement

7.1 Review

(a) A Review of the operation of this Agreement, including the Schedules, must be undertaken by the parties:

(i) if Council revises or amends the FFMP;

(ii) when the National Recovery Plan for Grey-headed Flying-fox is finalised; and

(iii) in any case-at least once every five years from the commencement of this Agreement.

(b) If a Review is to be undertaken the parties will agree in writing on:

(i) the terms of the Review;

(ii) the scope of the Review; and

(iii) the date by which the Review will be completed.

(c) A Review may be linked to a Report requested under clause 7.2.

(d) Failure to undertake the Review contemplated by clause 7.1(a) does not invalidate this Agreement.

(e) This clause does not limit the Minister's powers to terminate or vary this Agreement under section 308 of the EPBC Act.

7.2 Reporting

(a) Council must publish the FFMP on the Council website within three months of the commencement of the Agreement.

(b) Council must, within 20 Business Days of a request in writing, provide the Department with a report on the operation of this Agreement. The Report will not be requested more than once within a 12 month period. The Department may publish the Report on its website.

(c) Council must provide the Department with a Report on the effectiveness of the FFMP in achieving its objectives every five years.

7.3 General

Subject to any written agreement to the contrary, each party must bear its own costs of any Review undertaken, and Reports prepared, pursuant to clauses 7.1 and 7.2.

8. Dispute resolution

8.1 Dispute resolution

(a) If a dispute arises in relation to the conduct of this Agreement, a party must comply with this clause 8.1 before starting court proceedings (except proceedings for urgent interlocutory relief). After a party has sought or obtained urgent interlocutory relief, that party must comply with this clause 8.1.

(b) The parties agree that any dispute arising during the course of this Agreement will be dealt with as follows:

(i) either party may give written notice of a dispute to the other party which will state that it is a notice under this clause and will specify the details of the dispute concerned;

(ii) management representatives of each of the parties will endeavour in good faith to agree upon a resolution of the dispute;

(iii) if the management representatives fail to reach a solution within 10 Business Days of receipt of a notice of dispute (or a timeframe agreed in writing between the parties), the dispute will be taken to senior executive representatives of each of the parties;

(iv) senior executive representatives will endeavour in good faith to agree upon a resolution of the dispute;

(v) if the senior executive representatives fail to resolve the dispute within 10 Business Days (or other timeframe agreed in writing between the parties), the dispute will be taken to the:

(A) Chief Executive Officer of Council; and

(B) Secretary of Department,

who will endeavour to reach agreement regarding the dispute.

(c) If agreement cannot be reached in accordance with clause 8.1(b), the parties must endeavour to resolve any dispute under this Agreement by mediation or other alternative dispute resolution method before they commence legal proceedings (except proceedings for urgent interlocutory relief).

8.2 Costs

Each party to a dispute must pay its own costs of complying with this clause. The parties to the dispute must equally pay the costs of any mediator or other alternative dispute resolution provider.

8.3 Breach of this clause

If a party to a dispute breaches clause 8.1 to 8.2, the other party does not have to comply with those clauses in relation to the dispute.

9. Termination or variation

9.1 Termination by agreement

This Agreement may be terminated by agreement between the Minister and Council in accordance with section 308(3)(a) of the EPBC Act.

9.2 Termination or variation by order

(a) Notwithstanding any other provision of this Agreement, this Agreement may be terminated or varied by the Minister by order published in the *Gazette* in accordance with section 308(4) of the EPBC Act.

(b) If the Minister varies this Agreement by an order made under section 308(4) of the EPBC Act, this Agreement may be terminated by Council in accordance with section 308(7) of the EPBC Act.

(c) In accordance with section 308(8) of the EPBC Act, if the Agreement is terminated or varied by an order, Council is not entitled to any compensation in respect of the termination or variation.

9.3 Variation

Subject to clause 9.2 and the Minister's rights under section 308 of the EPBC Act, no agreement or understanding varying or extending this Agreement is legally binding upon a party to this Agreement unless the agreement or understanding is in writing and signed by the parties.

10. Notices

10.1 Service of notices

(a) A party giving notice or notifying under this Agreement must do so in English. The notice must be given in writing or by Electronic Communication:

(i) directed to the other party's contact person at the other party's address (as set out in Item 5 of the Agreement Details or subsequently notified by the first party); and

(ii) hand delivered or sent by prepaid post or Electronic Communication to that address.

(b) A party to this Agreement must ensure it provides current and correct contact details to the other party.

10.2 Effective on receipt

A notice given in accordance with clause 10.1 takes effect when it is taken to be received (or at a later time specified in it), and is taken to be received:

(a) if hand delivered, on delivery;

(b) if sent by prepaid post, on the sixth Business Day after the date of posting (or on the seventh Business Day after the date of posting if posted to or from a place outside Australia); or

(c) if sent by Electronic Communication, at the time that would be the time of receipt under the *Electronic Transactions Act 1999* (Cth), but if the delivery, receipt or transmission is not on a Business Day or is after 5.00pm on a Business Day, the notice is taken to be received at 9.00am on the next Business Day.

11. General clauses

11.1 Rights and powers of the Minister

The rights and powers of the Minister under this Agreement are in addition to any rights and powers the Minister has under the EPBC Act.

11.2 Ownership of Agreement

All copyright and other intellectual property rights contained in this Agreement remain the property of the Commonwealth.

11.3 Approvals and consents

Except where this Agreement expressly states otherwise, a party may, in its discretion, give conditionally or unconditionally or withhold any approval or consent under this Agreement.

11.4 Assignment and novation

A party may only assign its rights or novate its rights and obligations under this Agreement with the prior written consent of the other party.

11.5 Costs

A party must pay its own costs of negotiating, preparing and executing this Agreement.

11.6 Counterparts

This Agreement may be executed in counterparts. All executed counterparts constitute one document.

11.7 Entire agreement

This Agreement constitutes the entire agreement between the parties in connection with its subject matter and supersedes all previous agreements or understandings between the parties in connection with its subject matter.

11.8 Further action

Each party must do, at its own expense, everything reasonably necessary (including executing documents) to give full effect to this Agreement and any transaction contemplated by it.

11.9 Severability

A term or part of a term of this Agreement that is illegal or unenforceable may be severed from this Agreement and the remaining terms or parts of the terms of this Agreement continue in force.

11.10 Waiver

Waiver of any provision of or right under this Agreement:

(a) must be in writing signed by the party entitled to the benefit of that provision or right; and

(b) is effective only to the extent set out in any written waiver.

11.11 Relationship

(a) The parties must not represent themselves, and must ensure that their officers, employees, agents and subcontractors do not represent themselves

as being an officer, employee, partner or agent of the other party, or as otherwise able to bind or represent the other party.

(b) This Agreement does not create a relationship of employment, agency or partnership between the parties.

11.12 Governing law and jurisdiction

This Agreement is governed by the law of the Australian Capital Territory and each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts of the Australian Capital Territory.

Schedule 1 – Agreement Details

Item No.	Description	Clause reference	Details
1.	**Department details**	1.1	Commonwealth of Australia as represented by the Department of the Environment ABN 34 190 894 983
2.	**Department Representative**	1.1	Name: Matt Cahill Position: First Assistant Secretary, Environment Standards Division Phone: 02 6274 1077 Email: matt.cahill@environment.gov.au
3.	**Council details**	1.1	Eurobodalla Shire Council ABN 47 504 455 945
4.	**Council Representative**	1.1	Name: Catherine Dale Position: General Manager Phone: 02 4474 1308 Email: catherine.dale@esc.nsw.gov.au
5.	**Address for notices**	10.1	**Department:** Kim Farrant Assessments (NSW, ACT) and Fuel Branch Department of the Environment Postal address: GPO Box 787, Canberra, ACT, 2601 Email: kim.farrant@environment.gov.au and epbc.referrals@environment.gov.au **Council:** Name: Deb Lenson Position: Divisional Manager Environmental Services Postal address: PO Box 99, Moruya, NSW, 2537 Email: Deb.Lenson@esc.nsw.gov.au

Schedule 2 –Flying-fox Management Plans for Grey-headed Flying-fox at Batemans Bay, NSW

Water Gardens Grey-headed Flying-fox Camp Management Plan 2015

Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019

Batemans Bay Grey-headed Flying-fox Management Plans: Supplement August 2016

Execution page

EXECUTED as a Conservation Agreement under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

SIGNED on behalf of the **Commonwealth of Australia** as represented by the delegate of the Minister for the Environment and Energy

MATTHEW CAHILL	Valerie Hush
Name	Name of witness (print)
FIRST ASSISTANT SECRETARY	Executive Officer
Position	
M L Cahill	Valerie Hush
Signature	Signature of witness
22/9/16	22/9/16
Date	Date

SIGNED on behalf of the **Eurobodalla Shire Council** by an authorised representative

Catherine Dale	KYLIE GREEN
Name	Name of witness (print)
GENERAL MANAGER.	EXECUTIVE ASSISTANT
Position	
CATHERINE DALE	
Signature	Signature of witness
8/9/16	8/9/16.
Date	Date

Appendix 4 Biodiversity Conservation Licence

Office of Environment & Heritage

Your reference	:
Our reference	: DOC18/311067
Licence no.	: C0003444
Contact	: Damon Oliver, 6229 7112

Deb Lenson

Divisional Manager, Environmental Services

Eurobodalla Shire Council

PO Box 99

MORUYA NSW 2537

Dear Ms Lenson

RE: Threatened Species Licence to disperse Grey-headed Flying-fox camps at Batemans Bay

I refer to your application to the Office of Environment and Heritage (**OEH**) dated 14 March 2018 for a Threatened Species Licence, a class of biodiversity conservation licence under Part 2 of the *Biodiversity Conservation Act 2016* (**BC Act**), to undertake dispersal of Grey-headed Flying-fox camps at Batemans Bay. This application is to extend the approval under the current Section 95 Certificate (C001958), which expires on 30 June 2018.

OEH understands that this activity, if required, will be undertaken at appropriate times between 1 July 2018 and 30 June 2023. The main dispersal locations within Batemans Bay are the Water Gardens Reserve, Catalina Lake and the Catalina Country Club. Dispersal of Grey-headed Flying-foxes may also be required at other locations within the Batemans Bay area, including splinter camps that form as part of dispersing flying-foxes from the three main localities. These activities are to reduce the impacts of Grey-headed Flying-foxes on the urban residents in proximity to these camps.

I have assessed your licence application in accordance with the provisions of the BC Act and the *Biodiversity Conservation Regulation 2017* and determined that a Threatened Species Licence should be granted for the proposed action. A copy of your new biodiversity conservation licence is enclosed. Please note that your licence is subject to conditions. These conditions are outlined in the licence. It is an offence under s2.14(4) of the BC Act to breach a condition of a licence.

If you have any further questions regarding this matter, please contact Damon Oliver on (02) 6229 7112.

Yours sincerely

18/05/2018

MICHAEL SAXON

Director, South East Branch

OEH Regional Operations Division

Threatened Species Licence

Biodiversity Conservation Act 2016

Threatened species licence, a class of biodiversity conservation licence under Part 2 of the *Biodiversity Conservation Act 2016*, to:

- **harm or pick a threatened species or ecological community**

Licence No.:
Date Granted: 18 May 2018
Date of Expiry: 30 June 2023

Granted To:

Deb Lenson

Divisional Manager

Environmental Services

Eurobodalla Shire Council

PO Box 99

MORUYA NSW 2537

Relevant Conditions

This Threatened Species Licence is issued subject to the conditions below.

Note: These conditions are consistent with the intent of the guidelines, stop work triggers and rest requirements in the *NSW Flying-fox Camp Management Plan Template 2016*.

1. The dispersal must be carried out in accordance with the report 'Eco Logical Australia 2016. *Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019.* Prepared for Eurobodalla Shire Council', dated 7 June 2015 (the **Dispersal Plan**) and the Threatened Species Licence application to carry out the dispersal activities, received on 14 March 2018. Unless specified otherwise, all terms used in this certificate have the same meaning as in the Dispersal Plan. Where there is an inconsistency between the Dispersal Plan and these conditions, these conditions prevail.

2. Dispersal activities must not occur:

   a) where there are females in the last trimester of pregnancy or they are visibly pregnant, birthing or lactating females, or dependent (including crèched) young, present.

   b) during or immediately after extreme weather events, severe weather events (being weather events for which a Severe Weather Warning is issued by the Bureau of Meteorology) or climatic extremes (for example, temperatures above 38 degrees Celsius),

   c) during any period of food stress or when flying-foxes are malnourished,

d) if any animal welfare trigger occurs on more than two days during a period of primary dispersal activity, being the following triggers:

(i) unacceptable levels of stress (any individual flying-fox panting, saliva spreading, located on or within 2 m of the ground),

(ii) fatigue (low flying, laboured flight, settling despite dispersal efforts),

e) if injury or death of flying-foxes occur (that is, a flying-fox appears to have been injured or killed on site (including aborted foetuses) during dispersal, or a flying-fox death is reported within a kilometre of the dispersal sites that appears to be related to the dispersal, when loss of body condition is evident),

f) if multiple aborted foetuses are observed at or within a kilometre of the dispersal sites,

g) if there is ongoing proliferation of splinter camps in inappropriate locations,

3. If dispersal is suspended for any of the reasons listed above, it may only resume upon obtaining agreement from OEH:

4. A flying-fox rest day, that is, a continuous 24 hour period when no dispersal activities occur, must take place at least once each week.

5. Dispersal activities may continue for up to a total of 2.5 hours in a 12 hour period. Activities may take place over two or more periods but such periods must not total more than 2.5 hours in a 12 hour period.

6. Dispersal is not to continue past sunrise, except for secondary activities which are carried out for the purposes of preventing flying-foxes from returning to inappropriate locations. Inappropriate locations do not include existing camps.

7. Secondary dispersal past sunrise from highly problematic locations (defined as within 5 metres of dwellings) within existing camps may occur with the permission of OEH.

8. The duration of both primary and secondary dispersal activities each day must be minimised.

9. An area within the camp must be designated as a rest area for flying-foxes during dispersal activities, before any such activities commence. No dispersal activities may take place within the rest area.

Note: the rest area may be progressively reduced in size over time, unless the nominated flying-fox expert justifies a reason not to do so.

10. If the number of flying-foxes being taken into care increases or showing signs of stress increases, dispersal activities must be suspended and the holder must obtain OEH's agreement before dispersal activities continue.

11. At least one person experienced in dispersal, vaccinated against Australian Bat Lyssavirus, and able to rescue flying-foxes, is to be present at all locations where dispersal activities are being carried out, at all times while those activities are being carried out.

12. A flying-fox expert, being an expert nominated by the holder and approved by OEH prior to any dispersal activities commencing, must attend daily at the site where dispersal activities are being carried out.

13. Primary dispersal activities are only to be undertaken between 1 May and 31 July each year.

14. Following agreement with OEH, maintenance dispersal at existing camps or dispersal of any splinter camps may occur after the 31 July 2016 if:

    a) the initial dispersal at the location where the maintenance dispersal is proposed has been successful,

    b) appropriate mitigation measures are in place, and

    c) malnourished individuals or dependent or crèched young are not present.

15. Monitoring records are to be completed consistent with the templates in the *OEH Flying-fox Monitoring Data Sheet* and provided to OEH weekly as part of the reporting requirements described below.

16. Brief reports of dispersal activities and their outcomes, key issues encountered, and maps of the camp extent including splinter camps are to be provided to OEH each week during the dispersal activities.

Note it is an offence under s2.14(4) of the *Biodiversity Conservation Act 2016* to breach a condition of a licence.

18/05/2018

MICHAEL SAXON

Director, South East Branch

OEH Regional Operations Division

(by Delegation)

Appendix 5 Standard measures to avoid impacts

The NSW Camp Management Plan template details the below measures to avoid impacts. These will be complied with wherever possible during Council's implementation of the Plan. Should any contradictions occur with existing or future licences issued by state or Commonwealth government, conditions of those licences will apply.

All management activities

- All personnel will be appropriately experienced, trained and inducted. Induction will include each person's responsibilities under this Plan.
- All personnel will be briefed prior to the action commencing each day, and debriefed at the end of the day.
- The use of loud machinery and equipment that produces sudden impacts/noise will be limited. Where loud equipment (e.g. chainsaws) is required they will be started away from the camp and allowed to run for a short time to allow flying-foxes to adjust.
- Activities that may disturb flying-foxes at any time during the year will begin as far from the camp as possible, working towards the camp gradually to allow flying-foxes to habituate.
- Any activity likely to disturb flying-foxes so that they take flight will be avoided during the day during the sensitive GHFF/BFF birthing period (i.e. when females are in final trimester or the majority are carrying pups, generally August – December) and avoided altogether during crèching (generally November/December to February). Where works cannot be done at night after fly-out during these periods, it is preferable they are undertaken in the late afternoon close to or at fly-out. If this is also not possible, a person experienced in flying-fox behaviour will monitor the camp for at least the first two scheduled actions (or as otherwise deemed to be required by that person) to ensure impacts are not excessive and advise on the most appropriate methods (e.g. required buffer distances, approach, etc.).
- OEH will be immediately contacted if LRFF are present between March and October, or are identified as being in final trimester / with dependent young.
- Non-critical maintenance activities will ideally be scheduled when the camp is naturally empty. Where this is not possible (e.g. at permanently occupied camps) they will be scheduled for the best period for that camp (e.g. when the camp is seasonally lower in numbers and breeding will not be interrupted, or during the non-breeding season, generally May to July).
- Works likely to disturb flying-foxes will not take place in periods of adverse weather including strong winds, sustained heavy rains, in very cold temperatures or during periods of likely population stress (e.g. food bottlenecks). Wildlife carers will be consulted as required to determine whether the population appears to be under stress.

- Works will be postponed on days predicted to exceed 35°C (or ideally 30°C), and for one day following a day that reached ≥35°C. If an actual heat stress event has been recorded at the camp or at nearby camps, a rest period of several weeks will be scheduled to allow affected flying-foxes to fully recover. See the OEH fact sheet on Responding to heat stress in flying-fox camps.
- Evening works may commence after fly-out. A suitably qualified person should confirm the camp is empty, and monitor carefully during works to ensure no flying-foxes will be impacted (including crèching young, although December – February should be avoided for this reason). All Level 1 and 2 works (including pack up) will cease by 0100 to ensure flying-foxes returning early in the morning are not inadvertently dispersed. Works associated with Level 3 actions may continue provided flying-foxes are not at risk of being harmed.
- If OEH considers impacts at another site (e.g. increased numbers and associated impacts at another camp) to be a result of management actions under this Plan, assistance will be provided by the proponent to the relevant land manager to ameliorate impacts. Details of this assistance are to be developed in consultation with OEH.
- OEH may require changes to methods or cessation of management activities at any time.
- Ensure management actions and results are recorded to inform future planning. See the OEH fact sheet on Monitoring, evaluating and reporting.

Human safety

- All personnel to wear protective clothing including long sleeves and pants; additional items such as eye protection and a hat are also recommended. People working under the camp should wash their clothes daily. Appropriate hygiene practices will be adopted such as washing hands with soap and water before eating/smoking.
- All personnel who may come into contact with flying-foxes will be vaccinated against Australian bat lyssavirus with current titre.
- A wash station will be available on site during works along with an anti-viral antiseptic (e.g. Betadine) should someone be bitten or scratched.
- Details of the nearest hospital or doctor who can provide post-exposure prophylaxis will be kept on site.

Post-works

- Reports for Level 2 and 3 actions will be submitted to OEH one month after commencement of works and then quarterly for the approval period (for all Level 3 actions and in periods where works have occurred for Level 2 actions). Each report is to include:
    - results of pre- and post-work population monitoring
    - any information on new camps that have formed in the area

- impacts at other locations that may have resulted from management, and suggested amelioration measures
- an assessment of how the flying-foxes reacted to the works, with particular detail on the most extreme response and average response, outlining any recommendations for what aspects of the works went well and what aspects did not work well
- further management actions planned including a schedule of works
- an assessment[1] of how the community responded to the works, including details on the number and nature of complaints before and after the works
- detail on any compensatory plantings undertaken or required
- expenditure (financial and in-kind costs)
- Plan evaluation and review (Section 8).

All Level 2 and 3 actions

Prior to works

- Residents adjacent to the camp will be individually notified one week prior to on-ground works commencing. This will include information on what to do if an injured or orphaned flying-fox is observed, a reminder not to participate in or interfere with the program, and details on how to report unusual flying-fox behaviour/daytime sightings. Relevant contact details will be provided (e.g. Program Coordinator). Resident requests for retention of vegetation and other concerns relating to the program will be taken into consideration.
- Information on any management activity will be placed on Council's website along with contact information.
- OEH will be notified at least 48 hours before works commence.
- A protocol, in accordance with the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012), for flying-fox rescue will be developed including contact details of rescue and rehabilitation organisations. This protocol will be made available to all relevant staff, residents and volunteers prior to the action commencing. See Appendix 11 for an example protocol.
- A licensed wildlife carer will be notified prior to beginning works in the event that rescue/care is required.

Monitoring

- A suitably qualified person will undertake an on-site population assessment prior to, during works and after works have been completed, including:
  - number of each species

[1] A similar approach should be taken to pre-management engagement (see Section 3) to allow direct comparison, and responses should be assessed against success measures (Section 9) to evaluate success.

    - age of any pups present including whether they are attached or likely to be crèched
    - visual health assessment
    - mortalities.
- Counts will be done at least:
    - once immediately prior to works
    - daily during works
    - immediately following completion
    - one month following completion
    - 12 months following completion.

During works

- A suitably qualified person will attend the site regularly to monitor flying-fox behaviour and ensure compliance with the Plan and the Policy. They must also be able to identify pregnant females, flightless young, individuals in poor health and be aware of climatic extremes and food stress events. This person will make an assessment of the relevant conditions and advise the supervisor/proponent whether the activity can go ahead.
- Deterrents in buffer areas will be assessed by a flying-fox expert so those that may cause inadvertent dispersal (e.g. canopy-mounted sprinklers) are not used during fly-in.
- At least one flying-fox rest day with no active management will be weekly. Static deterrents (e.g. canopy-mounted sprinklers) may still be used on rest days.

Vegetation trimming/removal

- Dead wood and hollows will be retained on site where possible as habitat.
- Vegetation chipping is to be undertaken as far away from roosting flying-foxes as possible (at least 100 metres).

Canopy vegetation trimming/removal

Prior to works

- Trees to be removed or lopped will be clearly marked (e.g. with flagging tape) prior to works commencing, to avoid unintentionally impacting trees to be retained.

During works

- Any tree lopping, trimming or removal is undertaken under the supervision of a suitably qualified arborist (minimum qualification of Certificate III in Horticulture (Arboriculture) who is a member of an appropriate professional body such as the National Arborists Association).

- Trimming will be in accordance with relevant Australian Standards (e.g. AS4373 Pruning of Amenity Trees), and best practice techniques used to remove vegetation in a way that avoids impacting other fauna and remaining habitat.
- No tree in which a flying-fox is roosting will be trimmed or removed. Works may continue in trees adjacent to roost trees only where a person experienced in flying-fox behaviour assesses that no flying-foxes are at risk of being harmed. A person experienced in flying-fox behaviour is to remain on site to monitor, when canopy trimming/removal is required within 50 metres of roosting flying-foxes.
- While most females are likely to be carrying young (generally September – January) vegetation removal within 50 metres of the camp will only be done in the evening after fly-out, unless otherwise advised by a flying-fox expert.
- Tree removal as part of management will be offset at a ratio of at least 2:1. Where threatened vegetation removal is required, the land manager will prepare an Offset Strategy to outline a program of restoration works in other locations (in addition to existing programs). The strategy will be submitted to OEH for approval at least two months prior to commencing works.

Bush regeneration

- All works will be carried out by suitably qualified and experienced bush regenerators, with at least one supervisor knowledgeable about flying-fox habitat requirements (and how to retain them) and trained in working under a camp.
- Vegetation modification, including weed removal, will not alter the conditions of the site such that it becomes unsuitable flying-fox habitat for Level 1 and 2 actions.
- Weed removal should follow a mosaic pattern, maintaining refuges in the mid- and lower storeys at all times.
- Weed control in the core habitat area will be undertaken using hand tools only (or in the evening after fly-out while crèching young are not present).
- Species selected for revegetation will be consistent with the habitat on site, and in buffer areas or conflict areas should be restricted to small shrubs/understorey species to reduce the need for further roost tree management in the future.

Additional measures for Level 3 actions

Prior to dispersal

- Prepare a communications plan in relation to the program and provide a copy to OEH. This will include notifying wildlife carers of planned activities.
- Councils that manage camps within 50 kilometres, and airports within 50 kilometres, will be informed of the intended start date and likely duration, and encouraged to report any change in flying-fox movements.
- Council will liaise with the Environment Protection Authority (EPA) in regard to management of noise issues.

Monitoring

Additional monitoring requirements for dispersal actions (including maintenance dispersal and splinter camp dispersal):

- potential flying-fox habitat within three kilometres of the site monitored within two weeks of works commencing and at the completion of works
- daily checks of 'potential flying-fox habitat' within 600 metres, twice weekly checks of 'potential flying-fox habitat' within three kilometres and weekly checks of known camps within 20 kilometres of the site
- where weekly counts are already being undertaken by flying-fox experts at other camps within 20 kilometres, counts at these camps are not required, provided there is an agreement with these experts to access these data.

A count is also required at any known camp site within a 25 kilometres radius once within two weeks of works commencing and again at the completion of works.

During dispersal

- At least one person experienced in dispersal, vaccinated against ABLV and able to rescue flying-foxes if required, is to be present at all times. For maintenance dispersals only, this person may be on-call rather than on site, however maintenance dispersal personnel will still have suitable experience in flying-fox behaviour and monitoring.
- Dispersal of an occupied camp will only occur when females are not in final trimester and dependent young are not present (generally May and July).
- Dispersal methods will not have the potential to harm flying-foxes and may include only noise, spotlights, laser pointers, smoke from contained fires, canopy-mounted sprinklers, and visual deterrents such as balloons.
- Dispersal may continue for up to a total of 2.5 hours in a 12-hour period, early morning and/or in the evening. Morning dispersal will not continue past sunrise. Evening dispersal will not begin before sunset. If flying-foxes are showing signs of distress or are tiring, dispersal will cease for the day as per 'stop work triggers' in the Plan.
- The duration of dispersal each day will be minimised as much as possible.
- A section of the camp will be designated as a rest area for flying-foxes during dispersal, to be progressively reduced in size over time, unless the nominated flying-fox expert justifies a reason not to do so.
- During any dispersal action, liaison with wildlife carers is required to monitor whether there is an increase in the number of flying-foxes being taken into care or showing signs of stress. If increases are apparent, OEH will be consulted before continuing the action.

- Maintenance dispersal activities (i.e. deterring flying-foxes from recolonising a dispersed or otherwise empty camp) may be undertaken. During November to February it is essential that camps are checked to ensure there are no crèched young in the camp or individuals in visibly poor health, as determined by a suitably qualified expert. While females are likely to be in final trimester or carrying young (generally August to January), maintenance dispersal will be implemented at a reduced intensity using smoke, lights, continuous noise (no sudden noises) and passive deterrents (e.g. canopy mounted sprinklers turned on prior to possible fly-in, visual deterrents, etc.).
- Residents will be notified of a maintenance action, within a timeframe as agreed to by the residents.
- Splinter camp dispersals are subject to the conditions above. Adequate consultation will be undertaken with neighbouring landowners and land managers.
- No actions are to be undertaken at any splinter camps without consulting OEH.

Additional mitigation measures for any activity at a nationally important GHFF camp

- The action will not occur if the camp contains females that are in the late stages of pregnancy or have dependent young that cannot fly on their own (generally August to February).
- Disturbance activities will be limited to a maximum of 2.5 hours in any 12-hour period, preferably at or before sunrise or at sunset. Disturbance activities can be defined as any activity, other than routine activities, that disturbs the camp and therefore this may apply to both Level 2 and 3 activities.
- The action will not involve the clearing of all vegetation supporting a nationally important flying-fox camp. Sufficient vegetation will be retained to support the maximum number of flying-foxes ever recorded in the camp of interest.

Appendix 6 Summary of noise and odour monitoring trial

Flying-fox Camp Noise and Odour Monitoring Trial

Overview

Noise and odour were reported by the community during engagement in developing the Eurobodalla Flying-fox Management Plan 2018 as two of the most significant impacts associated with flying-fox camps. To try and better understand these impacts and possibly inform management, Eurobodalla Shire Council and Ecosure worked with specialist consultants, Air Noise Environment Pty Ltd, to undertake a noise and odour monitoring trial at a flying-fox camp. Flying-fox numbers in the Eurobodalla were low at the time of the trial, and therefore it was undertaken at a surrogate camp in Qld similar to camps within the Eurobodalla at the time they are seasonally occupied (flying-fox number, species, vegetation type, public use etc.).

A range of experienced NSW land managers and subject matter experts were consulted for input, including identifying opportunities and limitations of using quantitative noise and odour data to inform management. Key points from an initial workshop with this group are provided in Appendix 10 of the Eurobodalla Flying-fox Management Plan 2018. The outcomes of a second workshop to discuss trial findings and further research are incorporated below.

Monitoring methods

Noise

Unattended monitoring stations recorded noise continuously within and near the camp Friday 27 July 2018 – Friday 3 August 2018. In addition to the unattended monitoring positions, short-term attended measurements were taken inclusive of live flying-fox observations.

Various parameters and statistics describe typical 'Acoustic' reviews:

- L_{A1} (average maximum),
- L_{A10} (noise level exceeded 10% of the time)
- L_{A90} (noise level exceeded 90% of the time, generally considered the ambient noise)
- L_{Aeq} (energy average equivalent, logarithmic average factoring in 'spikes' in noise)
- L_{Amax} (single highest maximum).

Odour

Odour samples were collected at three locations below the centre of the camp (approximately 4-5 metres from the bats). Samples were collected using an evacuated drum to allow collection of the odour sample directly into a sample bag (without passing through any equipment or pumps). Duplicate samples were collected at each location. Analysis of the samples was undertaken by a NATA accredited laboratory (The Odour Unit) in accordance with *4323.3 Stationary source emissions Part 3: Determination of odour concentration by dynamic olfactometry*. The analysis method provides an odour concentration for each sample in Odour Units (OU).

Summary findings

Noise

Peak noise at and around the camp occurred pre-dawn as flying-foxes were returning to the camp (fly-in). Some elevated periods of varying duration were recorded during the day (potentially due to human disturbances to the camp), and a short burst just after sunset as flying-foxes were exiting the camp (fly-out).

There is no existing precedence of criteria for the influence of fauna noise impacting on humans (as fauna, insects and birds, are generally a major contributor to the 'ambient noise level' utilised in defining criteria). As such, data are not directly comparable with industry thresholds currently established for other nuisance noise impacts.

World Health Organisation guidelines can be used to assess flying-fox noise levels with regard to potential health impacts. Noise levels should be measured inside buildings, specifically in sleeping areas, as elevated noise in sleeping areas can (in the long term) have potential health impacts associated with loss of restful sleep. Review of potential for 'sleep awakenings' is often defined as either an:

- L_{Amax} of 45 dB(A) measured internal to a sleeping area (or 15 dB(A) above ambient internally), or
- L_{Aeq} of 30 dB(A) measured internal to a sleeping area, not to be exceeded more than 15 times per night.

Cross reference of the attended short-term measurements, and review of the unattended monitoring, identified that in the short-term individual 'squabbles' with 1-2 flying-foxes vocalising resulted in noise typically behaving like a **point** in space, and reducing approximately 6 dB(A) for each doubling of distance from the source of noise. However, the week of data indicated that the 'rabble' and 'successive squabbles' began to act more like an **area** of noise, which may only reduce approximately 3 dB(A) for each doubling of distance.

Internal noise levels will be influenced by the house type and construction, but can generally be reduced by between 15 and 20 dB(A) by closing windows. Sealing gaps in older houses will also assist in reducing noise while windows are closed.

A preliminary model using external noise data shows there is potential for houses in close proximity to a camp to experience sleep disturbing levels of noise against the World Health Organisation guidelines. Commonly adopted internal noise goals are associated with industrial plant noise and vehicles noise (road/rail/aircraft), which often include an elevated level of low-frequency content. It was noted during review of the flying-fox vocalisations that their frequency spectra is predominately mid-high frequencies, and it is possible that standard residential construction materials result in greater reduction than the external criteria assume. Thus there is potential that the elevated levels of noise as a result of flying-fox activity are not necessarily impacting on restful sleep periods. Further monitoring is required.

Odour

There is no known existing precedence of criteria for the influence of wildlife odour impacting on humans. Thresholds associated with industrial sources have been established, however, odour data from wildlife, such as flying-foxes, should not be directly compared with such thresholds without due consideration.

The level of impact associated with flying-fox odour is highly variable with variable tolerances/sensitivities/interpretation of the odour between individuals. For example, some people find the odour extremely offensive, whereas some describe it as 'earthy' and are not offended by it.

Flying-fox odour is generally described as a nuisance impact with no known direct health impacts. However, members of the community reported respiratory concerns associated with the odour / flying-fox presence. As such, further investigation is required to determine if flying-foxes themselves may cause an allergic or inflammatory physiological response. It is also recognised that secondary health implications may be caused by stress or anxiety some people may feel as a result of camp odour or the general presence of flying-foxes. Secondary impacts may also be associated with environmental factors, for example, an increased in pollen in the environment during a flowering event which may have attracted an influx of flying-foxes.

Preliminary odour modelling based on coarse assumptions supports literature published by SEQ Catchments (2012) that odour impacts may be experienced at times within a 300 m radius of a camp (depending on wind speed, direction, odour buffers, etc.). Further monitoring and modelling may be particularly useful to determine, with consideration of these site-specific factors, which sensitive receptors are affected at different times.

Conclusions

Results of this initial trial highlighted the need for significant additional research, which is beyond the scope of this project. Council will liaise with NSW state and federal governments and researchers to encourage further work in this area. Possible next steps may include (in no preferential order):

- Review measured data and basic modelling of noise source against World Health Organisation criteria
- Undertake baseline noise monitoring during minimal bat activity at Water Gardens or appropriate site/s
- Undertake calculations for external to internal, with informed assumptions regarding typical building materials and their respective performance
- Complete contemporaneous noise monitoring external and internal to a property, with concurrent observational data
- Model for the topography, buffer distances, foliage density, etc for the Water Gardens or appropriate site/s

- Review potential benefits of boundary fence heights (given elevation of bats, unlikely to be beneficial)
- Review of similar fauna impacting on quality of life (sleep) investigations, e.g. lorikeet noise.
- Investigate potential links between odour / flying-fox presence and human health.
- Improve quantification of odour concentrations from flying-foxes with consideration of odour during different seasons, times of day and downwind measurements.
- Consider developing a relative odour concentration plot (through desktop modelling) to determine which sensitive receptors are affected at different times.
- Further nuisance noise and odour monitoring may be particularly useful to determine, with consideration of site-specific factors, which sensitive receptors are most affected at different times.

Appendix 7 General dispersal outcomes based on previous research

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

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

Ecosure, in collaboration with a Griffith University Industry Affiliates Program student, researched outcomes of management in Queensland between November 2013 and November 2014 (the first year since the current Queensland state flying-fox management framework was adopted on 29 November 2013). An overview of findings[3] is summarised below.

- There were attempts to disperse 25 separate roosts in Queensland (compared with nine roosts between 1990 and June 2013 analysed in Roberts and Eby (2013)). Compared with the historical average (less than 0.4 roosts/year) the number of roosts dispersed in the year since the Code was introduced has increased by 6250%.
- Dispersal methods included fog[4], birdfrite, lights, noise, physical deterrents, smoke, extensive vegetation modification, water (including cannons), paintball guns and helicopters.

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

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

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

- The most common dispersal methods were extensive vegetation modification alone and extensive vegetation modification combined with other methods.
- In nine of the 24 roosts dispersed, dispersal actions did not reduce the number of flying-foxes in the LGA (i.e. flying-foxes moved to other existing camps, or commonly created a new camp or camps in the area).
- In all cases it was not possible to predict where new roosts would form.
- When flying-foxes were dispersed, they did not move further than 6 km away.
- As at November 2014 repeat actions had already been required in 18 cases.
- Conflict for the council and community was resolved in 60% of cases, but with many councils stating that they feel this resolution is only temporary.
- The financial costs of all dispersal attempts, regardless of methods used were considerable, ranging from $7500 to more than $400,000 (with costs ongoing).

Appendix 8 Camp management options

Below is an overview of management options commonly used throughout NSW and Australia which were considered in the development of the Plan. These are categorised as Level 1, 2 or 3 in accordance with the NSW Flying-fox Camp Management Policy (OEH 2015).

Level 1 actions: routine camp management

Community engagement and awareness programs

This management option involves undertaking a comprehensive and targeted flying-fox education and awareness program to provide accurate information to the local community about flying-foxes.

Such a program would include information about managing risk and alleviating concern about health and safety issues associated with flying-foxes, options available to reduce impacts from roosting and foraging flying-foxes, an up-to-date program of works being undertaken at the camp, and information about flying-fox numbers and flying-fox behaviour at the camp.

Residents should also be made aware that faecal drop and noise at night is mainly associated with plants that provide food, independent of camp location. Staged removal of foraging planted species such as fruit trees and palms from residential yards, or management of fruit (e.g. bagging, pruning) will greatly assist in mitigating this issue.

Engaging with the community and sharing information should always be the first response to community concerns in an attempt to alleviate issues without the need to actively manage flying-foxes or their habitat. Where it is determined that management is required, education should similarly be a key component of any approach.

The likelihood of improving community understanding of flying-fox issues is high. However, the extent to which that understanding will help alleviate conflict issues is probably less so. Extensive education for decision-makers, the media and the broader community may be required to overcome negative attitudes towards flying-foxes.

It should be stressed that a long-term solution to the issue resides with better understanding flying-fox ecology and applying that understanding to careful urban planning and development.

An education program may include components shown in the figure below.

Possible components of an education program

Property modification without subsidies

The managers of land on which a flying-fox camp is located would promote or encourage the adoption of certain actions on properties adjacent to or near the camp to minimise impacts from roosting and foraging flying-foxes:

- Create visual/sound/smell barriers with fencing or hedges. To avoid attracting flying-foxes, species 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 5 metres). Vegetation that produces fragrant flowers can assist in masking camp odour where this is of concern. Potential suitable native species which are unlikely to attract flying-foxes include:
    - *Arthropodium milleforum* (vanilla lily)
    - *Bursaria spinosa* (Christmas bush)
    - *Hardenbergia violacea* (false sarsaparilla)
    - *Hibbertia scandens* (golden guinea vine)
    - *Indigofera australis* (Austral indigo)
    - *Homalanthus populifolius* (bleeding heart)

- *Hymenosporum flavum* (native frangipani)
- *Kunzea ambigua* (white kunzea)
- *Lomandra longifolia* (spiny-head mat-rush)
- *Ozothamnus diosmifolius* (rice flower).

- Manage foraging trees (i.e. plants that produce fruit/nectar-exuding flowers) within properties through pruning/covering with bags or wildlife friendly netting, early removal of fruit, or tree replacement.
- Cover vehicles, structures and clothes lines where faecal contamination is an issue, or remove washing from the line before dawn/dusk when flying-foxes fly in and out of the camp.
- Move or cover eating areas (e.g. BBQs and tables) within close proximity to a camp or foraging tree to avoid contamination by flying-foxes.
- Install double-glazed windows, insulation and use air-conditioners when needed to reduce noise disturbance and smell associated with a nearby camp.
- Follow horse husbandry and property management guidelines provided at the NSW Department of Primary Industries Hendra virus web page (DPI 2015a).
- Consider removable covers for swimming pools and ensure working filter and regular chlorine treatment.
- Appropriately manage rainwater tanks, including installing first-flush systems.
- Avoid disturbing flying-foxes during the day as this will increase camp noise, odour and faecal drop.

The cost would be borne by the person or organisation who modifies the property; however, opportunities for funding assistance (e.g. environment grants) may be available for management activities that reduce the need to actively manage a camp.

Property modification subsidies

Fully-funding or providing subsidies to property owners for property modifications and infrastructure may improve the value of the property, which may also offset concerns regarding perceived or actual property value or rental return losses.

The level and type of subsidy would need to be determined by Council and dependent on funding.

Service subsidies

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 or car washing

Critical thresholds of flying-fox numbers at a camp and distance to a camp may be used to determine when subsidies would apply and amounts would be determined by Council and

funding resources.

Routine camp maintenance and operational activities

Examples of routine camp management actions include (OEH Policy, 2015):

- removal of tree limbs or whole trees that pose a genuine health and safety risk, as determined by a qualified arborist
- weed removal, including removal of weeds declared prohibited matter under the *Biosecurity Act 2015*, or species listed as undesirable by a council
- trimming understorey vegetation
- planting vegetation
- minor habitat modification for the benefit of the roosting animals
- mowing of grass and similar grounds-keeping actions that will not create a major disturbance to roosting flying-foxes
- application of mulch
- removal of leaf litter or other material on the ground.

Protocols should be developed for carrying out operations that may disturb flying-foxes, which can result in excess camp noise. Such protocols could include limiting the use of disturbing activities to certain days or certain times of day in the areas adjacent to the camp, and advising adjacent residents of activity days. Such activities could include lawn-mowing, using chainsaws, whipper-snippers, using generators and testing alarms or sirens**.**

Revegetation and land management to create alternative habitat

This management option involves revegetating and managing land to create alternative flying-fox roosting habitat through improving and extending existing low-conflict camps or developing new roosting habitat in areas away from human settlement.

Selecting new sites and attempting to attract flying-foxes to them has had limited success in the past. As such, dedicating known camp sites as flying-fox reserves (e.g. through a Biodiversity Stewardship Agreement) and managing in situ is desirable where possible. However, if a staged and long-term approach is used to make unsuitable current camps less attractive, whilst concurrently improving appropriate sites, it can be a viable option. Supporting further research into flying-fox camp preferences may improve the potential to create new flying-fox habitat.

When improving a site for a designated flying-fox camp, preferred habitat characteristics detailed in Appendix 1 should be considered.

Foraging trees planted amongst and surrounding roost trees (excluding in/near horse paddocks) may help to attract flying-foxes to a desired site. They will also assist with reducing foraging impacts in residential areas. Consideration should be given to tree species that will provide year-round food, increasing the attractiveness of the designated site. Depending on

the site, the potential negative impacts to a natural area will need to be considered if introducing non-indigenous plant species.

The presence of a water source is likely to increase the attractiveness of an alternative camp location. Supply of an artificial water source should be considered if unavailable naturally, however this may be cost-prohibitive.

Potential habitat mapping using camp 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.

Provision of artificial roost space

This management option involves constructing artificial structures to augment roosting habitat in current camp sites, providing additional roost space in existing camps while vegetation grows/recovers from damage, or to encourage roosting in low conflicts of a camp (e.g. away from buffer areas). Artificial structures that have been trialled include structures the same height as the canopy within the camp, with ropes or artificial branches, to provide additional roost space. However trials have showed limited potential as flying-foxes only used parts of the structures very close to the natural roosting habitat.

Protocols to manage incidents

This management option involves developing protocols for avoiding and managing incidents or situations specific to particular camps. Examples include:

- Monitoring protocol at sensitive sites (e.g. child care facility) near a camp to detect flying-foxes within the property and avoid an accidental negative interaction such as a bite or scratch.
- Temporarily switching dog off-lead parks to on-lead parks when flying-foxes are present.

Participation in research

This management option involves participating in research 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. Further research and knowledge sharing at local, regional and national levels will enhance our understanding and management of flying-fox camps.

Appropriate land-use planning

Suitable buffers and other provisions (e.g. covered car parks) should be incorporated into the design of any new developments.

Land-use planning instruments may be able to be used to ensure adequate distances are maintained between future residential developments and known flying-fox camps. While this management option will not assist in the resolution of existing land-use conflict, it may prevent

issues for future land development and residents.

Property acquisition

Property acquisition may be considered if negative impacts cannot be sufficiently mitigated using other measures. This option will clearly be extremely expensive and require substantial government funds. Assessment of property acquisition and other management options would have to be undertaken to determine the viability of this option.

Do nothing

The management option to 'do nothing' involves not undertaking any management actions in relation to the flying-fox camp and leaving the situation and site in its current state.

Level 2 actions: in-situ management

As detailed in Section 2.1, approval or regulator endorsement (e.g. through a Code of Practice) is required for Level 2 and Level 3 actions.

Buffers

Buffers aim to separate roosting flying-foxes from adjacent sensitive receptors (e.g. residences). These can be created through vegetation removal and/or the installation of permanent/semi-permanent deterrents.

Creating buffers may involve planting low-growing (e.g. less than five metres) or spiky plants between residents or other conflict areas and the flying-fox camp. This must be done in a way that will not attract flying-foxes to high conflict areas. Such plantings can create a visual buffer between the camp and residences or make areas of the camp inaccessible and limit camp disturbance. Similarly, buffers may noise attenuation fencing to buffer the noise of a camp.

The usefulness of a buffer to mitigate odour and noise impacts generally declines if the camp is within 50 metres of human habitation (SEQ Catchments 2012), however any buffer will assist and should be as wide as the site allows.

Buffers through vegetation removal

Vegetation removal aims to alter the area of the buffer habitat sufficiently so that it is no longer suitable as a camp. The amount required to be removed varies between sites and camps, ranging from some weed removal to removal of most of the canopy vegetation.

Any vegetation removal should be done using a staged approach, with the aim of removing as little native vegetation as possible. This is of particular importance at sites with other values (e.g. ecological or amenity), and in some instances the removal of any native vegetation will not be appropriate. Thorough site assessment will inform whether vegetation management is suitable (e.g. can impacts to other wildlife and/or the community be avoided?).

Removing vegetation can also increase visibility into the camp and noise issues for

The importance of under- and mid-storey vegetation for flying-foxes during heat stress events also requires consideration before removing vegetation in a buffer.

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 a suitable option where vegetation has high ecological or amenity value.

While many deterrents have been trialled in the past with limited success, there are some options worthy of consideration if required:

- Visual deterrents – Visual deterrents such as plastic bags, fluoro vests (GeoLINK 2012) and balloons (Ecosure, pers. comm.) in roost trees have shown to have localised effects, with flying-foxes deterred from roosting within 1–10 metres of the deterrents. The type and placement of visual deterrents would need to be varied regularly to avoid habituation. Potential for litter pollution should be considered and managed when selecting the type and placement of visual deterrents. In the absence of effective maintenance, this option could potentially lead to an increase in rubbish in the natural environment.
- Noise emitters on timers – Noise needs to be random, varied and unexpected to avoid flying-foxes habituating. As such these emitters would need to be portable, on varying timers and a diverse array of noises would be required. It is likely to require some level of additional disturbance to maintain its effectiveness, and ways to avoid disturbing flying-foxes from desirable areas would need to be identified. This is also likely to be disruptive to nearby residents.
- Canopy-mounted water sprinklers – This method has been effective in deterring flying-foxes during dispersals (Ecosure personal experience), and have been effective at deterring flying-foxes from designated buffer zones at several camps in Qld. This option can be logistically difficult (installation, water and power supplies) and may be cost-prohibitive. Design and use of sprinklers needs to be considerate of animal welfare and other features of the site. For example, misting may increase humidity and exacerbate heat stress events, and overuse may impact other environmental values of the site.

Note that any deterrent with a high risk of causing inadvertent dispersal may be considered a Level 3 action.

Noise attenuation fencing

Noise attenuation fencing could be installed in areas where the camp is particularly close to residents. This may also assist with odour reduction, and perspex fencing could be investigated where amenity is of concern. Vegetation may be planted along the fence to further improve amenity. 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. This requires further investigation as to feasibility.

Odour neutralising system

Odour-neutralising systems are commonly used in other areas where odour may affect nearby communities, for example water treatment plants, food processing units, landfills and composting plants. Odour management specialists could be consulted to determine the feasibility and likely benefits of an odour neutralising system to reduce odour associated with flying-fox camps. Such a system should not be used at the camp to avoid negatively impacting flying-foxes, but could potentially be useful at the boundaries of affected properties. This may be installed on Council property or smaller units for interested residents (with costs potentially subsidised). This requires further investigation as to feasibility.

Level 3 actions: disturbance or dispersal

As detailed in Section 2.1, approval or regulator endorsement (e.g. through a Code of Practice) is required for Level 2 and Level 3 actions.

Nudging

Noise and other low intensity active disturbance restricted to certain areas of the camp 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 camp site.

Unless the area of the camp is very large, nudging should be done during the day rather than early in the morning, with early morning disturbance more likely to lead to inadvertent dispersal from the entire camp 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). As a Level 3 action, approval is required from OEH prior to nudging.

Dispersal

Dispersal aims to encourage a camp to move to another location, through either disturbance or habitat modification.

There is a range of potential risks, costs and legal implications that are greatly increased with dispersal (compared with in-situ management). See Appendix 5 for more details. These include:

- impact on animal welfare and flying-fox conservation
- moving or splintering the camp into other locations that are equally or more problematic
- impact on amenity value and habitat value for other species (temporarily during dispersal or permanently if deterrents installed)
- effects on the flying-fox population, including disease status and associated public health risk

- impacts to nearby residents associated with ongoing dispersal attempts
- excessive initial and/or ongoing capacity and financial investment
- increased aircraft strike risk associated with changed flying-fox movement patterns
- may require multiple attempts, which may exacerbate all of the above.

Despite these risks, there are some situations where camp dispersal may be considered. Dispersal can broadly be categorised as 'passive' or 'active' as detailed below. These risks need to be carefully considered and mitigated in a site-specific plan should dispersal be progressed. It is important to note than even an effective dispersal is generally temporary (unless the camp is made unattractive for flying-foxes to return e.g. through vegetation thinning), and additional dispersal is likely to be necessary as flying-foxes attempt to return seasonally (or more often).

Passive dispersal

Removing vegetation in a staged manner (or potentially installing permanent deterrents) can be used to passively disperse a camp, by gradually making the habitat unattractive so that flying-foxes will disperse of their own accord over time with little stress (rather than being more forcefully moved with noise, smoke, etc.). This is less stressful to flying-foxes, and greatly reduces the risk of splinter colonies forming in other locations (as flying-foxes are more likely to move to other known sites within their camp network when not being forced to move immediately, as in active dispersal).

Generally, a significant proportion of vegetation needs to be removed in order to achieve dispersal of flying-foxes from a camp or to prevent camp re-establishment. For example, flying-foxes abandoned a camp in Bundall, Queensland once 70% of the canopy/mid-storey and 90% of the understorey had been removed (Ecosure 2011). Ongoing maintenance of the site is required to prevent vegetation structure returning to levels favourable for colonisation by flying-foxes. Importantly, at nationally important camps sufficient vegetation must be retained to accommodate the maximum number of flying-foxes recorded at the site (e.g. the Water Gardens).

This option may be preferable in situations where the vegetation is of relatively low ecological and amenity value, and alternative known permanent camps are located nearby with capacity to absorb the additional flying-foxes. While the likelihood of splinter colonies forming is lower than with active dispersal, if they do form following vegetation modification there will no longer be an option to encourage flying-foxes back to the original site. This must be carefully considered before modifying habitat.

There is also potential to make a camp site unattractive by removing access to water sources. However, at the time of writing this method had not been trialled so the likelihood of this causing a camp to be abandoned is unknown. It would also likely only be effective where there are no alternative water sources in the vicinity of the camp.

Active dispersal through disturbance

Dispersal is more effective when a wide range of tools are used on a randomised schedule

with animals less likely to habituate (Ecosure pers. obs. 1997–2015). Each dispersal team member should have at least one visual and one aural tool that can be used at different locations on different days (and preferably swapped regularly for alternate tools). Exact location of these and positioning of personnel will need to be determined on a daily basis in response to flying-fox movement and behaviour, as well as prevailing weather conditions (e.g. wind direction for smoke drums).

Active dispersal will be disruptive for nearby residents given the timing and nature of activities, and this needs to be considered during planning and community consultation.

This method does not explicitly use habitat modification as a means to disperse the camp, however if dispersal is successful, some level of habitat modification should be considered. This will reduce the likelihood of flying-foxes attempting to re-establish the camp and the need for follow-up dispersal as a result. Ecological and aesthetic values will need to be considered for the site, with options for modifying habitat the same as those detailed for buffers above.

Early intervention dispersal before a camp is established at a new location

This management option involves monitoring local vegetation for signs of flying-foxes roosting in the daylight hours and then undertaking active or passive dispersal options to discourage the animals from establishing a new camp. Even though there may only be a few animals initially using the site, this option is still treated as a dispersal activity, however it may be simpler to achieve dispersal at these new sites than it would in an established camp. It may also avoid considerable issues and management effort required should the camp be allowed to establish in an inappropriate location.

It is important that flying-foxes feeding overnight in vegetation are not mistaken for animals establishing a camp.

Maintenance dispersal

Maintenance dispersal refers to active disturbance following a successful dispersal event (acknowledging dispersal is generally temporary) to prevent the camp from re-establishing. It differs from initial dispersal by aiming to discourage occasional over-flying individuals from returning, rather than attempting to actively disperse animals that have been recently roosting at the site. As such, maintenance dispersal may have fewer timing restrictions than initial dispersal, provided that appropriate mitigation measures are in place.

Unlawful activities

Culling

Culling is addressed here as it is often raised by community members as a preferred management method**;** however, culling is contrary to the object of the BC Act and will not be permitted as a method to manage flying-fox camps.

Appendix 9 Community engagement plan

Centre for
Local Government

Eurobodalla Flying-fox Community and Stakeholder Engagement Plan

Centre for
Local Government

Contents

1 Context for this Plan

Flying-foxes have known camps across Eurobodalla. In addition, there may be other camps Council is unaware of or that may establish in the future. Flying-foxes will continue to return to the Shire on a seasonal basis, generally in spring and summer, as there are plentiful local food sources. However, in what numbers and which locations flying-foxes return to is unknown, and impacts on the community may continue.

Eurobodalla Shire Council (Council) has committed to prepare a Flying-fox Management Plan (FFMP) to readily assist and respond to the impacts of flying foxes on the community. The FFMP is a condition of a Conservation Agreement with the Australian Government, in accordance with the Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019, and is being prepared with funding from the NSW Government and the support of the Australian Government. The FFMP will steer Council in making decisions and readily responding to impacts based on a range of factors, including community values, legal, ecological and financial considerations.

Engagement on flying-fox impacts has been primarily undertaken with the community near the Water Gardens camp in response to a notable increase in numbers prior to 2016 and the 2016 influx in Batemans Bay. Council recognised that such an influx could happen again anywhere in the Shire.

Engagement throughout Eurobodalla will be necessary for the FFMP so that all community members that have been previously impacted as well as those who might be in the future can have the opportunity to influence the way flying-fox impact management decisions are made in the future.

This Community and Stakeholder Engagement Plan (CSEP) outlines the communications and engagement approach for the development of the FFMP.

2 Aims of this Plan

This CSEP has been prepared using templates from Council's Community Engagement Framework and building on Council's previous communications about flying-foxes to the community. The overarching aim is to seek community and stakeholder perspectives on managing flying-fox impacts so that these inform development of the FFMP and, ultimately, how and when Council makes decisions when managing impacts in the future.

The CSEP aims to:

- Inform and broaden understanding across the community about flying-foxes, their impacts, and the legal, ecological and financial constraints on Council when managing impacts.
- Identify community values as they relate to flying-foxes, community experiences of impacts to date, and expectations of how and when Council manages impacts in the future.
- Help the community understand potential decision-making considerations of regulators and land managers when managing impacts.
- Test Council's draft approach to impact management to ensure it meets community expectations.
- Update the community throughout the process so they are aware how their feedback shapes the FFMP, and understand how the FFMP may apply to their situation in the future.

2.1 Engagement Principles for this CSEP

This CSEP is aligned with the principles within Council's Community Engagement Framework, namely:

- Be open and inclusive – promoting opportunities for community involvement through the various mediums of online survey, workshops, interviews, public exhibition and communication activities.
- Generate mutual trust and respect, and be accountable – at all engagement activities it will be explained to the community how their input will be used and the final report will demonstrate how the community input has shaped the decision support tool. This will build trust of the process and hence trust in the validity of the final decision support tool.
- Engage early and provide information that is clear – communication activities are scheduled from the start of the project in number of formats to provide the community with all the information they need to participate meaningfully.
- Be considerate and provide feedback – communication activities are planned at various stages throughout the project to keep the community up to date and to feedback community input and how this input has shaped the outcome.
- Vale and acknowledge skills and resources – opportunities have been identified to coordinate

engagement with other projects to avoid duplication and staff will be able to develop community engagement skills throughout the process.

The engagement is designed at the **Involve** level of the IAP2 spectrum, as per the Eurobodalla Community Engagement Planning Tool (please see Appendix A), and Council commits to work with the community and stakeholders to reflect their views in developing the FFMP. As the FFMP is the basis for future Council operational decisions, the engagement at this time provides the community with an opportunity to influence ongoing Council decision-making.

The Involve level also recognises constraints on how Council manages impacts and, therefore, what the community can influence. For example, there are legal constraints on when dispersal activities can take place. Constraints such as these mean Council must balance through the FFMP community and stakeholder perspectives with legal, financial, and ecological considerations.

2.2 Justification for approach

The shire-wide coverage of the FFMP means engagement must include people not previously impacted by flying-foxes. Council wants to ensure the broader community is aware they may be impacted by flying-foxes in the future and want to offer them opportunities to participate. To achieve this, we will use Council's quarterly newsletter to communicate the relevance of flying-fox impact management to the broader community and promote participation. In our experience, council newsletters have high levels of readership and resonance amongst communities. Therefore, this approach is an appropriate way to build awareness and interest across the community, and extend to everyone an equal opportunity to participate.

An online survey has been selected as an appropriate principal engagement activity as it is not targeted at any particular stakeholder group and can be answered at a convenient time for community members. Combined with the communications approach, this will provide everyone an opportunity to participate. Hard copies of the survey will be made available at various locations for those without internet access. Incentives to complete the survey will also help to increase participation.

The CSEP also recognises there are some stakeholders, such as experts, interest groups, and those previously impacted or particularly sensitive to flying-fox impacts that have higher levels of awareness and interest in participating. More targeted communication and engagement will be undertaken with these stakeholders including emails, letters, interviews and community workshops.

2.3 Key communications and engagement elements

Key elements of this plan include:

- Brief Councillors to enable shared understanding of the communications and engagement approach, the FFMP process, and constraints on flying-fox management, and how community feedback has informed the FFMP.

- Broadcast communication to build awareness of the engagement process, understanding about flying-foxes, their ecological value and potential impacts, available management actions and reasons why particular management actions may be chosen (eg their effectiveness), and

generate interest in flying-fox impact management across the Eurobodalla community.

- Interviews to draw on the expertise of flying-fox experts, researchers, regulators and other land managers, including other councils, about considerations when making decisions about impact management.

- Use an online survey to identify community values that will then underpin how Council manages flying-fox impacts, understand how the community experiences impacts, and their expectations of how Council manages impacts in the future, including triggers for management actions.

- Workshops to undertake targeted testing of the impact management approach with cross sections of Council staff, residents and businesses directly impacted or who might be impacted in the future, and highly interested stakeholders such as sensitive receivers, community leaders/associations and interest groups.

- Update Council webpages, social media and media releases to support the engagement process.

2.3.1 Risks for the CSEP

The key risks for this CSEP include:

- For those with experience of impacts – fixed views and fatigue over the presence of flying-foxes and experience of impacts, and potential fatigue around consultation on this issue.

- For those without experience of impacts – low participation aligned with low levels of awareness, knowledge and interest in the issue.

- People not accepting the outcome – views on the issues and the desired management outcome not changing leading to low levels of acceptance of the tool.

To address these risks, the CSEP uses broad and reinforcing communications and engagement activities, as well as participation incentives, to achieve high levels of early participation. In terms of gaining acceptance of the outcome, there will be a story delivered with the development of the decision support tool to illustrate the comprehensive process and evidence based approach. The community will be informed of engagement outcomes and how these outcomes have influenced the tool.

2.4 Content and Updating the CSEP

This CSEP outlines:

- stakeholders to be engaged and their interests, views and role

- planned communication and engagement activities

- planned key messages

- an action plan with responsibilities and critical path dates.

- Council's completed community engagement planning tool

The CSEP is intended to be flexible and adapted as engagement progresses in response to community and stakeholder interest. Therefore, it will be a live document and continually reviewed through project management meetings.

3 Stakeholder analysis

The stakeholder groups listed below are targets for the CSEP. This list builds on those identified in Council's *Dispersal Communications Plan* who are still stakeholders in ongoing communication regarding flying-foxes. The main update to this list is the LGA-wide scope of the FFMP.

Stakeholder Group		Interest/Views	Role
Eurobodalla Shire Council	• Mayor and Councillors	• Manage flying-foxes consistently in line with community expectations and operational requirements	• Brief Council on engagement, FFMP process, legislative requirements for management, and progress of the FFMP.
	• Environmental planning, NRM, infrastructure and assets staff		• Engage staff to test impact management approach meets operational needs.
	• Coastal and Environmental Management Advisory Committee		• Engage Committee to test impact management approach
Residents/businesses already experiencing impacts	• Including residents/businesses such as near Catalina Golf Course, Batemans Bay Water Gardens, and Moruya Heads	• Heavily impacted in the past and likely to harbour concerns about future impacts and management actions. • Strong varying views and levels of understanding regarding flying-foxes, impacts and management actions	• Engage to understand values for flying-fox impact management and test draft management approach meets their expectations.
Residents/businesses not experienced impacts but with potential for future impact	• All residents, businesses and visitors to the LGA	• Likely low levels of knowledge and interest, and mixed views, some strongly polarised. • Potential concern regarding establishment of camps in their vicinity, including if established camps are moved on • Potential to undertake their own management actions within legislative parameters (i.e.	• Engage to understand values for flying-fox impact management and test draft management approach meets their expectations.

Stakeholder Group		Interest/Views	Role
		removing food sources on their property, shade covers, netting etc.). • Potential concern regarding flow-on impact of management actions (for example, smoke, noise, vegetation removal)	
Sensitive receivers	• Hospitals • Schools • Aged care facilities • Vets • Equine industry • Disability services	• Likely low levels of knowledge and interest. • Minimising flying-fox impacts on community and animal health and safety • Potential concern regarding camps establishing in their vicinity	• Engage to understand their values for flying-fox impact management and test draft management approach meets their expectations.
Community leaders/associations and interest groups	• Bat Action Group • Local Aboriginal Land Councils • Wildlife carers • Mogo Zoo • Conservation of vulnerable bats species • Chambers of Commerce • Community associations	• Commentators on flying-foxes with divergent interests in both dispersal and animal welfare and conservation. Engage for transparency and to balance trade-offs.	• Engage to understand their values for flying-fox impact management and opportunity to review approach during exhibition
Highly interested stakeholders	• Essential Energy • Moruya Airport • NSW Local Health District • NSW Air Ambulance Service	• Power outages during 2016 caused by flying-foxes • Potential for aircraft strike or disruption for service users. • Potential for community health impacts from flying-foxes (for example, Lyssavirus, loss of power for chronically ill patients	• Engage to understand their values for flying-fox impact management and determine if management approaches meets their expectations.

Stakeholder Group		Interest/Views	Role
		reliant on 24/7 electronic medical devices • Potential role reaching out to their service users to understand expectations for impact management.	
Government regulators	• NSW Office of Environment and Heritage • Commonwealth Department of Environment and Energy	• Ensuring FFMP developed and implemented within legislative parameters. • Insights on decision-making considerations for managing flying-fox impacts, and effectiveness and feasibility of management actions.	• Engage to test Council's suggested approach to impact management meets regulatory requirements. • Engage to test usefulness and replicability of Council's approach to impact management. • Engage to understand effectiveness and feasibility of management actions. • Engage to share learnings across NSW and Australia
Local government	• Neighbouring councils and other councils across Australia that have flying-foxes	• Insights on decision-making considerations for managing flying-fox impacts, and effectiveness and feasibility of management actions.	• Engage to test usefulness and replicability of Council's approach to impact management. • Engage to understand effectiveness and feasibility of management actions.
Experts / other land managers	• NSW Office of Environment and Heritage Land Managers Network • University researchers in flying-fox impacts and management	• Insights on decision-making considerations for managing flying-fox impacts, and effectiveness and feasibility of management actions.	• Engage to learn from latest research and developments in flying-fox impact management, and test usefulness and replicability of Council's management approach. • Engage to understand effectiveness and feasibility of management actions.
Media	• Local, national	• Interest in profiling flying-fox issues, including potential polarisation of community views	• Communicating relevance of flying-fox issue and impact management to the entire community.
Politicians	• State MP for Bega • NSW Environment Minister • Commonwealth Environment Minister	• Manage flying-foxes consistently in line with community expectations and legal expectations	• Inform Council is engaging the community to understand values and expectations on flying-fox impact management.

4 Communications and engagement activities

The table below provides a summary of the communication and engagement activities.

Communication activities Engagement activities			
Timing	**Activity**	**Aim**	**Purpose**
March 6	**Council briefing 1**	Inform Council	Communicate engagement approach, FFMP purpose
March 26	**April-June Council Newsletter**	Inform entire community	Build interest in participating, communicate engagement and FFMP purpose. Provide information to help community make informed submission
	Email newsletter	Inform key stakeholders	
	Media release, social media posts, and website update		
March	**Interviews**	Consult experts in flying-fox management	Identify potential considerations for decision-support tool
March – April	**Online survey**	Involve the entire community	Collect data on community values, experience of flying-fox impacts, and expectations about impact management
	Hard copy survey at key locations		
June	**About five workshops** *(or interviews if preferred by stakeholders)*	Consult Council staff and segments of the community and key stakeholders	Test decision-support tool scenarios, triggers and management actions
July	**Public exhibition**	Consult the entire community	Seek submissions on draft FFMP
July	**July-September Council Newsletter**	Inform entire community	Feedback findings to date, how they have shaped draft FFMP, and invite submissions on draft FFMP
	Email newsletter	Inform key stakeholders	
	Media release, social media posts, and website update		
August	**Council staff workshop**	Inform Council	Hand over decision support tool and discuss ongoing implications for community
	Councillor briefing/ workshop		Outline how community feedback shaped final FFMP
September	**Emails to key stakeholders and submitters**	Inform key stakeholders	Communicate how community feedback has shaped final FFMP

	October-December Council Newsletter	Inform entire community	Communicate endorsement of FFMP by Council and how it may apply to their situation in the future
	Media release, social media posts, and website update	Inform key stakeholders	

4.1 Communication activities

There are five key written communications to the community:

Information will be provided through three Council Newsletters released in the months of April, July and October

Direct emails will be sent:

- In late March to key stakeholders about FFMP, engagement process and online survey
- In September to submitters about final FFMP

4.1.1 Council newsletters

4.1.1.1 April-June Newsletter

This first will be sent to all residents and businesses to

- *build awareness* of this current engagement process,
- *communicate the relevance* of the issue
- *build interest* in participating
- *inform the community on flying-fox impacts and management* so they can provide informed input.

A key role of the newsletter will be to invite participation through an online survey about

- their values regarding flying-foxes,
- experience of impacts, and
- expectations regarding impact management.

It will include details of a prize draw to incentivise participation and direct them to further information on flying-foxes available on Council's website.

It will be supported by a media release and Council social media posts to promote the survey. Council will also update its website showing a diagram with an overview of the engagement process and a link to the online survey and further information about flying-foxes.

4.1.1.2 July-September Newsletter

The second newsletter will be sent to all residents and businesses to:

- provide a *high level summary of survey feedback* and
- *inform* recipients that the draft FFMP is on public exhibition and how they can submit comments.
- It will provide a link to a report on Council's website that shows how the interview, survey and workshop inputs contributed to the content of the draft FFMP.

It will be supported by a social media post and emailed directly to sensitive receivers, community leaders/associations and interest groups, and highly interested stakeholders.

A media release will be prepared and issued, and Council will also prepare social media posts to promote the public exhibition. Council will also upload the report with interview findings, detailed survey findings, and workshop findings and how these link to the draft FFMP content.

4.1.1.3 October-December Newsletter

The final newsletter will be sent to all residents and businesses to:

- *update the community* and
- *inform* them of how the FFMP may apply to their situation in the future.

At this time

- a Council media release will be prepared and issued,
- social media posts will promote the final FFMP.
- Council will update its website to include the final FFMP.

4.1.2 Direct emails

4.1.2.1 Email to key stakeholders about FFMP, engagement process and online survey

An email will be sent to sensitive receivers, community leaders / associations and interest groups, and known interested stakeholders to advise them of the engagement process and FFMP and with a link to the online survey.

In addition, know affected community members who are on Council's email database will be contacted directly to inform them of the engagement process and survey.

4.1.2.2 Email to submitters in September

An email will be sent to submitters with a submissions report that advises how feedback on the draft FFMP has been incorporated into the final version. They will also be made aware of when the final FFMP is on the agenda at the next available Council meeting.

Council will also update the website to include submissions report.

4.1.3 Measures of success

Data on the following measures of success will be collected:

a) Reach data from Council's social media posts

b) Media coverage about flying-foxes during the process

c) Number of downloads of public reports

d) Visits to Council's flying-fox webpage

e) Number of online survey responses and representatives

4.2 Engagement activities

There are seven engagement activities, plus reporting:

4.2.1 Councillor briefings

4.2.2 Interviews

4.2.3 Online survey

4.2.4 Targeted Workshops

4.2.5 Drop-In Sessions

4.2.6 Public exhibition

4.2.7 Council staff workshop

4.2.1 Councillor briefings

A briefing of Eurobodalla Shire Councillors will take place on 6 March 2018. The briefing will outline and enable shared understanding of the communications and engagement approach, the FFMP process, and legislative constraints for Council when managing flying-fox impacts.

A Councillor briefing will also be held at the end of the process to provide an overview of the engagement findings and how they have informed the FFMP.

4.2.2 Interviews

Government regulators, other councils, and experts in flying-fox management will be engaged through telephone interviews that will take place in March:

1. A group of representatives from regulators such as the NSW Office of Environment and Heritage and Commonwealth Department of Environment and Energy to understand regulatory decision-making considerations for flying-fox impact management.

2. Flying-fox management experts to understand the effectiveness and feasibility of impact management options.

3. Councils that experience flying-fox impacts to test the likely usefulness of the decision support tool to them and understand their decision-making considerations when managing flying-fox impacts.

Interviewees will be selected from the relevant stakeholder group in consultation with Council.

4.2.3 Online survey

An online survey has been selected because it provides the community the opportunity to participate and influence the FFMP. The survey will be live for approximately four weeks from March 26 when the newsletter distribution begins, and the results will be analysed from late April through mid-May.

To increase survey participation, incentives will be offered. Survey respondents will have the chance to win one of three gift vouchers valued at $500, $200, and $100. To ensure those without computer and internet access can participate, hard copy surveys will be placed at various locations including libraries, community centres, Council's administration and customer service centres, visitor information centres etc.

The survey may include:

a) Introduction

b) Values questions from flying-fox Engage to identify the participants preference for outcome of management actions

c) Interactions with flying-foxes

d) Selected household attributes and flying-fox impacts

e) Impact management actions undertaken by individuals

f) Sensitive locations considered inappropriate for flying-foxes

g) Interest in being further engaged through workshops

h) Demographic attributes

Values questions from the NSW Office of Environment and Heritage's Flying Fox Engage survey will be included. These questions outline potential preferences for impact management such as prioritising mental health, animal welfare, species conservation, or cost. Understanding these values will assist with identifying what might trigger action and the management actions that align with these preferences, for example, taking immediate and strong action if there is danger to human health. Data from these questions will enable Eurobodalla to be benchmarked against other communities where flying-foxes are present.

Conditional filtering will minimise the length of the survey to respondents. Based on Eurobodalla's population, a sample of 400 provides statistical confidence of 95% at an interval of 5 for the whole sample, which is widely accepted as an appropriate level of statistical confidence for social research. The response rate will be monitored through project management meetings and take corrective action if an adequate sample is not reached.

A social media post across Council platforms will be posted mid-April to remind recipients to complete the survey. A summary of survey findings will be prepared for the July-September newsletter.

4.2.4 Targeted Workshops

Targeted workshops will take place after the online survey and once a draft of the decision support tool is available. The appropriateness of group composition and content will be reviewed through project management meetings as engagement progresses. The workshop will take the community through the findings to date and to test the draft decision support tool and scenarios.

At this stage, the following groups have been identified:

a) **One group** with Council staff to test the draft decision support tool for operational use. Findings from this group will be used to make adjustments to the tool before high level testing in the subsequent groups

b) **One group** with residents and businesses previously directly impacted by flying-foxes to test the draft tool scenarios, triggers and management actions

c) **One group** with residents and businesses not previously directly impacted by flying-foxes but who may be in the future, to test the draft tool scenarios, triggers and management actions

d) **One group** with sensitive receivers and other highly interested stakeholders to test the draft tool scenarios, triggers and management actions

e) **One group** with Council's Coastal and Environmental Management Committee to test the draft tool scenarios, triggers and management actions at a high level

Participants for group b and c will be recruited using contact details from the survey. Participants for group d will be recruited through direct email invitation. Alternately, interviews may be used if there are difficulties recruiting or a preference is expressed by these stakeholders. Each group will run for up to two hours and include up to eight people and will be recorded for reporting purposes.

4.2.5 Expert Working Group

Volunteers from the interviews will be sought to assist with refining the decision support tool. After incorporating the feedback from the workshops. The group will review the parameters, functionality and useability of the decision support tool.

4.2.6 Drop-In Sessions

Council will be hosting twelve drop-in sessions regarding Companion Animal Management Engagement. The Natural Resources Officer – Flying Foxes will be available at these drop-in sessions to promote the project and encourage the community to complete the online survey. Verbal submissions will be recorded and fed into the reporting process.

4.2.7 Public exhibition

The draft FFMP will be on exhibition for public submissions throughout July. The exhibition period will be notified through Council's quarterly newsletter for July-September, supported by media releases and social media posts.

4.2.8 Council staff workshop

Once the draft FFMP is finalised, a workshop with Council staff will discuss what worked well about the engagement and what could be improved, ongoing implications of the FFMP for the community, hand over the decision support tool, and discuss Council's October-December newsletter advising endorsement of the final FFMP.

4.2.9 Reporting

Three reports will be prepared:

1. A report with findings of the interviews, survey, and workshops, and how this feedback contributed to the draft FFMP content.

2. An overall report integrating the interview, survey, and workshop findings with public exhibition submissions analysis.

3. A feedback report documenting how submissions shaped changes to the final FFMP.

The reports will be published on Council's website and links to them contained in relevant communications.

4.2.10 Measures of success

Data on the following measures of success will be collected:

a) Online survey response rate and the interests represented in respondents such as those previously impacted and those never impacted.

b) % of online survey respondents interested in participating in workshops

c) Level of participation by experts, highly interested stakeholders, sensitive receivers, community leaders/associations and interest groups, and local government stakeholders.

5 Key Messages

These messages have been developed for use in communications. They are in addition to existing information in flying-fox fact sheets, for example, Council's fact sheet on *health and safety and flying-foxes*, and NSW Office of Environment and Heritage's *living with grey-headed flying-foxes*.

Further key messages will be developed as the process progresses and engagement findings are known, for example, to provide high level summaries of survey findings and public submissions.

5.1 General key messages about the FFMP for use in all communications

- Council understands there are impacts on the community from flying-fox camps and foraging, and that the camps can impact any part of the community at any time.
- Council wants community input to the preparation of a Flying-Fox Management Plan to guide Council responses and assist the community manage flying-fox impacts.
- The Plan will set the framework for how Council makes future decisions about managing flying-fox impacts.
- The Plan will consider both short and long term management options, and balance impacts on the community with legal, ecological and financial considerations.
- The Plan is funded by the State Government and supported by the Australian Governments.

5.2 General key messages about the FFMP engagement process for use in all communications

- Council working with the community, stakeholders and flying-fox experts to develop a framework that will guide future decisions Council makes when managing flying-fox impacts.
- There is an opportunity to have input into how Council makes future decisions about managing flying-fox impacts through an online survey, community workshops, interviews with experts, and submissions on the draft Plan.
- Council is engaging to better understand the community values about flying-foxes, the flying-fox impacts they experience, and their expectations about how Council manages impacts.
- Council is also working with flying-fox experts, regulators and other councils where flying foxes are present to develop the draft Plan.
- The draft Plan is expected to be ready the second half of 2018, and finalised before the end of the year. Regular updates will be provided through the Council newsletter on the process for developing the Plan, and the feedback received from the community and stakeholders.

5.3 General key messages about flying-foxes and Eurobodalla

- Flying-foxes are highly mobile animals that move up and down much of Australia's east coast.
- Eurobodalla has known flying-fox camps across the Shire.
- Flying-fox food resources are abundant in Eurobodalla including Spotted Gum, Banksia, and Lilli Pillis. This means flying-foxes will return in the future, although it is difficult to predict in what numbers and which locations
- Approximately 40% of the national population of flying-foxes were in Batemans Bay in 2016, and this influx was linked to a mass local flowering event.
- Whilst a large number of flying-foxes have been found in Eurobodalla, nationally the population is declining because of habitat loss and food shortages. Flying-foxes are regulated as a vulnerable species under State and Commonwealth Government legislation. This means flying-foxes are afforded additional legal protections and there are limits on what Council can do to manage them.
- Managing the impacts of flying foxes is difficult even if they were not protected due to not being able to predict when or where they will move to.
- Flying-foxes are long distance pollinators and disperse seeds for native plant species. This means they are critical in ensuring long-term survival of ecosystems, including Eucalypt forests. Flying foxes are also important for local tourism and forestry industries.

5.4 General key messages about flying-fox impacts

- Flying-foxes can impact people. The main impacts experienced by the community include smell, noise and droppings.
- Flying-foxes do not disperse to new areas during the day. If disturbed, they will only rise and resettle, and are likely to defecate and increase their noise levels as they move about.
- Like other animals, bats can carry diseases harmful to humans and animals. NSW Health takes the potential for disease seriously however the risk of disease is low if contact is avoided.
- Options to manage flying-fox impacts are subject to legal and ecological constraints. Attempts to move flying-foxes on are usually temporary, and may 'splinter' a colony into separate (more) camps.

6 Action Plan

TIMING	ITEM	AUDIENCE	ACTIVITY / MESSAGE	CHANNEL	RESPONSIBLE	✔
Prepare						
February 21	Draft newsletter content	All residents and businesses	• Engagement and FFMP processes, flying-foxes in Eurobodalla, environmental and community health, flying-fox management legal constraints, overview of Council and resident impact management, survey link	Newsletter	Margie / Alex	
February 26	Finalise newsletter content	All residents and businesses	• Arrange for newsletter copy to go into design template		Angie / Deb	
Late February – March	Book and undertake interviews	Government regulators Local government Experts / other land managers	• Develop outline of interview questions • Book and undertake interviews with experts to identify impact management regulatory parameters, decision-making considerations, and usefulness and replicability of decision support tool to other councils	Interview	Alex / Jess	
March 6	Councillor briefing	Eurobodalla Shire Council	• Engagement process, FFMP process, flying-fox impact management legal constraints	Briefing	Margie / Alex / Angie / Deb	
March 8	Draft Survey	All residents and businesses	• Introduction, values, interactions with flying-foxes, impacts experienced, sensitive locations, household attributes, management actions by individuals, preferred management actions by Council, interest in being involved in workshops, demographic attributes	Online survey	Alex	
March 14	Finalise survey	All residents and businesses			Alex / Angie / Deb	
Engage						
March 26	Newsletter	All residents and businesses	• Newsletter distribution commences	April-June Newsletter	Angie / Deb	

TIMING	ITEM	AUDIENCE	ACTIVITY / MESSAGE	CHANNEL	RESPONSIBLE	✔
	Email to key stakeholders	Sensitive receivers Community leaders/associations and interest groups Highly interested stakeholders Local Aboriginal Land Council	• Email newsletter communications with letter to stakeholders	Email	Alex / Margie	
	Council media release, social media updates, update website	All residents and businesses Media Politicians	• Distribute media release and social media posts promoting engagement process and survey • Update Council website with process diagram and link to survey	Council media release, social media posts, website update	Angie / Deb	
March 26 – end April	Survey live	All residents and businesses Sensitive receivers Community leaders/associations and interest groups Highly interested stakeholders	• Online survey live • Distribute hard copy survey at libraries, community centres, Council administration and customer service centres	Online survey	Alex / Angie	
Mid-April	Social media post	All residents and businesses	• Social media post to remind recipients survey is open • Based on survey response rate encourage participation	Council social media	Angie / Deb	
June	Identify participants and undertake workshops	Council staff	• Test draft decision support tool for alignment with operational requirements of Council divisions • Make adjustments to tool based on findings	1 x workshop	Angie / Deb / Jess / Alex	

TIMING	ITEM	AUDIENCE	ACTIVITY / MESSAGE	CHANNEL	RESPONSIBLE	✔
June	Identify participants and undertake targeted workshops	Residents and businesses Sensitive receivers Community leaders/associations and interest groups Highly interested stakeholders Coastal and Environmental Management Committee	• Test decision support tool triggers, scenarios and management actions	up to 5 x workshops	Jess / Alex / Angie / Deb	
By end June	Reporting	All	• Draft report on findings from interviews, survey and workshops, including high level summary of survey findings, and identifying how feedback informed draft FFMP content	Report Website	Alex / Margie	
By end June	Draft newsletter copy	All residents and businesses	• Invite comment on draft FFMP through public exhibition and include high level summary of survey findings • Newsletter distribution commences	July-September Newsletter	Alex / Margie / Angie / Deb	
	Email to key stakeholders	Sensitive receivers Community leaders/associations and interest groups Highly interested stakeholders	• Email newsletter communications to stakeholders	Email	Alex / Margie	
	Council media release, social media updates, and Council website update	All residents and businesses	• Distribute media release and social media post inviting comment on draft FFMP • Update Council website to include public exhibition and submissions portal, and upload report of findings from interviews, survey and workshops to Council website	Media release, social media, website update	Angie / Deb	
By end August	Public exhibition report	All residents and businesses	• Complete overall report integrating findings from interviews, survey and workshops with submissions analysis	Report	Margie / Alex	

Close the loop						
By end September	Council workshop	Council staff	• Reflect on what worked and what didn't from the engagement process, hand over decision-support tool and consider implications for ongoing engagement with community	Workshop	Margie / Alex / Angie / Deb	
	Councillor briefing	Eurobodalla Shire Council	• Briefing on how community feedback shaped FFMP	Briefing		
By September	Email to advise final FFMP	Submitters and key stakeholders	• Email report identifying how submissions informed final FFMP to stakeholders	Email	Margie / Alex / Angie / Deb	
By September	Draft Newsletter copy	All	• Advise endorsement of final FFMP • Newsletter distribution	October-December Newsletter	Angie / Deb	
By September	Media release, social media updates, and Council website update	All residents and businesses	• Draft media release and social media post advising endorsement of final FFMP • Update Council website to include overall report with public submissions analysis, and final FFMP	Media release, social media, website update	Angie / Deb	

Appendix A - Eurobodalla Community Engagement Planning Tool

Council's **Community Engagement Planning Tool** has been used in preparing this CSEP. The **score from the Tool is 13**, which means the project is at the **Involve** (Discuss) level of the IAP2 spectrum.

Question no.	Ranking	Description	Rationale
STEP 1: DETERMINE ENGAGEMENT LEVEL			
1. What are we planning to do?	3	Prepare the FFMP to manage flying-fox impacts on the Eurobodalla community.	It is a Plan of Management / Control plan
2. Is there a statutory requirement to engage?	No ranking required per framework	Preparing the FFMP is a statutory requirement of the Conservation Agreement. There is no statutory requirement to engage. The NSW Government strongly encourages councils to engage communities when preparing FFMPs.	Council recognises heightened community interest in managing flying-fox impacts and the importance of the community influencing how Council makes future decisions on flying-fox impact management through the FFMP.
3. Is there opportunity for the community to influence or have input into the decision-making?	No ranking required per framework	There is a desire to have the community influence Council's future decision-making on flying-fox impact management within legislative provisions.	Some aspects of Council decision-making on flying-fox impact management are subject to State and Commonwealth legal requirements for vulnerable species, for example, conditions under which dispersal activities can be undertaken.
4. Is this an operational decision?	No ranking required per framework	Not an operational decision, however Council has resolved to prepare the FFMP.	The FFMP may have implications for future operational decisions.
5. What is the aim of the engagement?	3	We will work with the community to ensure their values about flying-foxes and expectations regarding impact management are considered when developing the FFMP. *Justification* We do not believe we should be going to level 4 where we would be promising to partner with the community in each aspect of decision-making. This is because there are legal and ecological constraints (for example, under what circumstances dispersal can be undertaken) that constrain Council's decisions on impact management.	We will also be using aims from the 1 and 2 ranking: • providing the community with objective information about flying-foxes, impacts and management to help them understand what Council is doing and why by describing the problems, alternatives, opportunities and/or solutions. • obtaining community feedback on a proposal, analysis, alternatives and/or decisions, particularly feedback on the decision-support tool and submissions on the draft FFMP.
STEP 2: CONSIDER SOCIAL IMPACT *Consider the level of impact and key messages to share with the community. (reporting to include a section on social impact with any likely impacts, sensitivities and impact to community values or social wellbeing)*			
6. Are there any sensitivities associated with the project?	No ranking required per framework	Sensitivities associated with this project might include: • Political – the State MP for Bega has demonstrated interest in how Council manages flying-fox impacts • Media – there has been local media interest, for example, the major 2016 flying-fox influx and power outages • Environmental – there are potential environmental health implications of flying-fox impact management actions • Financial – there are potential financial costs associated with flying-fox impact management actions	

		• Safety – there are potential community health and safety implications of flying-fox impacts and management actions
7. Is there a potential impact to community values or social wellbeing?	No ranking required per framework	There is potential impact to community values and / or social wellbeing including: • Social impacts such as noise and odour from flying-foxes roosting across the LGA or smoke and noise from potential impact management actions • Economic impacts such as costs borne by the community and Council in managing impacts • Money / funding provision required by Council to implement management actions • Health of humans and animals across the LGA
8. How would you describe the (likely) impact	4	**Moderate – High** Moderate to significant impact on a section of, or the entire, LGA
STEP 3: CONSIDER STAKEHOLDERS		
9. Which stakeholders will we engage?	No ranking required per framework	All community members, including: • Residents and businesses • Environmental or local Interest and community groups • Visitors • Agencies and peak bodies • Council staff • Councillors • State MPs • Council committees • Funding providers • Media
10. What level of influence will stakeholders have on the decision?	3	Stakeholder views will be sought at multiple stages to inform progressive development of the FFMP. Council will consider community and stakeholder input, along with other relevant information such as technical research, legal, financial, social, and other short and long term implications to inform the management approach.
Have you considered any barriers that could limit people with disability from participating and taken action to remove those barriers where possible?	We will endeavour to ensure the online survey is accessible to screen readers, and to provide venues accessible to people with disabilities.	

STEP 4: DETERMINING ENGAGEMENT METHODS	
Overall ranking: *13 Involve (Discuss)*	Our promise to the public is to work with stakeholders to ensure their values and expectations are reflected in developing the FFMP, and provide feedback on how this input has influenced the FFMP. Council will design a participatory process to identify community values and expectations and ensure they are considered prior to decision-making. Techniques have been selected that are in keeping with the engagement level.

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Appendix 10 Community and stakeholder engagement report

Centre for
Local Government

Flying-fox Plan: Community and Stakeholder Engagement Report

Prepared for Eurobodalla Shire Council

Contents

Figures

Tables

Executive Summary

Ecosure engaged the University of Technology Sydney's Centre for Local Government (UTS:CLG) to deliver a stakeholder and community engagement process for Eurobodalla Shire Council, to inform a plan for managing flying-fox impacts across the entire Shire (the Plan), which Ecosure is preparing for Council.

Flying-foxes have known camps across Eurobodalla, and there may be other camps of which Council is unaware or that may establish in the future. Food resources are readily available in the Eurobodalla and flying-foxes will continue to return on a seasonal basis to forage. However, it is difficult to predict the numbers of returning flying-foxes, and impacts on the community are likely to continue. The uncertainty surrounding the spatial extent of potential future flying-fox impacts means it is important the Plan has a Shire-wide focus and the engagement process is designed to reflect this.

This report documents findings of the engagement process, which included interviews with key stakeholders, an online survey open to the entire Eurobodalla community, and targeted workshops with community members and key stakeholders. Feedback received will be reflected in the Plan to ensure impacts experienced most intensely by the community are the priority for Council's management responses. Feedback will help identify preferred principles for future management actions that align with community values, feasible costs, animal welfare and conservation and community health.

Interviews

Five, one-hour phone interviews were conducted with academic experts on flying-foxes, State and Commonwealth agencies responsible for regulating flying-foxes, and a representative of other councils across NSW at which flying-foxes are present.

The purpose of the interviews was to understand the latest research on flying-foxes and approaches to managing impacts, test the concept of a 'Decision Support Tool' that would establish triggers for how and when Council responds to flying-fox impacts, understand the usefulness of this tool for other councils, and any regulatory considerations the tool needs to incorporate.

Overall, all stakeholders were supportive of the development of a decision support tool and stated that there are a number of considerations to be made specifically around quantitative metrics and measurements, spatial representation of the tool, community awareness and communication and potential management actions.

Key findings included:

1. The potential exists for Council to develop a new and innovative approach to managing flying-fox impacts and other councils expressed strong interest in the results of this approach.
2. Quantitative triggers could be determined for impacts, especially noise and potentially odour for which there are accepted thresholds and standards, although this would require further technical studies. For example, experts indicated wind, rain, humidity levels, terrain and other environmental features can all change whether and how intensely impacts are experienced.
3. Different people have different levels of tolerance and sensitivity to impacts and experience them differently. Therefore, community feedback is an ap propriate trigger for action but requires further testing of the process for action.

4. Making any Decision Support Tool publicly available to help educate the community on Council's decision-making process for management action, including what would happen if there is no trigger but the community demands action.

Online survey

A community online survey was designed and analysed by UTS:CLG's survey experts, building on previous surveys about flying-fox impacts used by Eurobodalla and other NSW councils as well as other levels of government. The survey was designed to understand people's awareness, knowledge and attitudes toward flying-foxes, the impacts they experience from flying-foxes and actions they take to manage these, and preferences for future impact management actions.

The survey was open throughout April 2018, following an invitation to all community members to participate via Council's quarterly Shire-wide *Living in Eurobodalla* newsletter, as well as on Council's social media and website, local radio, and letterbox drops to Catalina and Bay residents. Hard copy surveys were made available at key locations including community centres, Council libraries and drop in sessions.

An open online survey is an appropriate method as it provides an opportunity for all community members that may be impacted in the future, not just those that are currently impacted, to input into the Plan's development.

However, a key limitation of this method is that self-selected participation means it is more likely people that have previously experienced impacts will participate. To help increase participation by those who have not previously experienced impacts, but could in the future, a prize draw for completing the survey was offered. The survey was also used as the recruiting method for targeted workshops with community members and respondents were able to nominate at the end of the survey whether they would like to participate in further face-to-face discussions about flying-foxes.

Survey respondents

A total of 492 responses were received, of which 459 (93%) came from residents and the remainder from businesses. This response rate provides a confidence level of 95% at an interval of 4.39, which is a robust basis for social research of this kind. This means that, if the survey was repeated 100 times, we can be sure that 95 of those surveys would return results within plus or minus 4.39% of the findings contained in this report.

Responses were received from 38 suburbs across the Shire. Almost two thirds (n=316, 64%) were from the northern part of the Shire. The suburbs of Batemans Bay (n=67, 14%) and Catalina (n=49, 10%), where there are known camps, received the highest number of responses at the suburb level. A total of 75 respondents indicated they lived within 300 metres of a camp, most of whom (n=63) lived near a camp in the northern part of the Shire. A further 74 respondents indicated flying-foxes roost in trees within 50 metres of their home or business during the day and, again, most of these respondents came from the north of the Shire (n=60).

The highest proportion of responses came from people aged 56 to 65 (30%), with a fairly even proportion from those aged 36 to 45, 46 to 55, and 66 to 75 (all 18%). There was also an unusually high response rate from females, who made up over 60% of respondents in almost all age categories, which provides some insights into some of the findings. For example environmental attitude surveys, such as *Who Cares About the Environment in NSW?,* have consistently found females display higher levels of concern for issues such as animal welfare and conservation and the intersection between the environment and community health outcomes. The online survey generated similar results.

Awareness and knowledge of flying-foxes

Almost two thirds of respondents (n=310, 65%) indicated they had received information about flying-foxes from Council, mostly through the *Living in Eurobodalla* newsletter (31%), social media (26%), Council's website (22%) and the local newsletter (20%).

Almost all reported they are aware flying-foxes are a protected species under legislation (95%), that the risk of disease transmission can be managed by not handling flying-foxes and appropriate animal husbandry (82%), and that flying-foxes play a critical role in seed dispersal and pollination (80%).

These are all pieces of information that Council has communicated to the community through various media including the *Living in Eurobodalla* newsletter, Council's website, and fact sheets. However, almost a third (29%) indicated they were not aware that population numbers for the grey-headed flying-fox (the main species that visits Eurobodalla) is in decline, which Council has also communicated to the community through its media.

These findings indicate the community is receiving and listening to the information Council is providing about flying-foxes.

Attitudes towards flying-foxes

Survey respondents were presented with a series of attitudinal statements and asked to indicate their level of agreement or disagreement with them (from strongly agree/disagree, agree/disagree, or neither agree nor disagree). These statements were framed both positively and negatively and randomly rotated in the question bank to avoid bias, as is best practice in survey design.

Over one third agreed or strongly agreed flying-foxes should be moved on permanently from Eurobodalla (34%). A similar proportion agreed or strongly agreed flying-foxes should not be listed as threatened species with legal protection (35%), whilst a higher proportion disagreed or strongly disagreed they are concerned that flying-fox numbers are declining (45%).

In contrast, half disagreed or strongly disagreed flying-foxes should be permanently removed from Eurobodalla (50%), just under half disagreed or strongly disagreed flying-foxes should not be listed as a threatened species with legal protection (44%), over half agreed or strongly agreed flying-foxes are important to improving the health and diversity of native forests (52%), whilst a lower proportion agreed or strongly agreed they are concerned flying-fox numbers are declining (34%).

Significantly, over half agreed or strongly agreed they are concerned about the risk of disease to humans from flying-foxes (57%), flying-foxes contaminating water supplies (59%), and the risk of disease to other animals (51%). These had some of the highest levels of agreement across all the attitudinal statements, and were confirmed through the targeted workshops where participants expressed strong concern about the potential for community health impacts.

These findings indicate about a third of the community hold consistently negative attitudes towards flying-foxes, and about half hold consistently positive attitudes. Levels of agreement and disagreement tended to be higher for respondents living or working within 300 metres of a camp than those living or working further away.

Flying-fox impacts

Over two thirds of respondents (68%) indicated they have been impacted by flying-foxes in the past, and just over a third (37%) indicated they were experiencing impacts at the time of the survey. People living within 300 metres of a camp were much more likely to report they were currently experiencing impacts at the time of the survey (76%). Of those that indicated flying-foxes have impacted them at some point in time but not at the time of the survey, over half experienced impacts in summer or autumn (both 29%).

These findings indicate most of the community is impacted by flying-foxes, regardless of how close they live to a camp, and these impacts are experienced at particular times of the year.

The survey found a clear hierarchy of impacts the community is concerned about. The levels of concern reported below are for those people that indicated they live further than 300 metres from a camp, as they made up the vast majority of respondents.

Impacts of most concern included:

- Noise (68%), faecal droppings (54%), and smell (53%)

Followed by:

- Damage to infrastructure such as power lines (37%), risk of disease (33%), and damage to vegetation from flying-foxes roosting in trees (31%)

Impacts of least concern included:

- Flying-foxes eating fruit and flowers (23%), inability to access areas where flying-foxes camp (22%), and aircraft strikes (19%)

People living within 300 metres of a camp reported much higher levels of concern about these impacts. The hierarchy of impacts was generally the same for people living within 300 metres of a camp and those living further away, although those living within 300 metres indicated much higher levels of concern about the risk of disease transmission.

Overall, there were more significant differences in levels of concern between those living within 300 metres or 50 metres of a camp, and those living further away. For example, people living within 300 metres and 50 metres of a camp reported similar levels of concern about the risk of disease (76% and 74%, respectively), which was much higher than those further away (53%). Similarly, people living within 300 metres and 50 metres of a camp reported similar levels of concern about flying-foxes contaminating water supplies (84% and 77%, respectively) although, again, this was much higher than those further away (54%).

This indicates the hierarchy of impacts about which the community are concerned is consistent across the Shire.

It also indicates relative proximity to a flying-fox camp does not significantly change people's concern about impacts. That is, people living 300 metres and 50 metres from a camp have similar levels of concern, although this is much higher than those living further away.

Therefore, concern for impacts does not automatically increase as people live closer and closer to a camp. Rather, the more significant difference is between people that live in the general proximity of a camp and those that do not.

Managing flying-fox impacts

Respondents were asked whether they or Council have done anything to reduce the flying-fox impacts they experience. Almost half (47%) indicated this was the case whilst a third (33%) indicated they or Council have not done anything.

Clearing vegetation (33%), dispersal (17%), and education (15%) were the most common management actions mentioned by respondents, and almost half (47%) indicated these were effective at reducing impacts. Clearing vegetation and removing food sources were considered particularly effective (32%).

This indicates there is scope to improve community understanding of what Council is doing to manage impacts and educate the community on actions that individuals and Council can take. For example, whilst there are high levels of concern over the potential for water contamination, and just under half the respondents have a water tank (40%), over half of these property owners have not installed a filter or first flush system on their tank (55%).

Respondents were asked their preferences regarding future impact management actions, which can then establish principles that underpin Council's future approach. Of greatest importance to the community is that future impact management actions provide a long-term solution (79% extremely or very important), ensure the risk of disease transmission stays low (73% extremely or very important), reduce noise and odour impacts on nearby residents and businesses (72% extremely or very important), do not move flying-fox camps to sites near other residents or businesses (68% extremely or very important), and do not degrade the natural values of a site (64% extremely or very important).

Of next greatest importance is that future impact management actions can be implemented quickly (56% extremely or very important), have a low financial cost to residents and businesses near camps (52% extremely or very important), do not harm the flying-foxes (50% extremely or very important), do not have a negative impact on how the site looks or recreation opportunities (49% extremely or very important), and have a low financial cost to ratepayers (43% extremely or very important).

Targeted Workshops

After the survey, four targeted workshops were undertaken with community members and stakeholders. A UTS:CLG engagement specialist facilitated the groups and was supported by a flying-fox expert from Ecosure, the environmental consultancy preparing the Plan on behalf of Council. Note that invitations were extended to stakeholders beyond those shown in the table below. Some were unable to attend or did not respond to the invitation.

Group 1	Group 2	Group 3	Group 4
Residents that indicated flying-foxes were impacting them at the time of the survey	Residents that indicated they were not impacted by flying-foxes at the time of the survey	Local community and environment organisation representatives and members of some of Council's advisory committees	Stakeholders that may be particularly sensitive to impacts, such as businesses located close to camps, infrastructure providers, and the aviation, commercial food, and animal industries

The purpose of these workshops was to provide further insights into the survey findings, seek feedback on Council's current and future approach to impact management, and test key issues

identified through the interviews such as the appropriate threshold for community feedback as part of the Decision Support Tool. Overall, there was a high degree of commonality in the range of views expressed across the groups, although each one emphasised slightly different issues.

Key findings included:

1. Participants expressed the need for Council to build community resilience and capacity to manage future flying-fox impacts in the short term through education, whilst also working towards a long-term environmental management and land use planning solution that moves flying-foxes out of Eurobodalla's urban areas.
2. The participants indicated they strongly value the ecosystem services and natural spectacle flying-foxes provide and would prefer they remain in Eurobodalla, though not close to urban areas.
3. Whilst few respondents to the online survey indicated flying-foxes are a tourism asset for the area, workshop participants identified several nature based tourism opportunities, as well as other initiatives with local community and environmental organisations, such as a flying-fox hospital or centre of excellence for flying-fox research.
4. The participants expressed the wish for a proactive management approach that monitors flying-fox food sources, updates the community on the potential for elevated population numbers, and provides practical advice on what the community do to manage impacts they may experience.
5. The impacts of most concern are community health and odour, and there is general uncertainty and a feeling of helplessness over how these could be managed. Participants indicated that odour impacts are experienced more intensely during periods of rain or high humidity. Whilst the online survey found noise was the impact of most concern, workshop participants indicated noise is generally confined to the fly in and fly out periods at dusk and dawn and can be managed more easily than odour.
6. The participants expressed the view that community feedback at the neighbourhood scale is an appropriate trigger for monitoring, and that Council should then undertake management actions appropriate to the monitoring results.
7. Commercial businesses and service providers experience different impacts to the general community but are uncertain of what action they can take to feasibly manage these. An intensive case management approach in which Council collaborates with these businesses and service providers to develop tailored impact management strategies is preferred. Some businesses and service providers report their current impact management strategies are working well.
8. Commercial businesses and service providers reported uncertainty over which level of government is responsible for regulating flying-foxes. Some businesses and service providers expressed frustration they were prevented from undertaking certain management actions on their own property. However, they were not aware this was because of the species' listing as vulnerable under national environmental legislation.

1 Introduction

Flying-foxes have known camps across Eurobodalla Shire. Other camps might exist of which Council is unaware and others might establish in the future. Food resources ae readily available in the Eurobodalla and flying-foxes will continue to return on a seasonable basis to forage. However, it is difficult to predict the numbers and possible new camp locations of returning flying-foxes, and impacts on the community are likely to continue.

Eurobodalla Shire Council (Council) has committed to preparing a Shire-wide Flying-fox Plan (the Plan) to assist Council to respond to the impacts of flying-foxes on the community. The Plan is a condition of a Conservation Agreement with the Australian Government, in accordance with the Batemans Bay Flying-fox Camp Dispersal Plan 2016-2019, and is being prepared with funding from the NSW and Australian Governments. The Plan will assist Council to make decisions and to respond to impacts based on a range of factors, including community values, legal, ecological and financial considerations.

As Council's consultant to prepare the Plan, Ecosure has engaged UTS:CLG to undertake community engagement to inform the development of the Plan and to ensure that all community members (whether they have been previously impacted or not) have the opportunity to influence how flying-fox impact management decisions are made in the future. The engagement included interviews with experts, regulators and other councils, an online survey, and targeted workshops with community members. This report outlines key findings of the interviews, survey and targeted workshops.

Interviews were conducted with academic experts in flying-foxes, State and Commonwealth agencies responsible for regulating flying-foxes and a representative of other councils across NSW in which flying-foxes are present. The purpose of these interviews was to understand the latest research on flying-foxes and approaches to managing impacts, test the concept of a 'Decision Support Tool' establishing triggers, thresholds and actions for Council to respond when managing future impacts, understand the usefulness of this Tool to other councils, and any regulatory considerations the Tool needs to incorporate.

The survey was designed by UTS:CLG's survey experts to capture Shire-wide input, to focus the draft Plan on the impacts that the community experiences most intensely and help shape management responses to these. The purpose of the survey was to understand people's awareness, knowledge and attitudes toward flying-foxes, the impacts they experience from flying-foxes, actions they take to manage these and preferences for future impact management actions.

An open online survey is an appropriate method, as it provides an opportunity for all community members that may be impacted in the future, not just those that are currently impacted, to input into the Plan's development. However, a key limitation of this method is that self-selected participation means it is more likely people that have previously experienced flying-fox impacts will participate. The survey was open for responses throughout April 2018, and received 492 responses.

After the survey, four targeted workshops were undertaken with community members and stakeholders. Each group was held at Council's premises in Moruya, went for between one and a half and two hours, and included between five and ten participants. Participants for the resident groups were recruited through the survey whilst participants for the community and environmental organisations and sensitive receiver groups were identified through a stakeholder analysis, in collaboration with Council. A UTS:CLG engagement specialist facilitated the groups and was supported by a flying-fox expert from Ecosure. The purpose of these workshops was to provide further insights into the survey findings, seek feedback on Council's current and future

approach to impact management, and test key issues identified through the interviews, such as the appropriate threshold for community feedback as part of the Decision Support Tool.

2 Interviews

2.1 Introduction

Five, one-hour phone interviews were conducted with academic experts in flying-foxes, State and Commonwealth agencies responsible for regulating flying-foxes, and a representative of other councils across NSW in which flying-foxes are present.

The purpose of the interviews was to understand the latest research on flying-foxes and approaches to managing impacts, test the concept of a 'Decision Support Tool' establishing triggers, thresholds and actions for Council to respond when managing future impacts, understand the usefulness of this Tool to other councils, and any regulatory considerations the Tool needs to incorporate.

2.2 Key observations

Interviewees indicated Eurobodalla Shire Council is well placed to develop a new and innovative approach to managing flying-fox impacts in the future given its experience with flying-foxes. In large part the interviews focused on the appropriateness of different impact triggers, such as noise levels, and thresholds for responding, such as a certain decibel level being reached. Interviewees indicated establishing thresholds for action would be a highly technical task with the potential for disagreement between experts involved in studies conducted to determine threshold levels.

Interviewees also noted people have different levels of tolerance and sensitivity to impacts and therefore perceive and experience them differently. For example, elevated noise during the day may be more unpleasant for shift workers than for people who are not at home during the day. Because of this, interviewees suggested community feedback is an appropriate trigger for considering action, as it accounts for different levels of tolerance and sensitivity to impacts that occur naturally across the community.

Interviewees also cautioned that it would be unfeasible for Council to respond to every piece of community feedback and that, once a threshold is established, it would need to be matched with data supporting the likelihood that increased impacts are being experienced, such as an increase in the flying-fox population potentially resulting in elevated noise levels.

3 Survey

3.1 Introduction

An online survey was designed and analysed by UTS:CLG's survey experts, building on previous surveys about flying-fox impacts used by other NSW councils as well as other levels of government. The survey was designed to understand people's awareness, knowledge and attitudes toward flying-foxes, the impacts they experience from flying-foxes and actions they take to manage these, and preferences for future impact management actions.

The survey was open throughout April 2018 following an invitation to all community members to participate, via Council's quarterly Shire-wide *Living in Eurobodalla* newsletter as well as on Council's social media and website, local radio, and letterbox drops to residents in close proximity to known camps. Hard copy surveys were made available at key locations including community centres and Council libraries, as well as drop in sessions. Given that the spatial focus of the Plan is Shire-wide, an open online survey is an appropriate method, as it provides an opportunity for all community members, not just those that are currently impacted, to input into the Plan's development.

However, a key limitation of this method is that self-selected participation means it is more likely people that have experienced impacts will participate. To help increase participation by those who have not experienced impacts, but could in the future, a prize draw for completing the survey was offered. The survey was also used as the recruiting method for targeted workshops with community members - respondents were able to nominate at the end of the survey whether they would like to participate in further face-to-face discussions about flying-foxes.

An online survey has the potential to be skewed to younger groups, given the lower likelihood of older people using this technology. The advantages of collecting data in this way include low cost, speed in collecting and analysing data and questionnaire design with functionalities that are more difficult to achieve with traditional modes. Online surveys are, therefore, a cost effective way to gauge community opinion.

The 492 survey responses came from 314 females (64%), 153 males (31%), and a further 25 (5%) that preferred not to say. This response rate provides statistical confidence in the findings of 95% at an interval of 4.39. This means that, if the survey was repeated 100 times, we can be sure that 95 of those surveys would return results within plus or minus 4.39% of the findings contained in this report.

The age distribution of respondents was slightly lower than Eurobodalla's Census profile in younger and older age groups, whilst there was some over representation in the 36 to 65 year old age groups. There was also an unusually high response rate from females, who made up over 60% of respondents in almost all age categories, which provides some insights into some of the findings. For example environmental attitude surveys, such as *Who Cares About the Environment in NSW?,* have consistently found females display higher levels of concern for issues such as animal welfare and conservation and the intersection between the environment and community health outcomes.

Data were analysed in the SPSS system using nonparametric tests. This testing approach related to the particular data collected in this survey, which was structured in ordered categories (e.g. levels of agreement or concern). The Mann-Whitney U test was selected as the most appropriate for this type of data, to test statistical differences between groups on issues of concern regarding flying-foxes and their impacts. This method compares two particular groups and their differences.

At the request of Council, some analysis was undertaken using suburb groupings (see Appendix 3). These also were analysed for statistically significant differences using a similar but different test, the Kruskall-Wallis H test. This was appropriate in this case as the independent variable, suburb groups, had three rather than two separate groups.

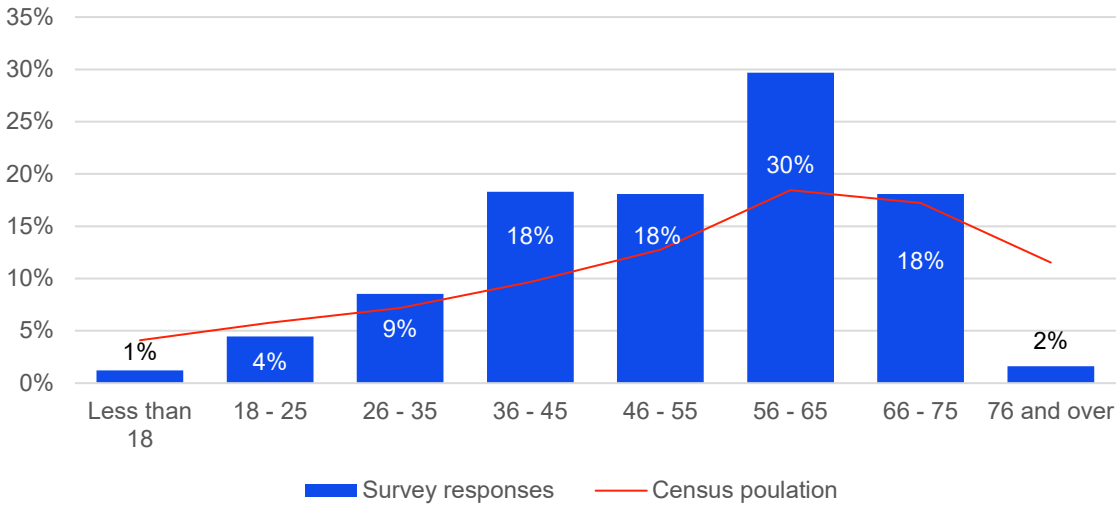
3.2 Key observations

3.2.1 Respondent characteristics

The survey was completed by 314 females (64%), 153 males (31%) with a further 25 (5%) preferring not to say. The age distribution was slightly lower than the census population in younger groups, especially less than 18 years. There was a higher proportion of respondents from the 36 - 65 year old age groups than the proportion of those age groups in the Shire's population. While representation in the 56 – 65 year age group was what would be expected there was under-representation in those over 75 years.

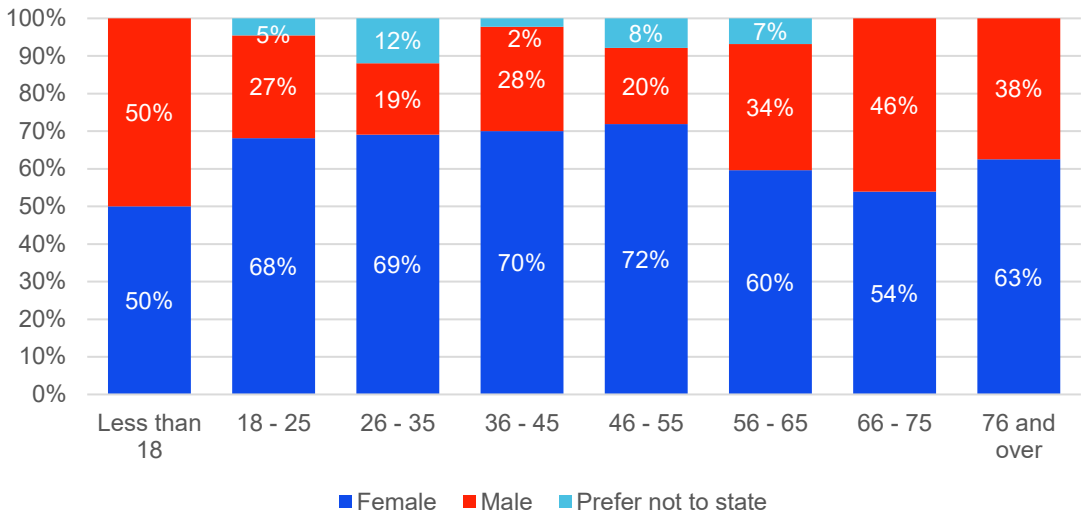
Figures 1 and 2 provide demographic breakdowns of the sample.

Figure 1: Age and gender of respondents



** Note the 2016 Census figures are approximate as they don't exactly match the age groupings sourced from ABS Tablebuilder.*

Figure 2: Age group by gender



Responses included representation of 38 suburbs in the area. Suburbs were divided into three areas: North, Mid and South. Almost two thirds were from the northern part of the Shire (n=316, 64%). The suburbs of Batemans Bay (n=67, 14%) and Catalina (n=49, 10%), where there are two large known camps, received the highest number of responses at the suburb level.

Table 1: Residential/business location of respondents

Suburb group	Number of responses	Percentage of all respondents
North	316	64.2%
Mid	99	20.1%
South	65	13.2%
Other	12	2.4%
Total	492	100%

Of all respondents, 459 (93%) described themselves as residents of Eurobodalla Shire. Forty respondents were business owners or representatives, of whom 28 were also residents of the Shire.

Table 2: Resident of Eurobodalla/ Business owner or representative

	Resident of Eurobodalla	Business owner or representative	Total
Resident of Eurobodalla	431	28	459
Other	20	12	32
Total	451	40	491

**One respondent did not answer this question*

11% of respondents (54 in number, ie n=54) said they were members of local community groups or associations. 49 of these provided the names of association. 3% (n=13) of respondents said they were members of environmental groups - mostly Landcare. A further 19 respondents described themselves in other ways, usually non-residents or those intending to become so.

Table 3: Member of local group or association

	Number of responses	Percentage of all respondents
Member of local community group or association	54	11%
Member of local environmental group or association	13	3%
Other	19	4%

Residents associations in various localities accounted for around 15 of these responses while others included sports clubs, business centred organisations and wildlife groups.

A full list is provided in Appendix 1.

3.2.2 Proximity to flying-foxes

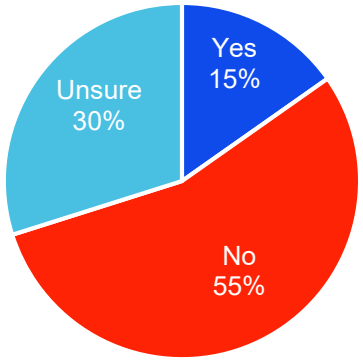
At least 420 respondents (85%) answered yes to at least one of the questions testing how close they are to a flying-fox camp and the extent of interaction with flying-foxes at their home or business environments. Almost a third indicated they live or work within 2 kilometres of a flying-fox camp, and about half of these are within 50 metres. Over half the respondents indicated flying-foxes feed in trees in their yard or fly over their home or business. A small proportion (6%) indicated flying-foxes are a nuisance that stop them from using services and businesses.

Table 4: Q3 Please indicate which of the following apply to you

	Number	Percent
Flying-foxes roost during the day in trees very close to my home (within 50 m)	55	11.2%
Flying-foxes roost during the day in trees very close to my business (within 50 m)	22	4.5%
Flying-foxes roost during the day in trees in my local area (50 m to 2km)	94	19.1%
Flying-foxes feed in trees at night in my yard	222	45.1%
Flying-foxes fly over my home or business	280	56.9%
Flying-foxes stop me from using services and businesses in the area	32	6.5%

Figure 3: Q4 Do you live within 300 m of a flying-fox camp (where they roost)?

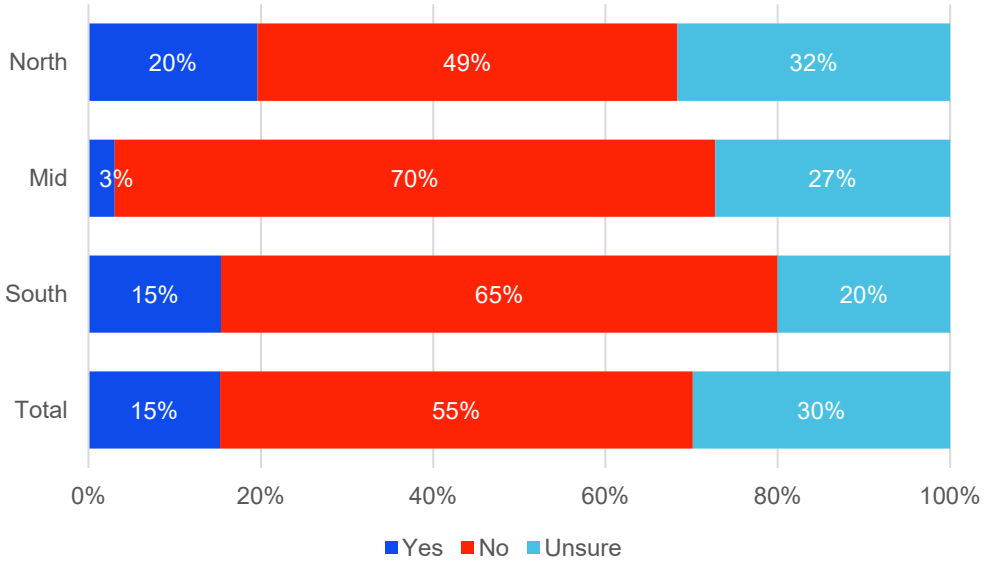
Just over half the respondents (n=270, 55%) indicated they live further than 300 metres from a flying-fox camp, whilst about 15% (n=75) stated they live within 300metres, and a further 30% (n=147) were unsure.



When broken down by suburb groupings, North had a higher proportion of yes responses to this question, totalling 62 of 316. Suburbs in the areas that had known camps showed much higher yes responses: Batemans Bay (57%) and Catalina (29%). A full list of the suburb groupings is shown in Appendix 3.

Awareness of proximity to camps was low in the Mid suburbs, where there are known camps at Moruya Heads and one in Moruya that is small and probably not known to many residents. Only one respondent out of 28 surveyed answered yes to this question. There were 15% (n=10) yes responses in suburbs grouped in the south area. Camps are known to exist in Narooma (n=2, 14% yes responses) and Tuross Head (n=8, 27% yes responses).

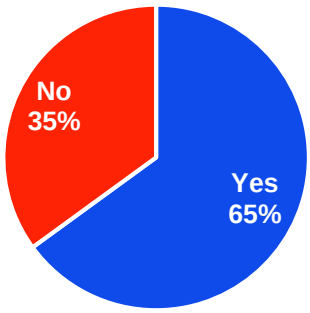
Figure 4: Do you live within 300 m of a flying-fox camp (where they roost)?



** Other (n-12) that do not have a residence or business within any suburb groups have been excluded. See Appendix 3 for a list of these places.*

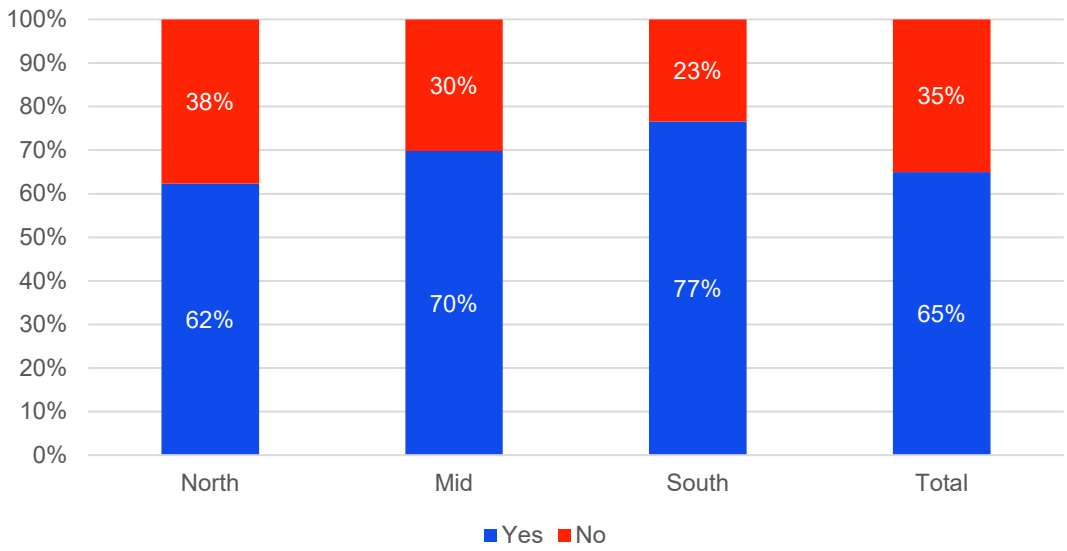
3.2.3 Awareness of flying-foxes

Figure 5: Q5 Have you recently seen any information from Eurobodalla Council regarding flying-foxes?



Around two thirds of respondents (n=310) indicated they had recently seen information from Eurobodalla Council. Others, i.e. those who are not resident within Eurobodalla Shire (n=12), have been excluded from the chart (see Appendix 2).

Figure 6: Have you recently seen any information from Eurobodalla Council regarding flying-foxes? Suburb grouping



The table below shows the main source of this information mentioned by respondents. The percentages shown relate to respondents who mentioned this as this was a multi-response question.

Table 5: Q6 Please specify where you saw this information (please select all that apply)

Place where information was seen	Number	Percent
Living in Eurobodalla - Council newsletter	154	31.3%
Council website	108	22.0%
Local newspaper	99	20.1%
Council Facebook or Instagram	82	16.7%
Council News - email newsletter	60	12.2%
Other social media	49	10.0%
Other (please specify)	26	5.3%

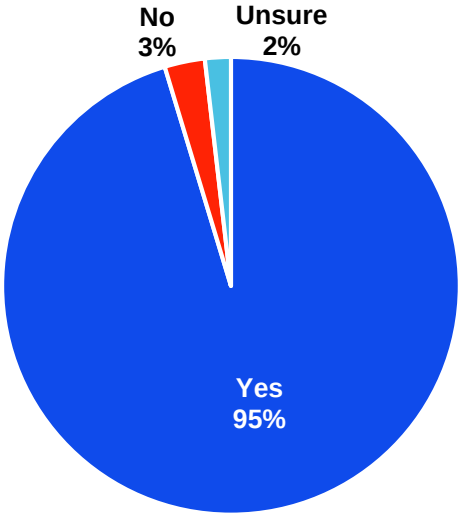
Other sources of information mentioned by respondents are set out in the table below. The most common source was a letter from the Council.

Table 6: Other place where respondent saw information

Other place where saw information	Number of respondents
Council letter	1
letter box drop Flying-fox update 23/03/2018	1
Letter dropped into work place	1
letter from council	1
Letter from council as I filled out the last survey and ticked updates.	1
Letter in mail	1
letter received in post to business address	1
mailer to residence	1
council letterbox pamphlet	1
art on the path, Broulee	1
Corrigans Beach Rep.	1
Direct contact through Landcare activities	1
Directly from Batman (Mitchell)	1
Durras Community Association	1
fact sheets given to me when Council had a stand at Stocklands re then revised dog walking areas	1
Information day at NATA oval	1
… from Melbourne Uni came to my home on December 11. And I did a questionnaire on the flying-foxes and she gave. Me lots of information about them. Also on Facebook local Batemans Bay site. People were very rude and insulting that I supported the flying-foxes.	1
Local radio	1

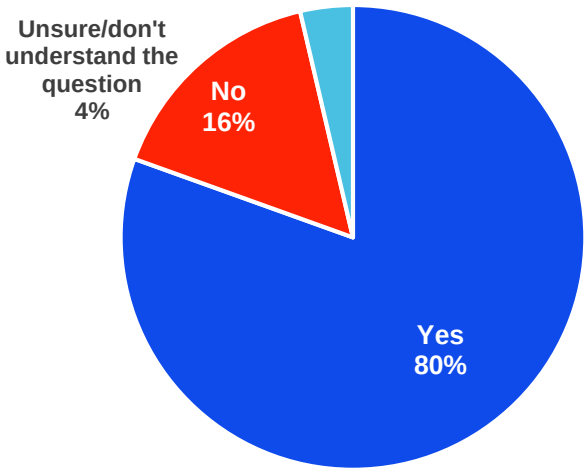
Meeting with Council reps	1
Talking with friends	1
Village information Morning	1
Watch them Fly!	1
web sites providing flying-fox articles	1
When we were looking to move here from Braidwood	1
work colleagues ESC	1

Figure 7: Q7 Do you know that flying-foxes are a native species, protected under legislation?



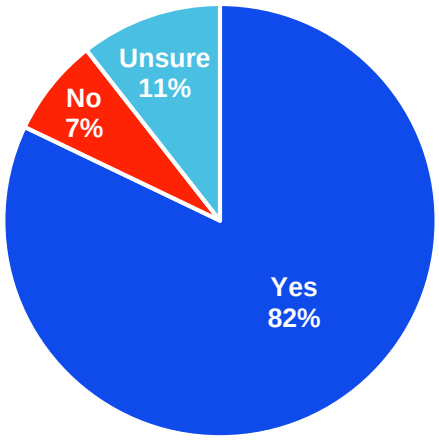
A large majority of respondents were aware of the protected status of flying-foxes as Australian native wildlife.

Figure 8: Q9 Do you know flying-foxes are critical to long-distance seed dispersal and pollination, and the long-term health of our environment and our natural areas?



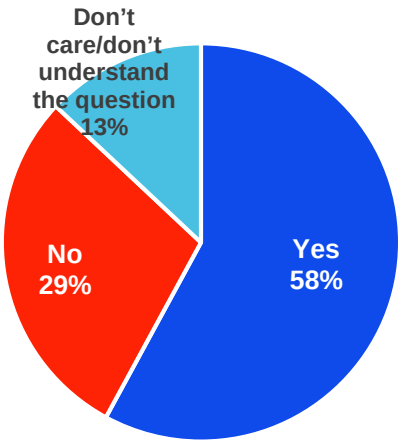
A large majority of respondents were also aware of the value that flying-foxes play in the environment.

Figure 9: Q9 Do you know that diseases from flying-foxes can be prevented by not handling them, and appropriate horse husbandry?



82% of respondents were aware that potential diseases from flying-foxes could be controlled with appropriate animal husbandry and avoiding handling them.

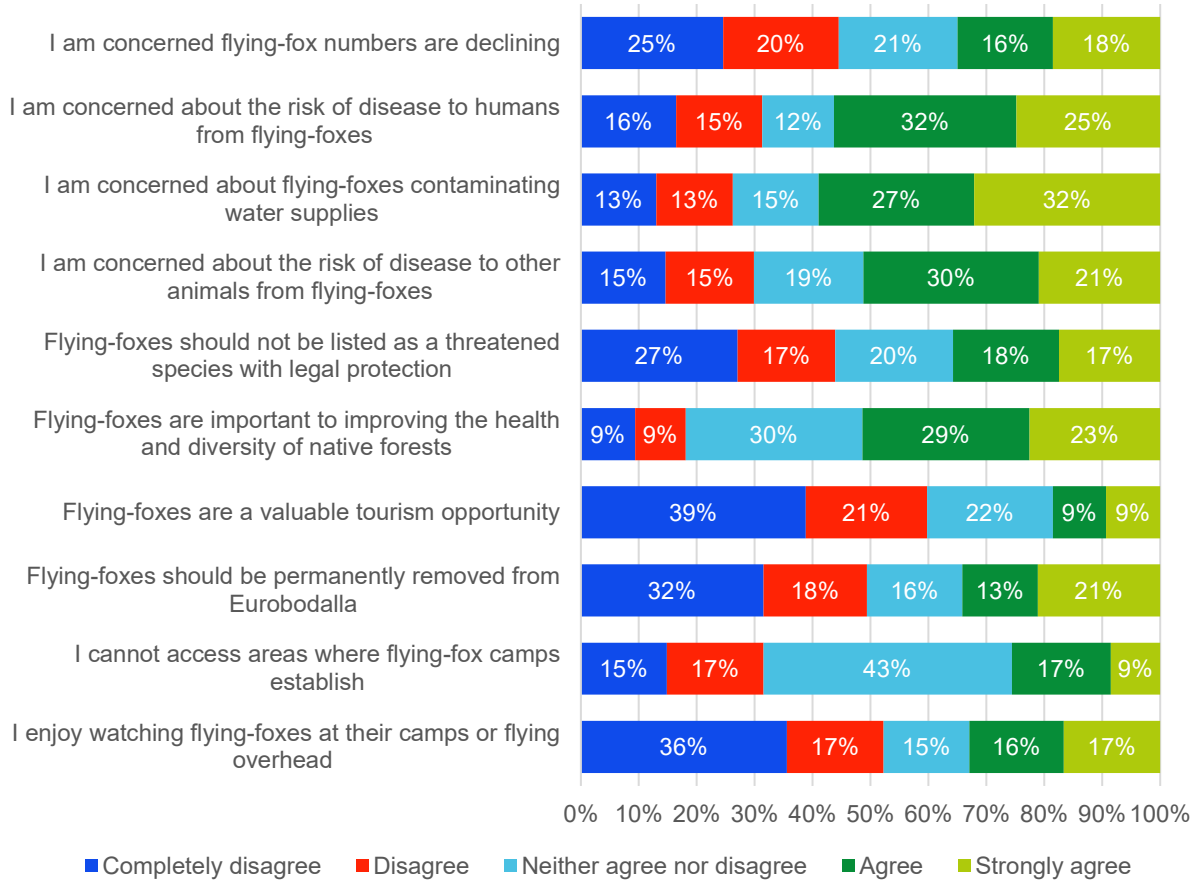
Figure 10: Q10 Do you know that the grey-headed flying-fox (the main species of flying-fox that visits the Eurobodalla area) is a threatened species due to population decline of more than 30%?



A lesser number of respondents (but still a majority) was aware that the main species of flying-fox present in Eurobodalla is in significant population decline.

3.2.4 Concerns about flying-foxes

Figure 11: Q11 Now, we would like to ask you about your concerns with flying-foxes. Please indicate your level of agreement or disagreement with each of the following statements:



This question sought respondents' level of agreement or disagreement with a range of statements. The figure above shows that the strongest levels of agreement about concerns with flying-foxes were:

- Contamination of water supplies – a total of 59% agreed or strongly agreed.
- Risk of disease to humans – a total of 57% agreed or strongly agreed.
- Risk of disease to other animals – a total of 51% agreed or strongly agreed.
- Over half (52%) agreed or strongly agree that the species was important in improving the health and diversity of native forests.
- There was a high level of disagreement with the idea that they represented a valuable tourism opportunity – 60% disagreed or strongly disagreed that they did.
- Half disagreed that they should be permanently removed from Eurobodalla. While 13% agreed and 21% strongly agreed that they should.
- A total of 53% disagreed that they enjoyed watching them either at their camps or flying overhead.

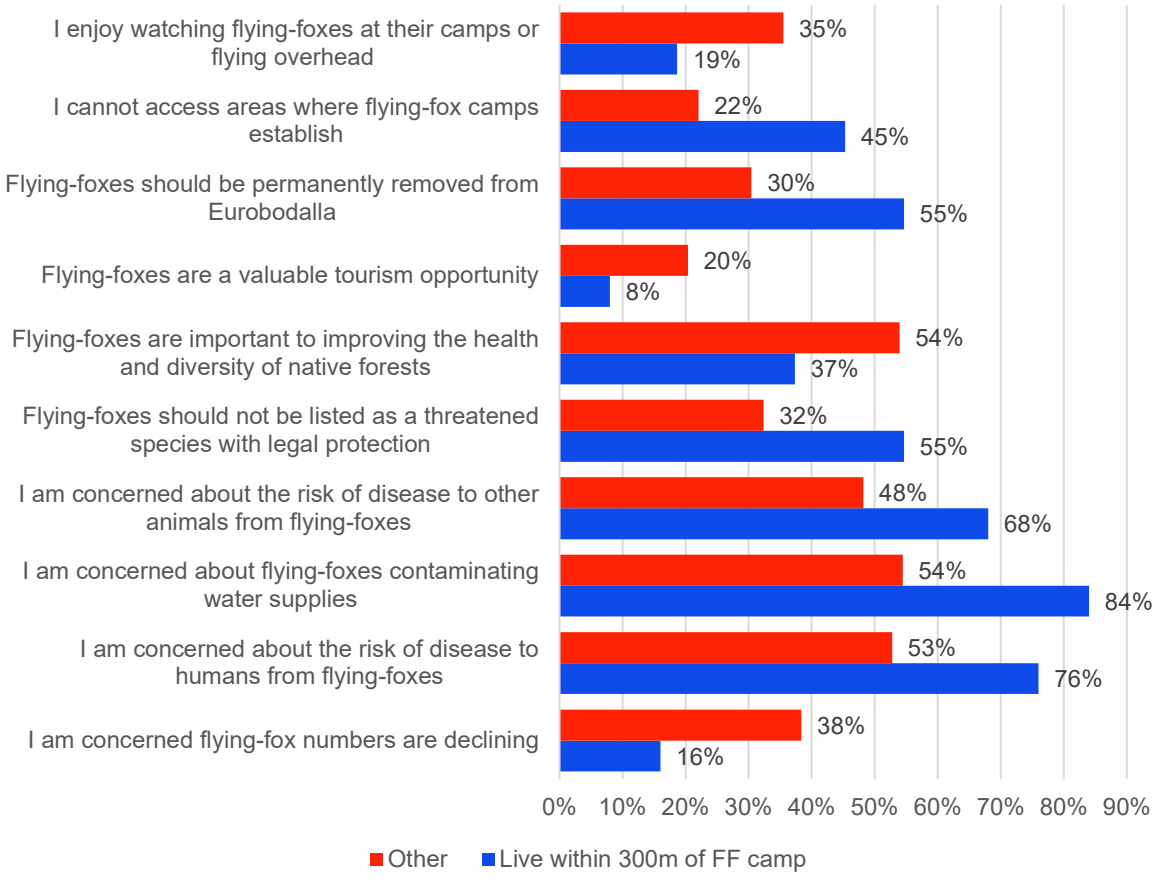
Those living within a closer proximity to flying-fox camps tend to have a more negative view of flying-foxes.

Concerns are particularly high in relation to water supply contamination. Of those who lived within 300 metres of a camp, 84% agreed or strongly agreed this was a concern compared with 54% who lived further away.

Concern was also higher with this group in relation to risk of disease to animals and humans.

Those living in closer proximity were also less concerned about declining numbers (16% compared with 38% for others), were more likely to think they should not have legal protection (55% compared with 32% for others) and more inclined to agree they should be permanently removed form Eurobodalla (55% compared with 30% for others). “Others” includes those not living within 300 metres of a camp and those who don’t know their proximity to a camp.

Figure 12: Comparison between those living within 300 metres of a flying-fox camp and all others. Percentage who agree or strongly agree with the statements



Similar higher levels of concern were expressed by those who lived or were at a business within 50 metres of trees where flying-foxes roosted during the day. For this group, concerns were higher concerning water supplies: 77% agreed or strongly agreed this was a concern compared with 56% for all others. The spread of disease to humans rated as a higher concern (74% v 53%), as did the risk of spread of disease to other animals (66% v 49%).

On both measures, greater proximity appeared to have a negative impact on the way people viewed flying-foxes. People who lived or worked in closer proximity tended to agree with permanent removal and appeared to have a more negative view on their value to the environment.

Figure 13: Comparison between agree/strongly agree between roosting within 50 metres of house or business during day and all other respondents

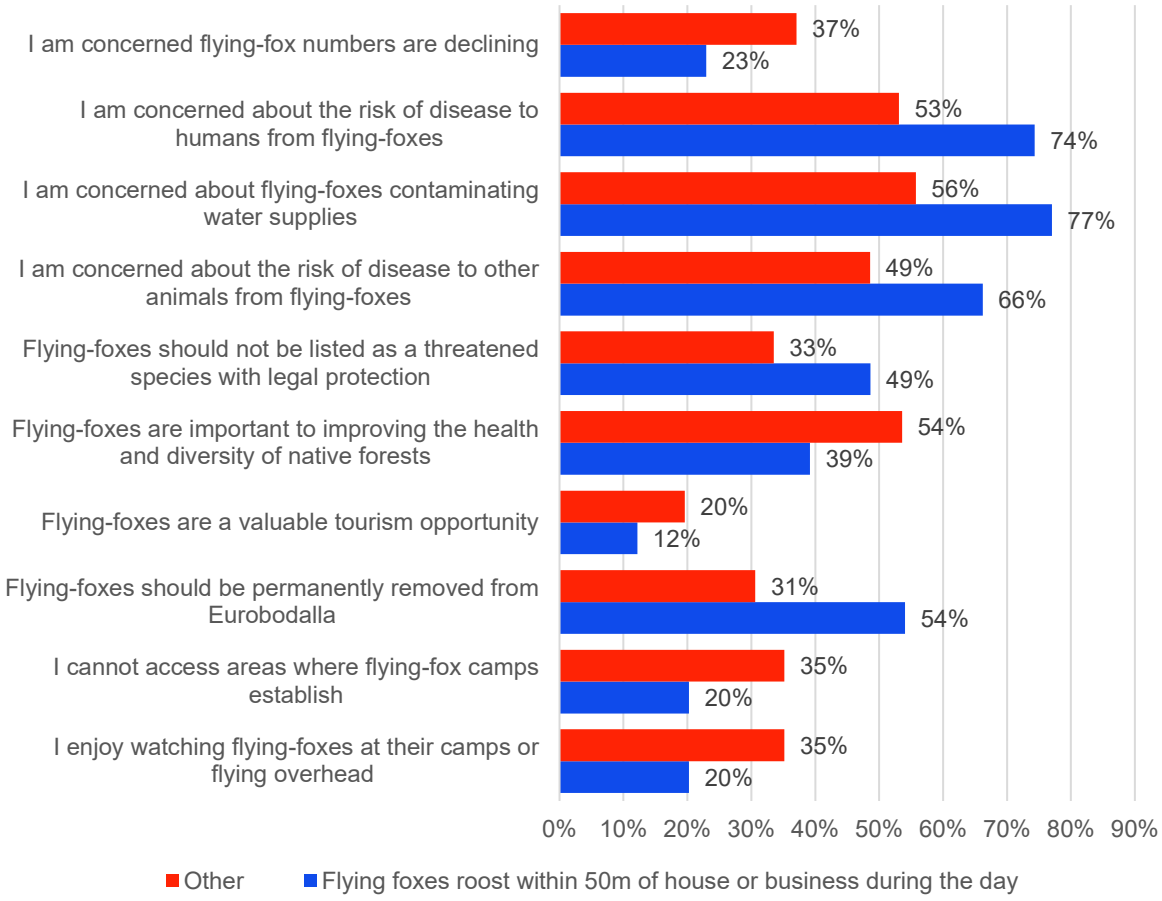


Figure 14: Agree/strongly agree difference by suburb grouping

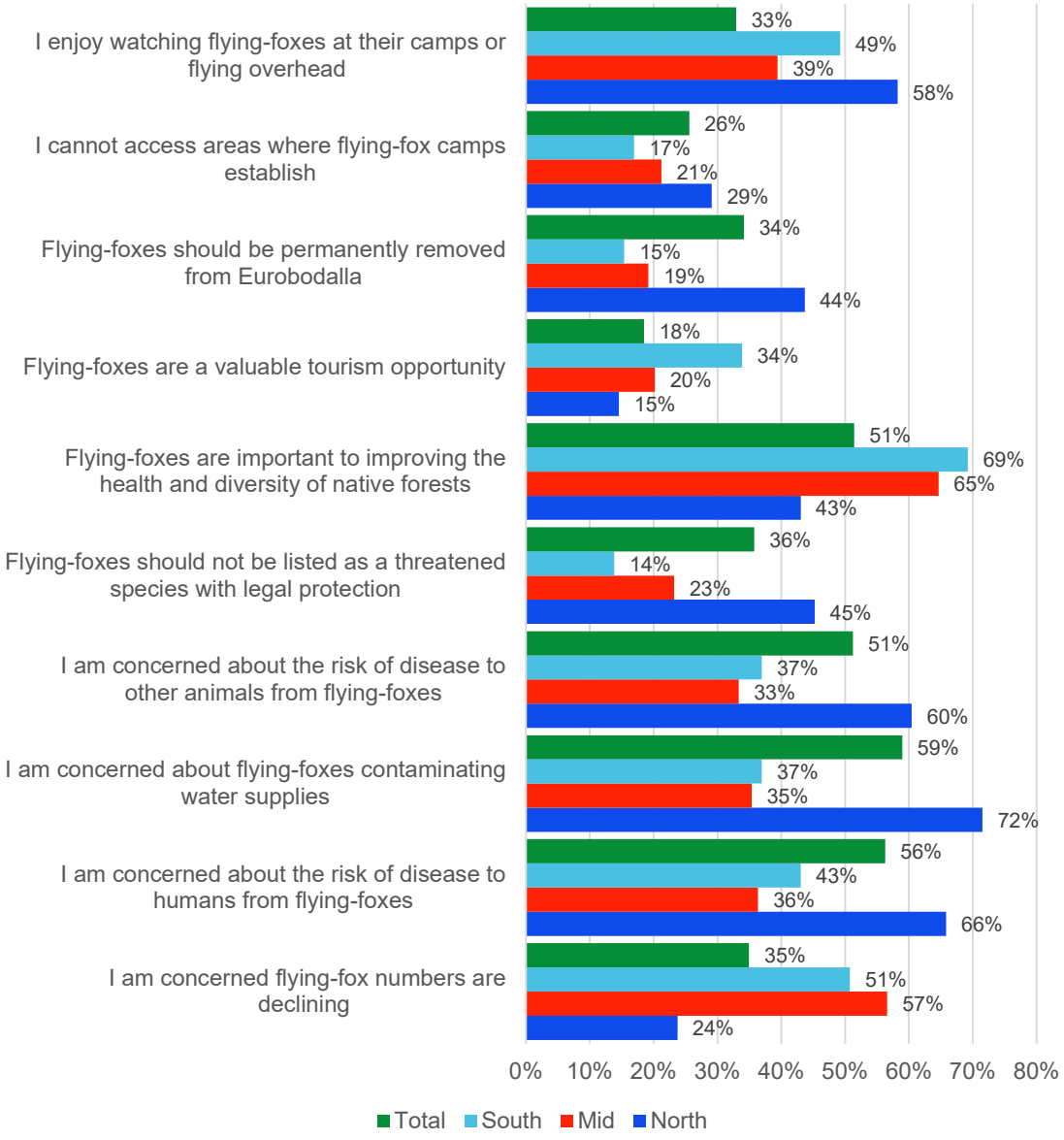
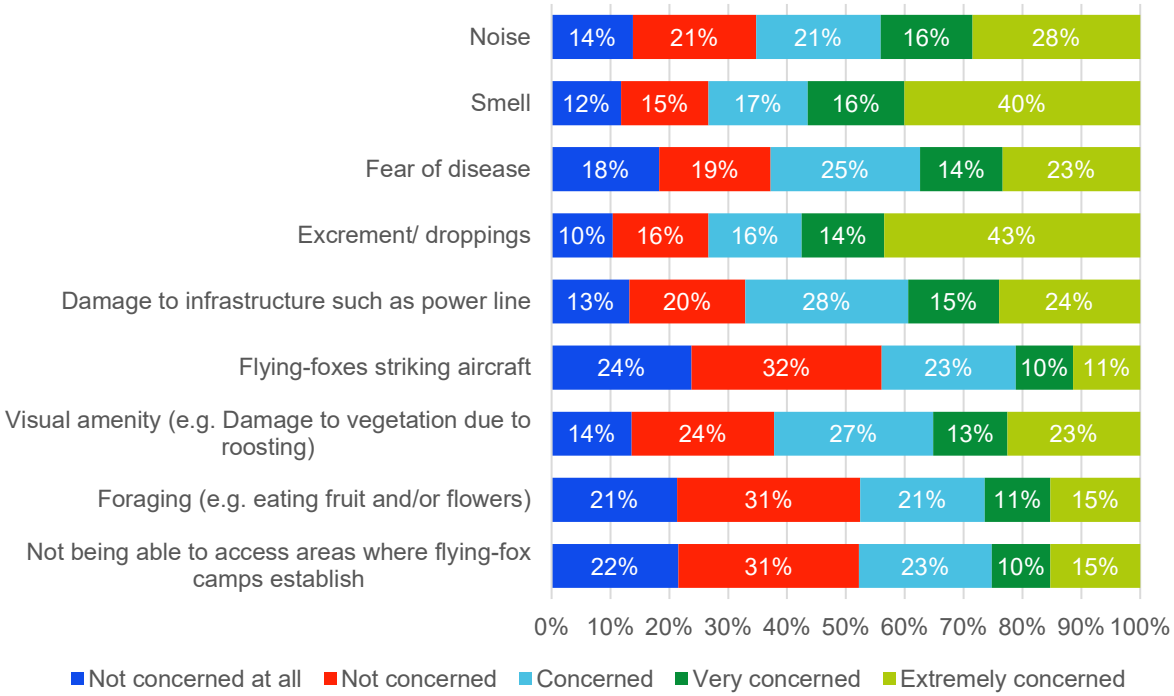


Figure 15: Q12 For each of the following, please indicate your level of concern regarding the impact of flying-foxes



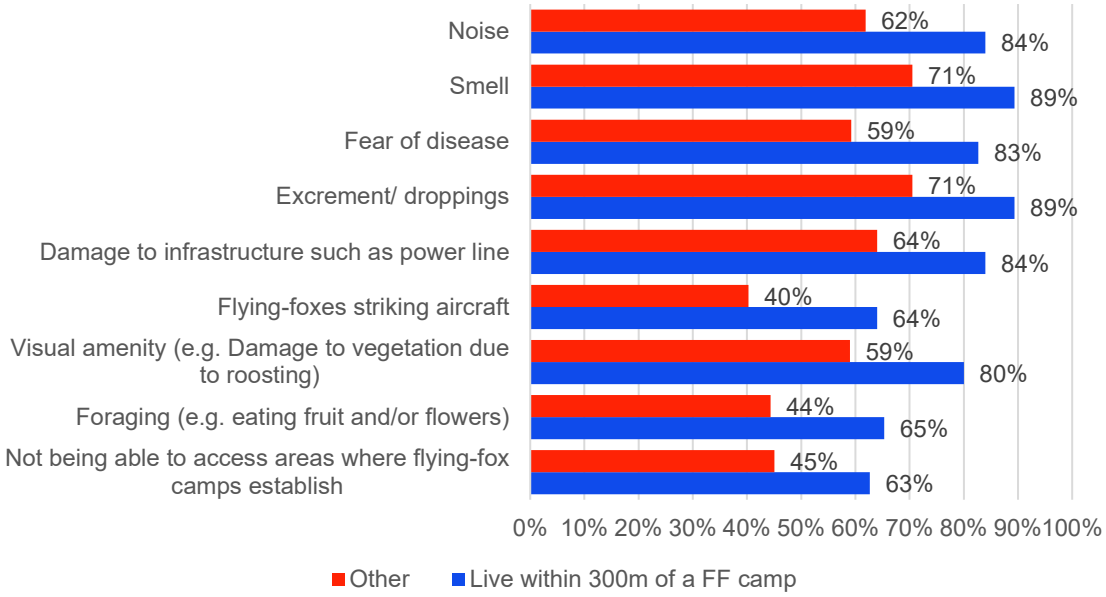
Note some percentages may not add to 100 due to rounding.

Figure 15 shows that excrement/droppings and smell from flying-foxes drew the greatest level of concerned responses 73% (n=361) for both.

Damage to infrastructure was the next highest area of concern with 67% (n=330).

Fear of disease was next with 63% (n=309) expressing concern.

Figure 16: Difference in percentage of those concerned, between those who live 300 metres or less from a flying-fox camp and respondents outside that zone or unsure of proximity



"Other" means those who live/work outside of 300 metres and those who did not know their proximity

For respondents who were concerned about particular impacts of flying-foxes, Figure 16 compares those who lived/worked within 300 metres of a flying-fox camp with others. Again, proximity seems to influence the degree of concern. While there was less difference in terms of noise, other factors such as smell, excrement, damage to vegetation and access to areas close to the camps generated greater differences. The results show that for all impacts, proximity generates statistically significant differences in levels of concern, at a 95% confidence level using a Mann Whitney U test.

The chart below shows that these differences were similar (except for noise) when those who live or work within 50 metres of places where flying-foxes roost during the day. Excrement and smell are the dominant issues of concern but issues such as noise become more significant. All differences were statistically significant at a 95% level, with the exception of not being able to access areas where flying-foxes camps are established.

Figure 17: Difference in percentage of those at all concerned between respondents reporting flying-foxes roosting during the day within 50 metres of house of business during day and respondents outside that zone or unsure of proximity

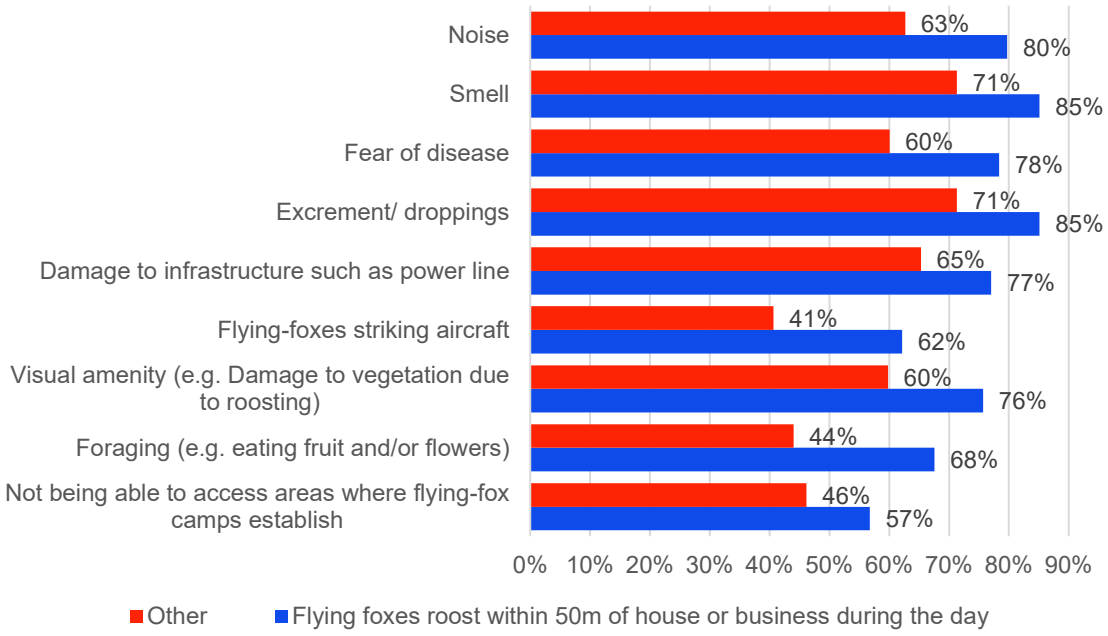
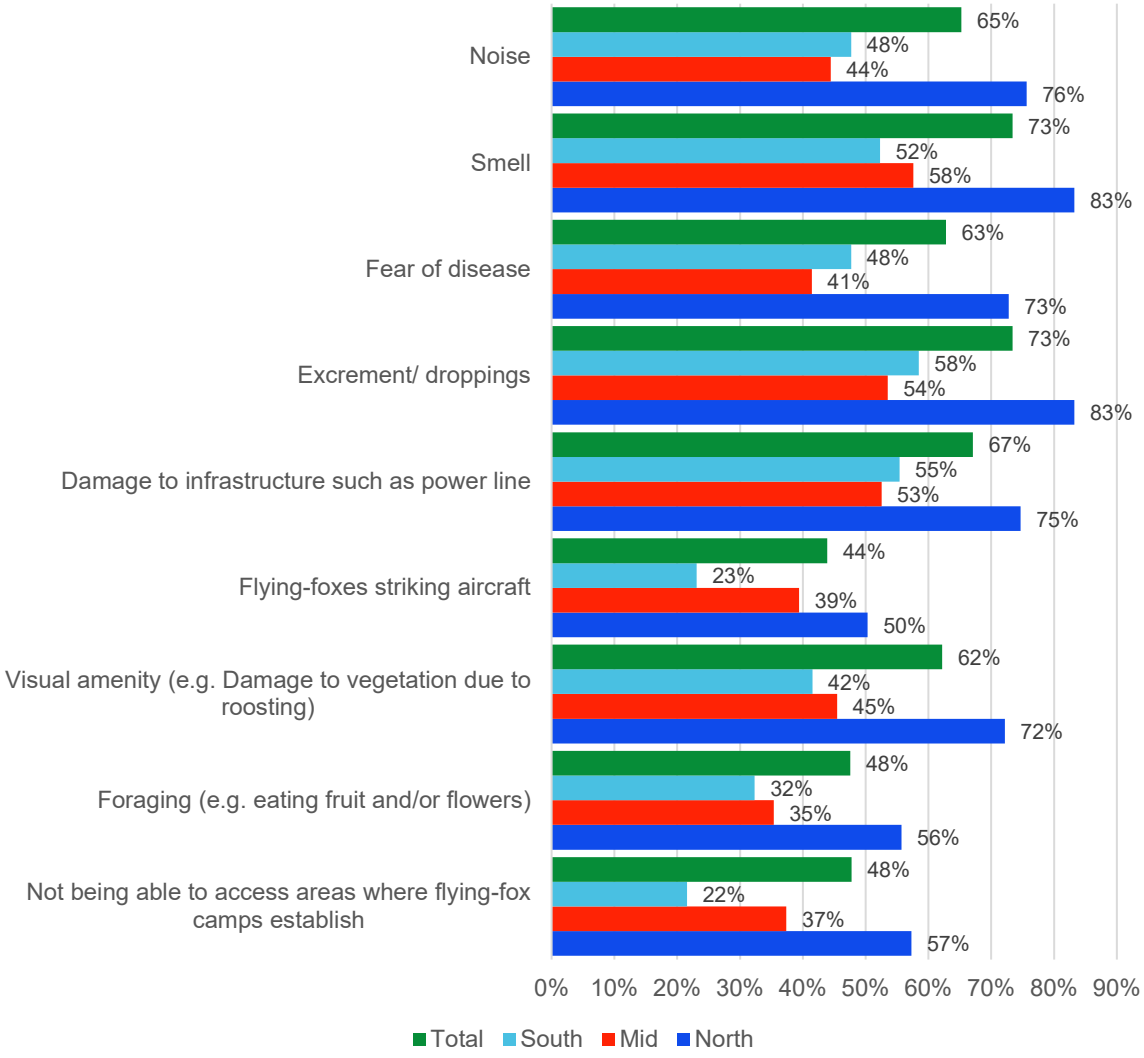


Figure 18: Difference in percentage of any level of concern between suburb groupings



Overall there tended to be greater concern expressed by those living in suburbs classified as North, where there is a larger resident population and known presence of flying-fox camps and a history of conflict with the 2016 influx. There is generally less difference between Mid and South suburb groupings. All differences between North and other suburb groups were tested as statistically significant, with the exception of not being able to access areas where flying-foxes camps establish.

A comparison of Batemans Bay and residents of other suburbs where respondents had indicated they lived 300 metres or less from a flying-fox camp did not provide any significant difference in attitudes towards flying-foxes. This would be, to some extent, influenced by the relatively small size of the samples as seen in the table below.

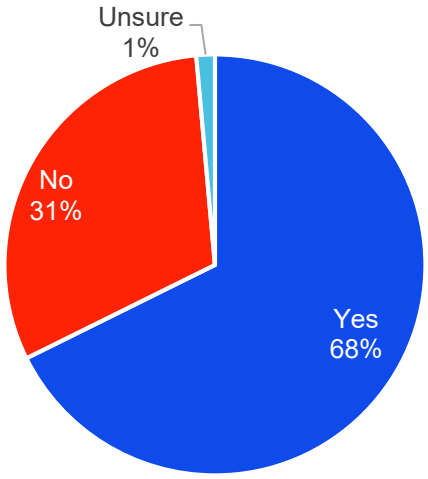
Table 7: Residents stating they live within 300 metres of a flying-fox camp

Locality	Number	Percent
Batemans Bay/Catalina	52	69%
Other areas	23	31%
Total	75	100%

3.2.5 Impacts of flying-foxes

68% of respondents indicated that they have been affected by flying-foxes previously.

Figure 19: Q13 Have you been affected or impacted by flying-foxes in the past?



Again, proximity is a significant factor for those living in proximity to a camp or living or working near roosting areas. Around 87% of those living or working within 300 metres of a flying-fox camp report having been affected, compared with less than two thirds who are not in this proximity.

Figure 20: Question 13: Have you been affected or impacted by flying-foxes in the past? Live within 300 metres of a flying-fox camp

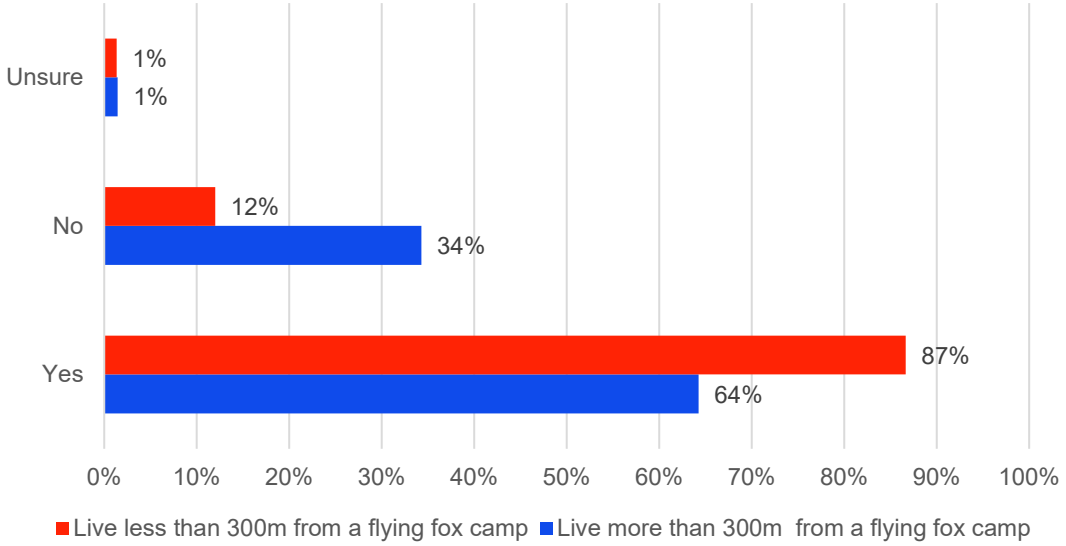


Figure 21: Q13: Have you been affected or impacted by flying-foxes in the past? Difference in percentage of very and extremely concerned between those who live or have a business where flying-foxes roost during the day within 50 metres of house of business during day and others.

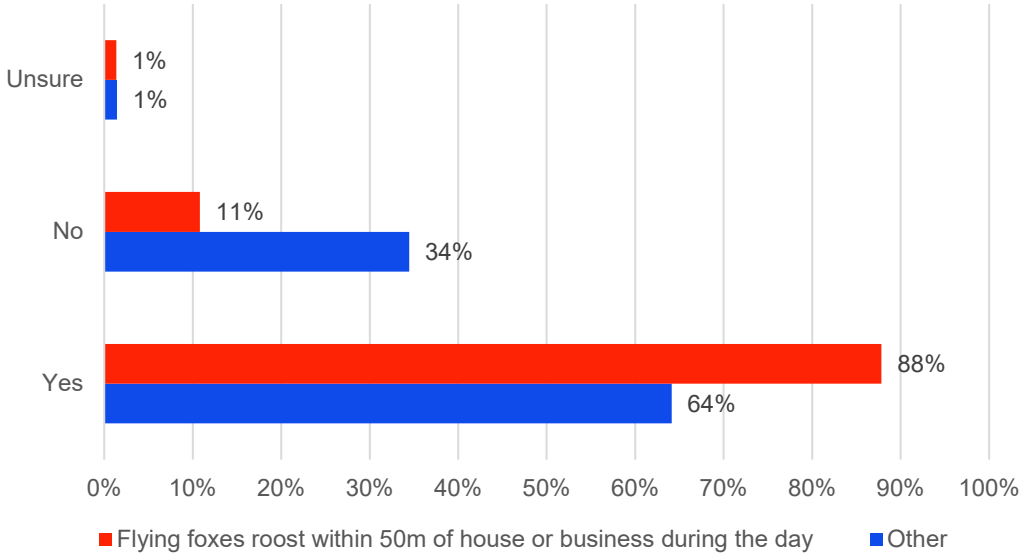
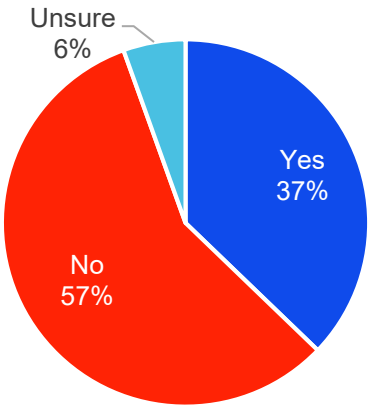


Figure 22: Q14 Are you currently affected or impacted by flying-foxes? Live/work within 300 metres of a flying-fox camp



Overall, 37% indicated that they are *currently* affected or impacted by flying-foxes. This figure nearly doubles for those living or working close to camps.

Figure 23: Q14: Are you currently affected or impacted by flying-foxes? Difference in percentage of those who were very and extremely concerned between those who live or work within 300 metres of where flying-foxes roost during the day and others.

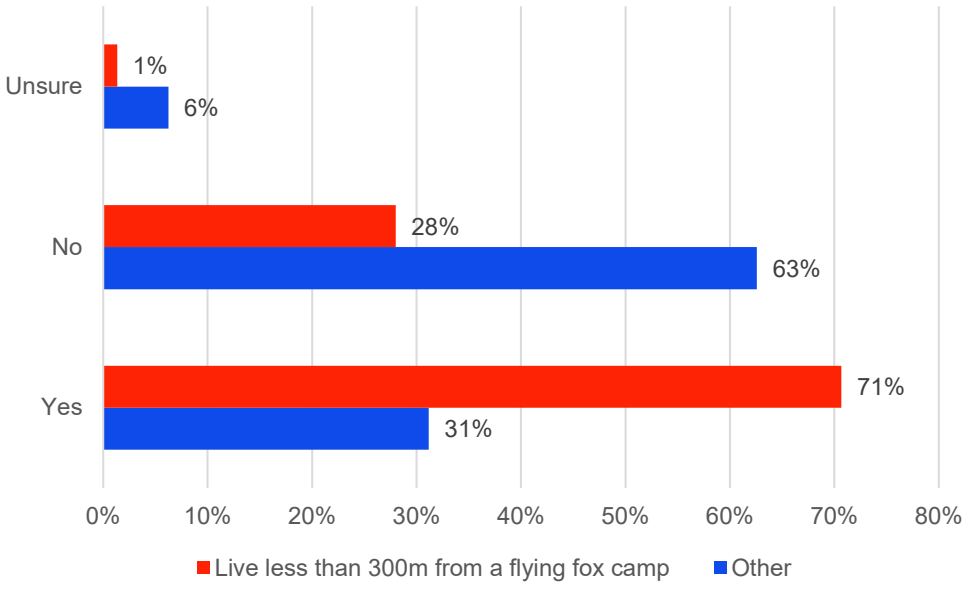


Figure 24: Question 14: Are you currently affected or impacted by flying-foxes? Difference in percentage of those who were very and extremely concerned between those who live or work within 50 metres of where flying-foxes roost during the day and others.

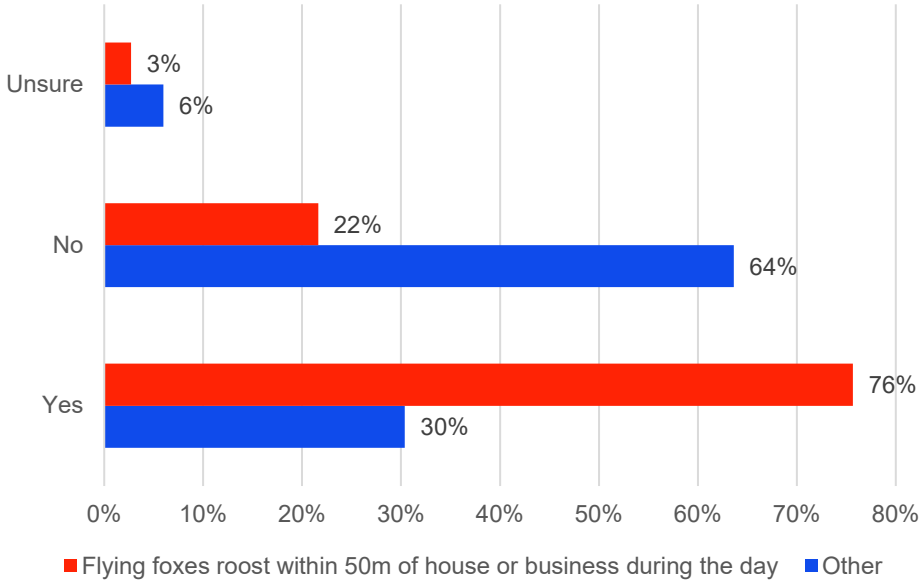
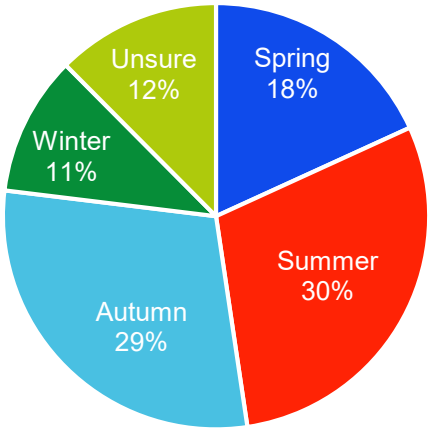
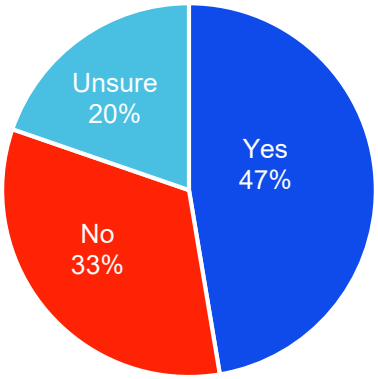


Figure 25: Q15 When are you most affected by flying-foxes?



Summer and autumn appear to be the seasons in which flying-fox activity has the most impact.

Figure 26: Q16: Have you or Council done anything to reduce the impacts of flying-foxes?



47% of respondents indicated that they thought the Council had done something about flying-foxes. 20% were unsure while one third thought nothing had been done.

Table 8 below summarises the main answers given to the question about what respondents thought Council had done and anything they had done themselves to reduce the impacts of flying-foxes. Clearing of vegetation was the most common activity, mentioned by 33% of respondents.

Clearing the water gardens in Batemans Bay was specifically mentioned by around 6% of respondents.

Table 8: Q17: What have you or Council done to reduce the impacts of flying-foxes?

Action	Number of mentions
Clearing vegetation/cutting trees/buffer zones	74
Noise	54
Dispersal	45
Water gardens management, clearing etc	37
Council programs, education, policies etc	34
Clearing of water gardens	24
Clearing food sources	22
Removal of cocos palms	13
Council programs	12
Removed/netted fruit trees	10
Smoke	8
Education	8
Car covers	6
Other	27

A list of responses is shown in Appendix 5.

Figure 27: Q18: Did this reduce the impacts of flying-foxes?

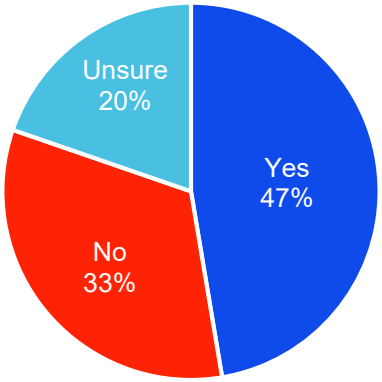


Table 9 below summarises actions that respondents considered effective.

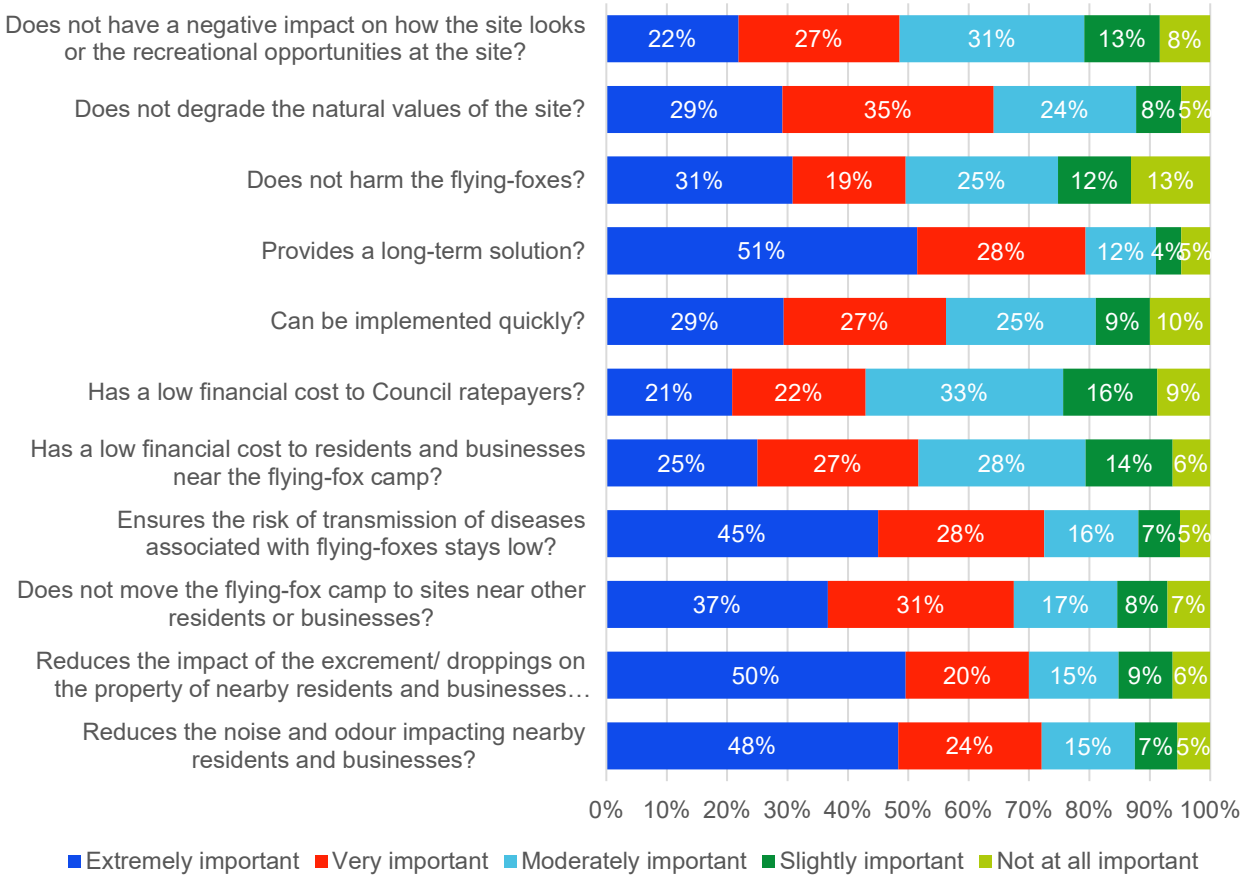
Table 9: Q19 Which of those actions do you feel helped reduce the impacts of flying-foxes?

Action	Number of mentions
Clearing vegetation/cutting trees/buffer zones	43
Noise	25
Dispersal	15
Council programs/actions	14
Clearing food sources	9
Clearing water gardens	9
Removal of cocos palms	6
Smoke	5
Car covers	3

A full list of actions mentioned is shown in Appendix 6.

3.2.6 Management of flying-fox impacts

Figure 28: Q20: For each of the following please indicate whether they are important or not important in managing the impacts of flying-foxes



Factors rated extremely or very important in the management of flying-foxes were:

- Provides a long-term solution 73% (n=381)
- Ensures the risk of transmission of diseases associated with flying-foxes stays low 73% (n=348)
- Reduces the noise and odour impacting nearby residents and businesses 72% (n=346)
- Reduces the impact of the excrement/ droppings on the property of nearby residents and businesses from flying-foxes 70% (n=336)

The highest rating for extremely important was “provides a long-term solution with 51% (n=247) with reducing impact of droppings at 50% (n=238).

The question does not define what a long-term solution is but it was asked with the assumption that it would be more than a temporary solution such as dispersal.

Figure 29: Q20: Indicate the importance of the following in managing the impacts of flying-foxes: percentage stating very or extremely important

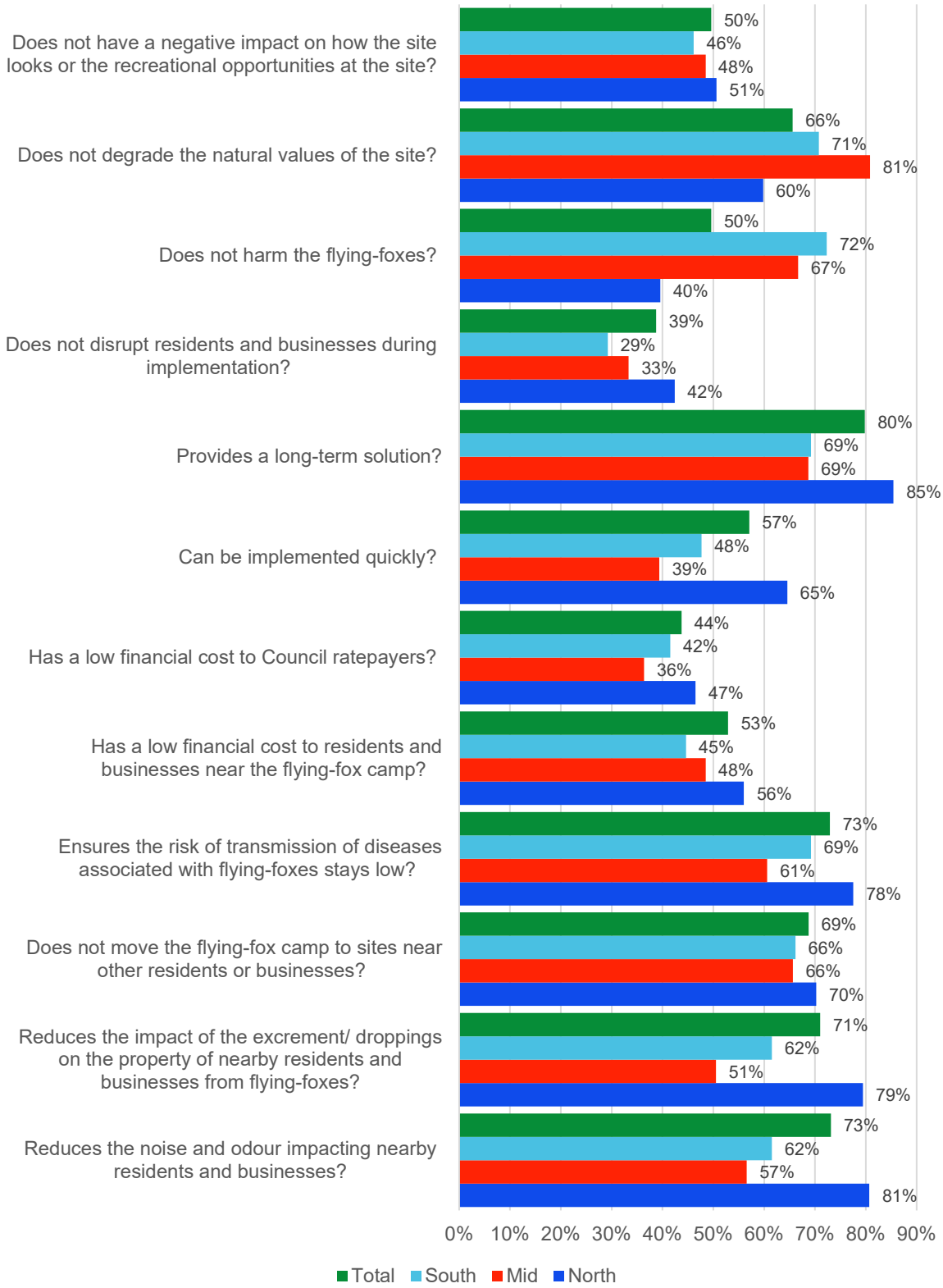


Table 10: Q21 Please tick all that apply to you:

	Number	Percent
My property has an outdoor clothes line	437	82.3%
My property has trees that produce fruit or nectar	325	61.2%
I have domestic pets such as cats or dogs	314	59.1%
My property has a garage or car cove	310	58.4%
My property has air conditioning	281	52.9%
My property has a water tank	215	40.5%
My property has a pool	43	8.1%
My property has double glazed windows	35	6.6%
My property has none of the above	28	5.3%

Table 11: Q22 I have a filter and first-flush system on my water tank

	Number	Percent
No	118	54.9%
Yes	97	45.1%
Total	215	100.0%

(n=215- those who stated their property has a water tank)

4 Targeted workshops

4.1 Introduction

After the survey, UTS:CLG facilitated four targeted workshops with community members and stakeholders. Each workshop was held at Council's premises in Moruya, went for between one and a half and two hours, and included between five and ten participants. Participants for the resident groups were recruited through the survey whilst participants for the community and environmental organisation and sensitive receiver groups were identified through a stakeholder analysis in collaboration with Council. The UTS:CLG facilitator was supported by a flying-fox expert from Ecosure, the environmental consultancy preparing the Plan on behalf of Council.

Group 1	Group 2	Group 3	Group 4
Residents that indicated flying-foxes were impacting them at the time of the survey	Residents that indicated they were not impacted by flying-foxes at the time of the survey	Local community and environment organisation representatives and members of some of Council's advisory committees	Stakeholders that may be particularly sensitive to impacts, such as businesses located close to camps, infrastructure providers, and the aviation, commercial food, and animal industries

The purpose of these workshops was to provide further insights into the survey findings, seek feedback on Council's current and future approach to impact management, and test key issues identified through the interviews, such as appropriate triggers for community feedback as part of the Decision Support Tool. Overall, there was a high degree of commonality in the range of views expressed across the groups, although each group tended to emphasise slightly different issues.

4.2 Key Observations

Participants felt the community and Council are only slightly more prepared to manage future impacts following the 2016 influx. Several participants were also unaware that this influx in part resulted from an unprecedented mass flowering event of two main flying-fox food sources that are abundant in Eurobodalla.

Participants indicated that Council could do more to enhance community resilience by helping residents and businesses become more prepared to manage short-term impacts during future flying-fox seasons. They thought Council could do more to educate the community on flying-fox migratory behaviours and food sources, what is known about the range of potential impacts and effective strategies to manage them in the short term, what Council is doing to help the community manage short-term impacts and how it is working towards a long-term solution.

Participants emphasised their strong environmental values, the important ecosystem services flying-foxes provide for long-distance seed pollination of native forests, and that any future management actions do not harm flying-foxes. A number of participants indicated they enjoyed certain aspects of flying-foxes that other community members may perceive as impacts. For example, some considered the visual amenity and noise generated during the evening fly-out and morning fly-in to be a spectacle of nature that Eurobodalla is fortunate to host. Reflecting on this, some identified the potential for entrepreneurial tourism activities based on the flying-foxes

and the unique environment Eurobodalla provides for them, as well as other opportunities such as establishing a 'Flying-fox Hospital' similar to Port Macquarie's renowned Koala Hospital.

Participants articulated a preference for a long-term environmental management solution for habitats and food sources, so that flying-foxes are no longer located close to Eurobodalla's urban areas. Long-term land use planning that conserves habitat and food sources in non-urban areas whilst directing residential and business land uses away from these areas should support this. It is acknowledged that currently knowledge of flying-fox camp selection is insufficient to be able to attract flying-foxes to a desired site, however this approach will be informed by ongoing research. Participants indicated they would feel more comfortable managing short-term impacts if they knew Council was working towards this long-term solution, but accepted it is difficult to manage the environment, particularly migratory animals, and that a long-term solution that moves flying-foxes out of urban areas may be a decade or more away or not feasible at all as it is difficult to control the behaviour and movement of migratory animals such as flying-foxes.

Overwhelmingly, participants identified the need for a proactive approach to managing future impacts based on real-time monitoring of increases in the population, alerting the community to the potential for increased numbers based on the level of food sources, and providing practical advice on what they can do to manage impacts. For example, whether washing droppings off vegetables grown in household gardens mitigates potential health risks. Participants also suggested there is an opportunity for the community to share ownership of the problem and contribute to monitoring population fluctuations, as some community members regularly count flying-fox numbers in various locations across the Shire. This was a particularly strong sentiment amongst the community and environmental organisations group, with a number of representatives expressing a willingness to work with Council to assist with management, such as helping to educate the community about flying-foxes.

The workshop participants were provided further insights on the impacts of most concern to the community. There was a striking degree of concern for potential community health impacts, particularly regarding respiratory conditions. This concern extended to flying-fox droppings landing on roofs and washing into water tanks and the town water supply, food growing in household vegetable gardens, and commercial agriculture and aquaculture grown outdoors. Participants also noted the significance of odour impacts, with some suggesting they are only ever made aware flying-foxes are around once they experience odour impacts. In particular, odour impacts were considered most difficult to mitigate and manage. Actions may make people feel trapped in their own homes, as it often required shutting all windows and doors, which could still be ineffective. Other attempts to mask the odour with scented candles or deodorisers were also considered ineffective.

In contrast, impacts from flying-fox droppings, whilst considered inconvenient and unpleasant, could be managed by washing items or hosing affected areas. Several community members felt that free pressure cleaner hire offered by Council in the past was helpful, but should have been extended to anyone in the Shire and for longer time periods. However, there was general uncertainty over whether vegetables grown in household gardens remained safe to eat once affected by faecal drop, even after washing, and similarly contamination of tanks collecting water from affected roofs. Noise was also considered more manageable as it was experienced most intensely during the evening fly-out and early morning fly-in.

Participants agreed community feedback is a legitimate trigger for some form of action by Council, and that feedback received at the neighbourhood scale (i.e. from approximately 50 to 100 residences) was an appropriate threshold for action. They also indicated action should only be taken following confirmation from Council's monitoring of the potential for heightened impact. For example, if Council received feedback, Council officers would need to visit the location and confirm the increased number of flying-foxes and/or impacts.

Discussions with the sensitive receiver group had a somewhat different focus from that of other groups. These stakeholders were keen to discuss how Council currently approaches managing

impacts, particularly on commercial businesses and service providers. They felt Council is only interested in protecting flying-foxes, rather than working toward a long-term solution, and expressed frustration at the lack of advice and consultation from Council on what they can do to manage short-term impacts on their businesses and services. They suggested Council should work more closely with businesses and service providers that may be particularly impacted through a more intensive case management style approach. This would help build Council's understanding of the impacts that businesses and service providers experience, collaboratively identify feasible impact mitigation measures, and educate businesses and service providers on what actions they can take to manage these impacts.

Some sensitive receiver stakeholders indicated flying-foxes are not particularly impacting them at this time, or they have processes in place to help manage impacts they do experience. For example, animal industry representatives indicated there is a low risk of Hendra Virus as it is mostly contained to Queensland, and they are working with industry peak bodies to monitor this. Food industry representatives indicated industry peak bodies had advised the potential risk from flying-fox droppings on food grown outdoors is low, although there is some scientific uncertainty and conflicting advice on this. Aviation industry representatives indicated they have existing processes to manage bird strikes on aircraft that also extend to flying-foxes.

5 Conclusions

This engagement process has identified the flying-fox impacts experienced most intensely by the Eurobodalla community. These include noise, odour and droppings, followed by community health impacts, damage to the environment and infrastructure, and, finally, flying-foxes eating fruit and flowers, inability to access areas where flying-foxes camp, and aircraft strikes. Current actions undertaken by residents and Council to manage some of these impacts are perceived as effective, in particular removing food sources and creating vegetation buffers.

However, these are not effective at managing all of the impacts experienced and there may be opportunities for the Eurobodalla community to take further action. For example, whilst there is concern over potential community health impacts from flying-fox droppings contaminating water tanks and storage, there is a degree of uncertainty over the threshold at which contamination may occur and whether installing filtration devices would mitigate potential impacts.

The Eurobodalla community accepts that short-term impacts may continue until Council can institute a long-term solution. In the interim, the community requires further education from Council to better understand the challenges faced when managing flying-fox impacts, better prepare them on day-to-day actions they can take to become more resilient to future impacts, and what Council is doing to work towards a feasible long-term solution. At the same time, Council should work more collaboratively and intensively with local businesses and service providers to educate them on what actions they can take and develop feasible strategies to address the short-term impacts they experience.

Ultimately, the respondents seek from Council a long-term, dual-pronged environmental management and land use planning solution that aims to encourage flying-foxes to set up camps away from Eurobodalla's central urban areas. Potential solutions include conserving and improving flying-fox habitat in non-urban areas and directing residential and business land uses away from these areas, whilst ensuring community health and the welfare and conservation of the flying-foxes in Eurobodalla remain paramount. The community understand at a general level the challenges and uncertainties of managing the behaviour and movement of migratory animals and awaits further advice from Council on the feasibility of this long-term solution.

The findings of this engagement process highlight a number of issues for further investigation when developing the Plan:

1. Assess the feasibility of a long-term environmental management and land use planning solution that aims to discourage flying-foxes away from Eurobodalla's urban areas (informed by ongoing research).
2. Develop a community education and communications strategy that improves community resilience by:
    a. building understanding of seasonality, behaviours and food sources, the range and likelihood of potential flying-fox impacts, and practical actions the community can take to minimise the impacts that they experience. This may require further research as there is some uncertainty around the range and likelihood of potential impacts and, therefore, what actions may be more or less effective in managing these.
    b. communicating what Council is doing in the short-term to help manage impacts experienced by the community, what Council is doing to assess the feasibility of and working towards a long-term solution, and the role of local government and other levels of government in regulating flying-foxes and impact management.
    c. regularly updating the community on Council's flying-fox monitoring and the likelihood of heightened impacts. For example, a change in the size of a camp or

another mass flowering event may increase the availability of food resources and the likelihood flying-foxes will return to the Eurobodalla in large numbers.

d. working with local community and environmental organisations to educate the community on the ecological and potential tourism value of flying-foxes to Eurobodalla.

3. Develop a process under which community feedback is established as a trigger for further investigation / monitoring, followed up by appropriate management by Council (ranging from education and support to camp management).
4. Undertake further studies to establish quantitative metrics as a trigger for action to manage noise and odour impacts, and investigate the effectiveness of odour neutralisers.
5. Develop a process to work more intensively with local business and service providers to collaboratively manage the impacts they experience.

Appendix 1: Membership of community groups

Table 12: Which local environment group or association are you a member?

Environmental group	Number
Landcare	3
BMP Landcare	1
South Durras Landcare	1
Broulee Mossy Point Dunecare	1
Deua River Care	1
Wires	1
N/a or no	4
Total	12

Table 13: Other description that applies to you

Other description	Number
8 – 7 [*unclear meaning*]	1
Bega Valley	1
Concerned environmentalist	1
Employee at Batemans bay hospital	1
ESC Employee	1
Eurobodalla Landcare Network	1
Ex resident intending to move back	1
Former resident	1
Have holiday home in Eurobodalla	1
Home owner	1
Interested	1
Na	1
no	1
Outer area resident/looking to move to Eurobodalla Shire	1
Own a house and live in it Approx 4 months per year	1
Regular visitor	1
Resident	1
We own a house at Batehaven and plan on moving into it in 2019	1
Total	18

Other description	Number
Club or association	**Number**
Catalina Golf Club	3
Durras Community Association	2
Long Beach Community Association	2
Marine Rescue NSW	2
Albert Ryan Park	1
Batemans Bay bushwalkers	1
Batemans Bay Chamber	1
Bingi Residents Assoc	1
Bodalla Soccer & Bodalla P&C and Narooma Swim Club	1
Broulee Mossy Point Community Association	4
Clyde united	1
Coast to Coast Animal Advocates	1
Eurobodalla Concerned Citizens and Save Albert Ryan Park	1
Eurobodalla orchid society	1
euroscug	1
Historical Society	1
Landcare, Old courthouse museum	1
Lions club	1
Long Beach Community Assn	3
Mogo Business Chamber	1
RAC	1
RAI	1
RFS	1
Rosedale Association Inc	2
RSPCA	1
SAGE	1
Soccer club	1
South Durras Community Association	1
Teacher	1
The Salvation Army	1
Tomakin Community Association	1
U3A	1
Wires member	1
Women in business	1
N/a	4
Total	49

Appendix 2: Respondents by suburb

Table 14: Respondents by suburb

Suburb	Number	Percent	Group
Batemans Bay	67	13.6%	North
Catalina	49	10.0%	North
Batehaven	20	4.1%	North
Lilli Pilli	10	2.0%	North
Surfside	28	5.7%	North
Surf Beach	27	5.5%	North
Long Beach	24	4.9%	North
Sunshine Bay	20	4.1%	North
Malua Bay	21	4.3%	North
Nelligen	7	1.4%	North
Rosedale	12	2.4%	North
North Batemans Bay	11	2.2%	North
South Durras	10	2.0%	North
Benandarah	2	0.4%	North
Runnyford	1	0.2%	North
Maloneys Beach	7	1.4%	North
North total	**316**	**64.2%**	
Bimbimbie	1	0.2%	Mid
Bingie	1	0.2%	Mid
Broulee	22	4.5%	Mid
Congo	3	0.6%	Mid

Suburb	Number	Percent	Group
Deua	1	0.2%	Mid
Deua River Valley	2	0.4%	Mid
Jeremadra	1	0.2%	Mid
Meringo	2	0.4%	Mid
Mogendoura	3	0.6%	Mid
Mogo	5	1.0%	Mid
Moruya	14	2.8%	Mid
Moruya Heads	14	2.8%	Mid
Mossy Point	13	2.6%	Mid
Tomakin	17	3.5%	Mid
Total Mid	**99**	**20.1%**	
Central Tilba	1	0.2%	South
Dalmeny	12	2.4%	South
Kianga	1	0.2%	South
Mystery Bay	2	0.4%	South
Narooma	14	2.8%	South
North Narooma	3	0.6%	South
Turlinjah	2	0.4%	South
Tuross Head	30	6.1%	South
Total South	**65**	**13.2%**	
Other	12	2.4%	Other
Grand total	**492**	**100.0%**	

Table 15: Places mentioned in the 'Other' category

Place	Number of mentions
Bodalla	6
Bermagui	1
Canberra	1
Hanging Rock	1
Moving back to Bay, not yet purchased home.	1
Potato Point	1
Quaama	1
Total	12

Appendix 3: Suburb groups

Table 16 Suburb groups

North	Mid	South
Batehaven	Bergalia	Akolele
Batemans Bay	Bimbimbie	Central Tilba
Benandarah	Bingie	Coila
Catalina	Broulee	Corunna
Lilli Pilli	Congo	Dalmeny
Long Beach	Deua	Dignams Creek
Maloneys Beach	Deua River Valley	Kianga
Malua Bay	Jeremadra	Mystery Bay
Nelligen	Kiora	Narooma
North Batemans Bay	Meringo	North Narooma
Pebbly Beach	Mogendoura	Tilba
Rosedale	Mogo	Turlinjah
Runnyford	Moruya	Tuross Head
South Durras	Moruya Heads	Wallaga Lake
Sunshine Bay	Mossy Point	
Surf Beach	Tomakin	
Surfside	Wamban	
	Woodlands	

Appendix 4: Comments on Council and individual actions on flying-foxes

Table 17: Comments on Council and individual actions

Vegetation clearing last year at the rear of property

Cleared trees

Cleared vegetation

Cleared vegetation

Clearing food sources

Council cleared SOME vegetation but not enough Casuarinas/Sheoaks. I keep windows closed, no shoes inside, restrict movements around town.

Council conducted dispersal in Batemans Bay, provided car covers, removal of cocos palms and other services to heavily affected areas. they also created buffer zones in Batemans Bay around the camps in Catalina and the water gardens.

Council cut down their roosting trees in the Bay. I am happy that they visit my place.

Council did a disbursement 2 yrs ago cutting trees down & tried moving them on

Council has cut down habitat

Council has cut down trees in town

Council has removed bush that attracted the bat

Council has removed trees in Batemans Bay

Council has removed vegetation & roosting areas which has also affected the local ducks etc

Council has removed vegetation around the water gardens to create a buffer, attempted dispersal in the past and offered rebates/car covers to affected residents.

Council reduce trees and used noise employers to move flying-foxes from roosting in the eater gardens at Batemans Bay

Council reduced impacts of colony near B/Bay hospital (trimming etc)

Council reduced vegetation around camp and tried to dispersed with water spray

Council reduced vegetation at water gardens to reduce numbers

Council reduced vegetation in Batemans Bay, and conducted a noise program at Catalina.

Council removed significant amount of vegetation in Batemans Bay to promote flying-foxes to vacate their roosting area.

Council removed trees at B. Bay water gardens but not at golf course

Council took action removing and trimming trees

Council trimmed trees and used noise to disperse them in 2017. We have to close all windows and run air conditioning to reduce impact of smell, noise and asthma attacks from the flying-foxes. We have to hose down verandahs and building daily to wash off excrement. We can't hand washing out overnight.

Council unnecessarily cut down established gum trees/casuarinas in Lake Catalina Reserve with the result the grass now grows profusely and the area has lost much of its natural amenity.

Council, noise and removal of trees

Created noise and cut back trees to move them on

Cut back trees in my yard, cover vehicles and clothes lines

Cut down some trees and loud music

Cut trees down where they roost.

Cut vegetation, ruined my garden

Cutting back trees, increasing buffer zone around homes, dispersal, community impact survey

Destroyed their habitat by ripping down the trees but they came back anyone thank god.

I have done nothing as I do not suffer any adverse effects from the presence of the bats, however, Council has done considerable tree clearing work, particularly in the water gardens, to establish a buffer zone between bat habitat and human habitat.

I have just recently had the fruit from Cocos Palm (in my yard) removed.

I have removed fruit trees from my garden that were attracting the flying-foxes.

I have trimmed food sources within my own yard. Council have proceeded with measures to decrease or 'move the population on'

Management of vegetation at the water gardens. People should better manage feed trees

Reduce number of fruit bearing palm trees.

Reduce vegetation & roosting trees. Provide coverings for cars, clotheslines etc

Remove Cocos palms from properties in my area

Remove vegetation

Removed 5 x large cocos palms

Removed 7 cocos palms

Removed all our cocos palms

Removed all seed pods from palms on our rural property.

Removed as many trees that may be attracted by the bats, council (with state and federal funding) had to remove overcrowded trees on the nature reserve at the Catalina lake area (Country Club Drive and Heron Road) as well as the extensive undergrowth crippling the nature reserve

Removed fruit from neighbors cocos palm

Removed large numbers of them recently

Removed or do not plant any vegetation on my land that might attract flying-foxes.

Removed palm trees

Removed palm trees from my yard.

Removed palm trees to deter them.

Removed particular trees that attract foxes

Removed seed from palm trees. Could council do same on streets?

Removed some tree areas of past concern

Removed their roosting habits such as trees in ware gardens

Removed them once after a long fight

Removed trees and created a buffer zone between Catalina lake and the back of our home in Country Club Drive

Removed trees that they roost in

Removed two cocos palms but still have two more

Removed weed species feeder trees, provided covers for cars, noise to disperse

Removing vegetation, making noise

Self: had to remove fruits before they ripen from extremly high (dangerous) palms however we cannot reach all the bunches of fruits

The animals feed substantially on palm tree fruit and domestic fruit trees on private property and on council verges even though their natural native food sources are plentiful. We have asked

neighbours to consider doing as we have done, eg reducing palm trees, as they are not native to this region they were originally imported for decorative purposes and are now an invasive problem as the bats spread their seed everywhere.

They cut the trees down next to our house to provide a bigger buffer zone, plus the dispersal early in the morning to prevent them from landing to roost.

Tree removal and pruning off seed heads

Trimmed trees

Vegetation management

Vegetation removal

Vegetation removal, 'moving on' of the group

Vegetation clearing

We have cut down the trees that they feed from in our yard and council have cleaned up the water gardens

We have removed several trees from our yard that the bats use to feed on. They were introduced palms that were not native.

Had some palms removed

I cut down the palms in my yard to stop the flying-foxes feeding. I assisted with dispersal.

Advised neighbours/community about removing species in gardens that are attractive food sources for flying-foxes eg. Tuckeroos, Date Palms

Attended information sessions ... council then developed a plan to move flying-foxes

Council program to reduce flying-foxes last year

Council > entire mitigation and relocation program 2015, 2016, 2017. Self > move/ cover car

Council are doing more work in this department than I can list, I saw council guys with drone cameras doing research one day. They do a lot more too, more than most people realise

Council attempted to remove bats

Council commenced measures to move the flying-foxes on in 2017

Council did a "clearing" of them about 2 years ago

Council did a move on about two years ago which was not overly successful

Council did something

Council discouraged flying-foxes from roosting

Council has drawn up a management plan and has attempted to relocate the flying-foxes. It has also done extensive remedial work in the water gardens and assisted locals severely impacted by flying-foxes. I have removed my peach tree. I did not mind using strategies to deter fruit fly or cockatoos but once I realised it was my peach tree that was attracting flying-foxes into my yard at night I did not hesitate to remove it.

Council has employed staff + volunteers to address the problem + develop a LGA wide strategy

Council has provided assistance to residents located in close vicinity to camps

Council has thoroughly monitored the camps to get a better understanding of whats going on, increased buffers between camps and houses, dispersal to move them on, updated community through media, received funds from state gov

Council has visited camps regularly at dawn and tried to collect data as to size of camp. Supplied protection covers for residents in affected zones. Kept public informed re situation. Adhered to regulations re controlling them,

Council have had eradication attempts in my area

Council implemented a plan of action in 2016 to reduce the impact

Council needs to do a lot more - a very disappointing Council response generally - very slow to action, need new people there.

Council received funding to stop grey headed flying-fox from landing after feeding to discourage colony

Council says it built buffer vegetation

Council's programme. Use of bright lights.

Council's work on their roosting area near the hospital. Personally I've not done anything, no will I.

Councils action at Batemans Bay!

Door knocking with surveys to gather information on what residents think about the smell and impact on the environment. Illness and other concerns residents had when the flying-foxes were roosting in their back yards

Drained ponds at BBay Museum, cut many trees down in Batemans Bay and Catalina, carried out other methods to disperse roosting flying-foxes

Educating people regarding endangerment to species, council looking at non harmful ways to reduce impact to residents

Education of local residents

Gave info

I understand the Council has taken measures but I don't know what they are

In 2016 I was involved when council engaged a consultant and I participated in meeting and the information sessions in Batemans Bay with the consultants.

It is about education - Council are doing a good job

Last year council did quite a lot to reduce the amount of flying-foxes

Our council are great

Disposing of all fruit and veggie debri very carefully

Don't leave food out at night,cover all bins. > no food available for them.

Council did smoking trials and some clearing

Smoke

Banging pots n pans n noise alarms but very little tree felling

Council removed them from Batemans Bay by making a lot of noise

Council tried to remove the camp in Batemans bay with noise

Didn't Council have a program where they made noise early in the morning when the foxes were coming back to roost?

Had a tree cut down but was for different reasons, but works well as the bats wont sit in it and make loud noise and poo all over our cars.

I am aware of the light/noise action taken at batemans bay

Last year and year before they did the noise with the metal sheets and stuff every night to get them to stop roosting. They stayed away for a year and now their back and something meeds ro be done before there's hundreds of thousands flying around again pooping on everything

Loud noise

Made noise and trim/removed trees

Make loud noises to scare off flying-foxes. Use a rodent ultrasonic device.

Make loud noises to scare them away from my house.

Moved flying-foxes on utilising noise & smoke

Personally nothing. Council in conjunction with state & federal gov used numerous tools, tree felling, noise, smoke when we had huge issues two years ago. I understand council are currently tracking numbers of bats.

Population control plan couple years ago. Used noise and lights to stop them roosting

Speakers and noise to make them relocate elsewhere

The noise at Batemans Bay

Various forms of noise to move on roosting flyingfoxes

When I lived in Batemans Bay I could hear banging and whistles early in the morning , apparently it was a way to make the flying-foxes not return to their roost and go elsewhere .

Music

Noise, lights and things

Noises at the Batemans Bay Camp arranged by the Council. Have not noticed much excrement this year. Much more last year.

Council dispersed the flying-foxes

Council dispersed the flying-foxes in Batemans Bay using pots and pans?

Council dispersed the last major colony

Council drove them out before about 2 years ago

Council finally acted last year/two years ago, but they (the bats) are back

Council has conducted dispersal in Batemans Bay

Council has created vegetation buffers in Catalina and Water Gardens, and a dispersal from that area last year.

Council has tried dispersal techniques

Council have been undertaking dispersal programs

Council have tried to evict the flying-foxes with loud noise.

Council helped move them on

Council made efforts to dispurse camps last year

Disbursement of some FF, education re FF

Dispersal

Dispersal activities

Dispersal by council. Cleaned up town centre main camp (Water Gardens). Me: distributed flyers advising local residents to watch for and report camps (roosting) close by in Long Beach and Maloney's Beach

Dispersal each morning 2016

Dispersal in 2016

Dispersal in 2016 due to the extreme numbers in the water garden area

Dispersal last year but they are back

Dispersal plan in the past

Dispersal program in recent Years

Disperse them

Flying-fox dispersal officer

Husband was a part of bat disporsal a few yrs ago, with the council

I was part of the dispersal in 2016

I was part of the volunteer dispersal team. I worked across the community sharing information. gathering data. I spoke at a council meeting

Just what council did in the previous year to disperse and clear vegetation from near homes

They dispersed

They tried to disperse the camp

Tried to disperse them

Participated in dispersal campaign

Previous dispersal improved the situation

Camp dispersal

Council did dispersal

A disbursement program

I know that the council has offered people car and clothes line covers in affected areas and conducted dispersal in Batemans Bay

Council has done a lot of work with the residents most affected by flying-foxes. There has been a lot of communications, subsidised services and the 2016 dispersal.

Cleared out water gardens, move them on with noise and lights, removed other vegetation

Clearing Water Gardens

Council cleared Water Gardens

Council clearing and improvements in water gardens.

Council destroyed the amenity of the water garden area and blocked access to the water garden for around 6 months making it almost impossible for myself and many others without a car to access shops and having to do without for food and medication. Much worse than any slight inconvenience caused by the bats and councils dis interest in the harm of not being able to access food and medication.

Council did try to disperse the flying-foxes last year from the Water gardens at Batemans Bay but atter being on the forshore at Batemans Bay at dusk over the last few months there are now thousands of flying-foxes back in Batemans Bay.

Council ha done work around the water gardens etc to minimise numbers

Council has closed Water Gardens in Batemans Bay and conducted dispersal

Council were involved in the removal of the Flying-foxes from the water gardens in Batemans Bay.

ESC cleared the beautiful Watergardens so that the Flying-foxes would have no homeESCc drove flying-fox camp away from the water gardens in Batemans Bay

I have made management suggestions and Council has undertaken action around the Water Garden.

In Batemans Bay - removal of attracting vegetation in water gardens

Last years efforts to reduce numbers and move on the bats from Catalina and the water gardens.

Remove them from the Water gardens in B/Bay

Water gardens action by council

Water gardens clean up

Water gardens clean-up

Water Gardens cleared

Water gardens management

You wasted our tax payers money trying to get rid of them from water garden. There were other cheaper options.

Broken up camp at Water Gardens

Cleaned up the water gardens

Cleaned up the water gardens in town

A year or so ago council cleared foxes from Batemans Bay which appeared to temporarily reduce the flying-fox issue but now they have returned in as many if not greater numbers

Attempt to relocate roosting areas

ESC

Eurobodella Flying-fox Management Plan

Havent seen them since the control measures at Batemans Bay last year

I lobbied Council to remove Cocos palms from public and private land at South Durras

I park my car in a different place so it doesnt get shat on

I volunteered with WIRES to rescue and relocate injured and displaced flying-foxes. Inoculated against Lyssavirus

I'm aware of the work that has been done in the Bateman's Bay area

Installed movement activated lights to no avail

k

keep them on the move

Major project to reduce impact on the district

Na

Netted fruit trees

Notified conserned parties to be aware of increased flying-fox activity

ranger visited my home and advised solar lights on the building with absolutely no effect at all

Reduce numbers

Reduce the impact of Flying-foxes on town by making be reducing the total number in the vicinity

Reduced ONLY SOME of the feeding grounds

Regular monitoring and relocation efforts

Relief for those people who are directly affected (eg. car covers)

Relocated them

Scared em away but they came back in force

Scared them away

Sprayed them with water

They moved them on from memory

Tried to move them to new roosting sites

Tried very hard to get rid of them

We are on tank water and have had to pay $500 to put in an underwater filter system to filter out bacteria and viruses.

We have netted our fruit trees

Appendix 5: Other actions you or the Council have taken to reduce impacts of flying-foxes

Table 18: Other actions you or the Council have taken to reduce impacts of flying-foxes

A year or so ago council cleared foxes from Batemans Bay which appeared to temporarily reduce the flying-fox issue but now they have returned in as many if not greater numbers

Attempt to relocate roosting areas

ESC

Eurobodalla Flying-fox Management Plan

Havent seen them since the control measures at Batemans Bay last year

I lobbied Council to remove Cocos palms from public and private land at South Durras

I park my car in a different place so it doesnt get shat on

I volunteered with WIRES to rescue and relocate injured and displaced flying-foxes. Inoculated against Lyssavirus

I'm aware of the work that has been done in the Bateman's Bay area

Installed movement activated lights to no avail

k

Keep them on the move

Major project to reduce impact on the district

Na

Netted fruit trees

Notified conserned parties to be aware of increased flying-fox activity

Ranger visited my home and advised solar lights on the building with absolutely no effect at all

Reduce numbers

Reduce the impact of Flying-foxes on town by making be reducing the total number in the vicinity

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Sprayed them with water

They moved them on from memory

Tried to move them to new roosting sites

Tried very hard to get rid of them

We are on tank water and have had to pay $500 to put in an underwater filter system to filter out bacteria and viruses.

We have netted our fruit trees

Appendix 6: Which other actions do you feel have helped reduce the impacts of flying-foxes?

Table 19: Which other actions do you feel have helped reduce the impacts of flying-foxes?

By reducing the number in the total area it made life easier. This was achieved by council taking measures to reduce the roosting area available to them in the local area

Car covers

Caring

Community

Coordinated dispersal efforts in the past

Don't know if it helped or if the foxes moving on was a seasonal thing

Don’t know

Everyone is impacted, even if one never sees one - lot of publicity, some nonsennse

Foods left out gives them a food source.

Get rid of Cocos palms

Going out every morning as the bats came home to roost and making them find elsewhere not close to homes

Having nowhere for them to feed

I don't know

I don't think that Council strategies have helped much as I still see thousands of flying-foxes if I am ever in Batemans Bay at dusk. Removing the peach tree has reduced the numbers and frequencies of flying-fox visits but has not entirely deterred them.

I hope that it means we won't get sick from the bat droppings on the roof.

I think it impacted flying-foxes which I don't believe is great for the species

I think they should have been left alone until they left of their own accord, then the trees could have been felled.

I would call it hindered not helped the flying-foxes. It helped humans.

I’m sure that people who used the car and clothes line covers would be less impacted.

It temporarily reduced the impact

It's unclear whether the dispersal action reduced flying-foxes or whether fluctuations in the past few years were due to other factors.

Less feed

Loss of food source and resting place.

Management of feed trees in housing areas could help

Maybe a vo incident but when remived from yge Bay no longer seen in Narooma on the flat

Minimal

Moved them back from being so close to residential housing and businesses.

Moving my car

Moving the flying-foxes on was just a temporary action and they have returned.

Previous council measures finally saw the bats move elsewhere (I assume). But like I said, they have returned.

Providing residents with protective covers.

Removal but they will come back, even council says this

Shoot them

Smoke and noise

Smoke billows, noise techniques

Some

Stop them from landing

Taking their homes, food and water away

The above

The buffer zones created

The clearing of the overgrown vegetation. the combined efforts from experts and community members

The consistency

The council had a removal program supported my local community.

The councils efforts

The disbursement plan of two years ago was successful. Currently the golf course is seeing increasing numbers of bats & associated problems with smell & the constant urination particularly when they are disturbed by hitting a ball & they take off on mass. I am unsure/unaware of any proactive measures to move the bats at the present time.

The first

The lights and noise

Think they have moved on from Bay?

Understanding seasonality of camp

Unsure

Unsure how they were moved but thankful

Unsure if they helped or they just moved on anyway.

Vegetation clearing as the flying-foxes have not returned to the immediate area at the rear of the property but have returned the area close by.

Vehicle covers, removal of cocos palms and access to a gurney

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Appendix 11 Example subsidy expression of interest form

Water Gardens Flying-fox Camp
Subsidised Services Expression of Interest Form
(Distance from camp Max. 25-50m $500, 50-200m $250, 200-300 $125 per resident)

APPLICANT DETAILS

Name:……

Applicant's residential address:
……Postcode……

Applicant's postal address:
……Postcode……

Phone number: (business hours) ……

Email address: ……

I am interested in the following subsidised services:

Double glazed windows	Air conditioner	Pressure washer
Shade sail	Cleaning Products	Pool Cover
Car cover	Clothes line cover	Air deodoriser

Other goods or service relevant to reducing the impact of flying fox activity, please specify: ……

Additional comments
Would you like to provide any further information regarding the subsidised services identified in this form?

……

……

Please post the completed expression of interest form to:
Eurobodalla Shire Council
Attention: NRM Flying fox Officer
PO Box 99
MORUYA NSW 2537
Or scan and email to: council@esc.nsw.gov.au

Council will give you a call within two weeks of receiving this form to discuss your eligibility.

*Each EOI is subject to distance and impact consideration.
*Once approved the goods or service can be purchased and the eligible party can be reimbursed directly within 14 days, alternatively provide clear details of the required item and council will pay directly to our approved supplier/s

89 vulcan street moruya
po box 99 moruya nsw 2537
t 02 4474 1000 | f 02 4474 1234
council@eurocoast.nsw.gov.au | www.esc.nsw.gov.au

Appendix 12 Council flying-fox protocols

ESC PROTOCOL

Infrastructure Services Works and Flying Fox Camps

Introduction

Following the increase in Flying Foxes in the Eurobodalla region there is a need to provide ESC Infrastructure Services staff with appropriate guidance and direction on conducting work where flying foxes / bats are present.

General Information

ESC staff should refer to the ESC Safety Guide – Flying Foxes Safety Precautions for information regarding removal of dead flying foxes, reduced noise activities (inspections), Personal Protective Equipment requirements, First Aid and Immunisation.

Flying-fox numbers can increase with food availability, particularly when Eucalypt trees are in flower and they can feed and roost anywhere at any time. It is unknown how long camps may remain in a particular location. Camps can last a few days or can stay for many years.

Although flying-foxes may appear plentiful, nationally populations are on the decline and they are a protected native species by law.

Flying Fox Camp Awareness

Staff undertaking works activities should incorporate into their works planning and Work Activity Brief an assessment of areas surrounding a works site and assess bushland areas for presence of Flying Fox camps.

Known Flying Fox camp sites have been recorded at:

- The Water Gardens Batemans Bay
- Gregory St & Bavarde Ave Batemans Bay
- Lake Catalina Heron Rd & Country Club Dv Catalina
- Renee Cr Moruya Heads
- Flying Fox Rd Narooma

If Flying Foxes camps are observed staff should stop works and contact their Supervisor or Coordinator and seek clarification on continuation of works.

Undertaking Planned Council Work Activities adjoining with Flying Fox Camps

All works must be done in accordance with animal welfare and threatened species impact minimisation strategies in consultation with Council's Flying Fox Officer or Environmental Officer.

Such works may include:

- maintenance mowing
- drainage maintenance with plant
- water & sewer mains works

Points to consider :

- Avoid works adjacent to camps from August to February. If works are necessary at that time, Council's Flying Fox Officer (FFO) or an Environmental Officer (EO) should be present at all times. Prior to works commencing FFO will contact WIRES or similar group and advise works will be taking place, and make arrangements to bring in any injured flying-foxes, or flying-foxes that require assistance.
- Limiting the use of disturbing activities to certain days or certain times of day in the areas adjacent to the camp, only work up to 3 days in a row for example. FFO or EO to assess level of disturbance. If flying-foxes settled, works can proceed throughout day for up to 3 days. If unsettled, works should not extend beyond 3 hours a day for 3 days at a time.
- Stop work triggers must be identified and communicated to site staff if there is a flying-fox injury or death, a new camp/camps appear to be establishing or **the Flying fox Officer/ Environmental Officer determines that flying foxes are exhibiting stress or abandonment behaviour**.

  Stress or vulnerability indicators include:
  - if they are in flight for longer than 5 minutes
  - Fatigue (low flying animals or laboured flight)
  - Pregnant females
  - Aborted foetuses
  - Exposure to extreme weather (heat stress includes wing fanning, panting, saliva spreading and shade seeking)
  - Poor body condition (thin or sick looking)
  - Dependant young
  - Vocalisations (short low frequency calling)
- Where loud equipment (e.g. chainsaws) is required they will be started away from the camp and allowed to run for a short time to allow flying-foxes to adjust. Begin as far from the camp as possible, working towards the camp gradually to allow flying-foxes to habituate.
- Where a flying fox appears injured, an experienced vaccinated flying fox handler only is to approach, handle and collect the animal. The animal is to be taken to a vet or handed in to WIRES immediately.
- Clear responsibilities and limits of authorities will be established and communicated in toolbox talks and inductions.

  <u>Heat stress</u>
  No maintenance works to be undertaken within 50m of closest flying fox, if the temperature is over 35°C.

  <u>Other issues to consider and discuss:</u>
- Discuss if works can be done at night after fly-out during these periods or late afternoon close to or at fly-out. If this is not possible, **the Flying fox Officer/ Environmental Officer** should monitor the camp to ensure impacts are not excessive and advise on the most appropriate methods (e.g. required buffer distances, approach, etc).
- Only exception to this is when crèched young are being left at the camp. Need to avoid night disturbance during this time.

Contractors

Staff responsible for contractors undertaking maintenance activities potentially affected by Flying Foxes should review the activity. Relevant Council staff should contact the contractor to review activity and determine continuation of activity if Flying Foxes are present. Responsible Council staff may need to postpone or monitor an activity potentially affected by the presence of Flying Foxes.

Note: Staff should check with their Supervisor to confirm work activities and for clarification if in doubt about undertaking any activities regarding Flying Foxes.

Emergency Council Work Activities adjoining with Flying Fox Camps

Staff and public safety should be maintained and securing of the site to address the initial emergency may be required take precedence over the presence of Flying Foxes.

Staff should contact their Supervisor or Coordinator and seek clarification on continuation of works depending on the situation regarding staff and public safety.

Consultation with Council's Flying Fox Officer or Environmental Officer must be sought out as soon as possible.

ESC Safety Guide – Flying Foxes Safety Precautions should be applied including implementation of WHS PPE as required.

Contacts

Natural Resources Officer (Flying Foxes)- Environmental Services (4474 7349)
Engineering Environmental Support Officer – Infrastructure Services (0428 621 765)

Supporting Documentation

ESC Safety Guide – Flying Foxes Safety Precautions

Grey Headed Flying Fox Camp

Appendix 13 Example flying-fox rescue protocol

Reference documents:

OEH 2012, NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes, Office of Environment and Heritage, Sydney.

OEH 2011, NSW Code of Practice for Injured, Sick and Orphaned Protected Fauna, Office of Environment and Heritage, Sydney.

Purpose

These work instructions are intended for Australian bat lyssavirus (ABLV)-vaccinated fauna spotter catchers (FSCs) or wildlife rescue personnel on site during dispersal activities to monitor, capture or provide first aid treatment for sick or injured flying-foxes that may require human intervention for their survival. Flying-fox rescue must only be attempted by personnel trained and experienced in flying-fox rescue and handling.

This work instruction provides rescuers with information regarding capture and first aid until a flying-fox is in the specialist care of a veterinarian or person qualified in wildlife rehabilitation.

Requirements

FSC and wildlife rescue personnel involved in flying-fox rescue must:

- be trained and experienced in rescue and handling
- be vaccinated against ABLV (titre levels checked at least once every two years)
- be aware of the hazards and risks of coming into contact with all bats
- utilise appropriate PPE and equipment for capture, transport and treatment of flying-foxes
- undertake a risk assessment before carrying out a rescue – do not endanger yourself or others during a rescue
- have the contact details for a local veterinarian or bat carer who will accept the sick or injured flying-fox.

Human first aid

All bats in Australia should be viewed as potentially infected with ABLV. If bitten or scratched by a bat, immediately wash the wound with soap and water (do not scrub) and continue for at least five minutes, followed by application of an antiseptic with anti-viral action (e.g. Betadine), and immediate medical attention (post-exposure vaccinations may be required). Similarly medical attention should be immediately sought if exposed to an animal's saliva or excreta through the eyes, nose or mouth.

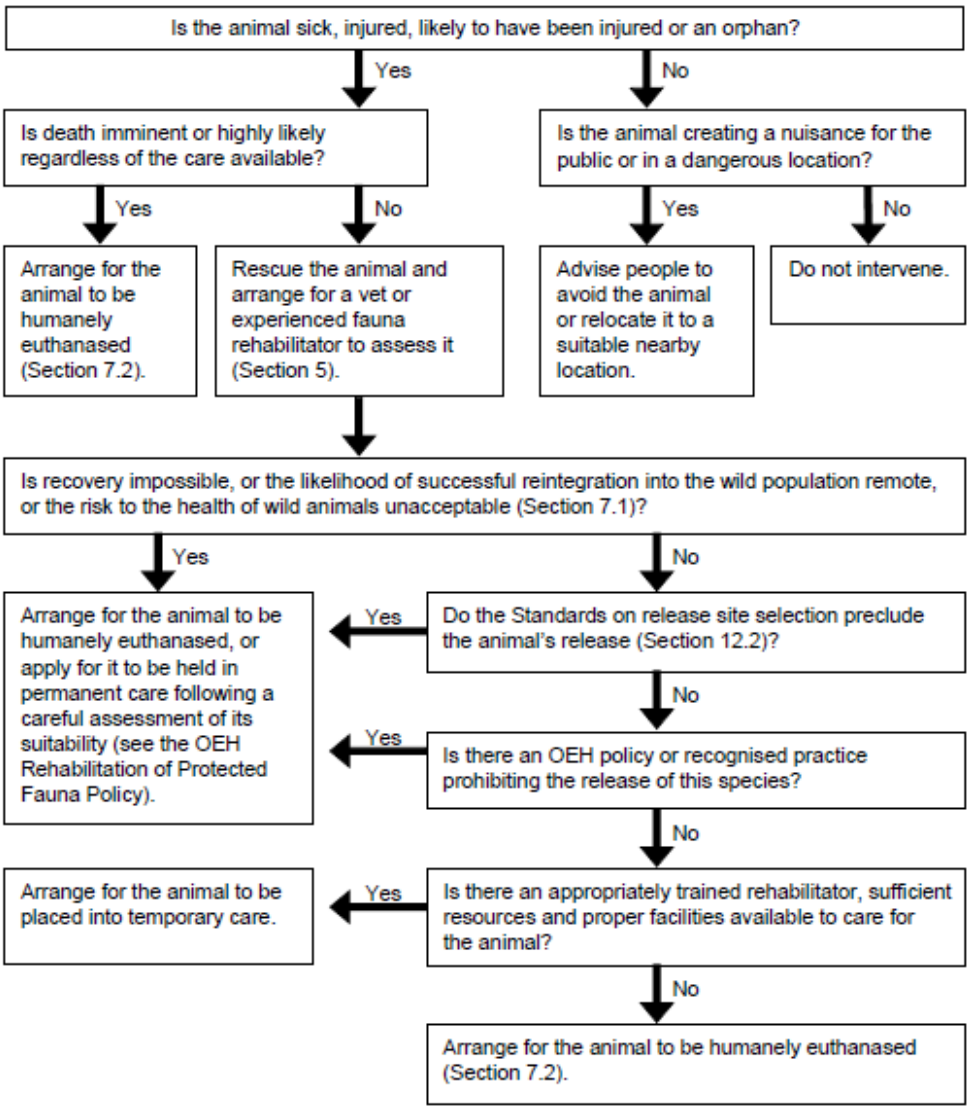
Equipment

- lidded plastic carry basket or ‘pet-pack’ with bedding (juveniles) / transport container with hanging perch, tall enough for bat to hang without hitting its head (in accordance with Section 5.1 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012))
- warm water bottle / cold brick
- wraps /towels
- teats for small bottle
- extension pole or broom
- bat first aid kit – juice drink/glucose powder, syringes, cloths for wounds, Betadine/saline, dummy for baby bats. FFs only to be offered liquids under advice from a licensed wildlife carer.

Work instructions

Case assessment

Observe, assess and then determine if/what intervention is required using the decision tree in the NSW Code of Practice for Injured, Sick and Orphaned Protected Fauna (OEH 2011), included below.



Personnel should approach stressed flying-foxes cautiously. If flying-foxes panic or fly this will waste energy; retreat and continue to monitor behaviour.

1. Dehydration: Eyes dull or depressed in skull, change to skin elasticity, skin stays pinched, animal cold, wing membranes dry, mouth dry.
2. Heat stress: wing fanning, shade seeking, clustering/clumping, salivating, panting, roosting at the base of trees, on the ground, falling from tree.
3. Obvious injury: bleeding, broken bones.

Rescue instructions

As per Section 4 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012):

i. The objective is to rescue a flying-fox while minimising further stress and injury to the animal.
ii. Before a rescue attempt, rescuers must assess the risks to the flying-fox from environmental hazards and from capture.
iii. Rescuers must employ the correct rescue equipment for the condition and location of the flying-fox, and be trained in its use.

Example scenarios

1. Bat low in tree:
   quickly place towel around bat before it can move away
   grab hold of feet, toes may curl over rescuers fingers
   place in carry basket / transport container.
2. Bat high in tree:
   place pole wrapped in towel in front of bat
   coax bat onto towel
   once on towel, quickly move away from branches and lower to ground
   once on ground, cover with towel and place into carry basket / transport container.
3. A bat caught on barbed wire fence:
   two people only – one to restrain with towel, while the other untangles
   put towels on the wire strands under or around to avoid further entanglement
   if the membrane has dried onto wire, syringe or spray water onto wing
   use pliers or wire cutter if necessary.

Animal first aid

Physical assessment: Keep animal wrapped and head covered, only expose one part at a time. Examine head. Unwrap one wing and extend. Wrap and extend other wing. Check legs. Examine front and back of body.

Dehydration: Offer water/juice (low acid juice only, e.g. apple/mango) orally with syringe (under supervision/advice from licensed wildlife carer ONLY).

Heat stress: Reduce temperature in heat exhausted bats by spraying wings with tepid water.

Hypothermia: May be seen in pups separated from mother – keep head covered and warm core body temperature slowly by placing near (not on) warm water bottle covered by towel.

Bleeding: Clean wounds with room temperature saline or diluted Betadine.

Transport to veterinarian / wildlife carer

See Section 5 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012) summarised below.

Objective

To transport a flying-fox so as to minimise further stress and injury to the animal.

Standards

The transport container must be tall enough for the flying-fox to hang by its feet without hitting its head on the floor.

The container must be designed, set up and secured to prevent injuries to the flying-fox. The sides of the container must prevent the flying-fox from poking its head or wings out.

The container must be designed to prevent the flying-fox from escaping.

The flying-fox must be allowed to hang by its feet from the top of the container or if it is unable to hang, wrapped in material (e.g. sheet or flannel) and placed in a sling so its feet are higher than its head.

The container must be kept at a temperature which is appropriate for the age and condition of the flying-fox. A range of 25–27°C is appropriate for an adult. A temperature of 28°C is appropriate for an orphan. A cool or warm water bottle may be required.

The container must be ventilated so air can circulate around the flying-fox.

The container must minimise light, noise and vibrations and prevent contact with young children and pets.

During transport, a container holding a flying-fox must have a clearly visible warning label that says ‘Warning – live bat’.

A flying-fox must not be transported in the back of an uncovered utility vehicle or a car boot that is separate from the main cabin.

Guidelines

- Flying-fox transport should be the sole purpose of the trip and undertaken in the shortest possible time.
- The fauna rehabilitation group’s contact details should be written on the transport container in case of an emergency.

Appendix 14 Heat Stress Event draft response plan

This draft plan aims to assist Council to manage heat stress events (HSE). The following should be read with referral to the OEH heat stress fact sheet. Whilst there is no obligation for Council to mitigate against heat stress impacts at a flying-fox camp, proactively managing these events will:

- minimise potential welfare impacts
- support conservation, including of the threatened GHFF
- minimise flying-fox mortality which will also reduce community amenity and potential health impacts associated with morbidity and mortality
- reduce the likelihood of close interactions with people and flying-foxes which may result in a bite or scratch
- minimise costs and energy expended by reactively managing HSE (i.e. carcass collection and disposal).

It is important to recognise that intervening at an inappropriate time or under certain circumstances can be more detrimental than beneficial. Welbergen (2012) suggests intervention is generally not recommended, unless animals are still unresponsive after temperatures have dropped below ~37°C. As such, a response plan should only be considered when guided by people with extensive experience in managing a HSE. As detailed in the OEH fact sheet, approval is also required to intervene in a HSE (e.g. for example when a response is initiated by a licenced fauna rehabilitation group).

What is heat stress?

Flying-foxes suffer from heat stress when the ambient temperature exceeds the physiological limits flying-foxes can endure for maintaining a comfortable body temperature (Bishop 2014). Flying-foxes are susceptible to heat stress due to their inability to sweat (Snoyman et al 2012), therefore they need to expend energy on cooling mechanisms such as fanning. BFF are considered to be more susceptible to HSE than GHFF due to the southern expansion of their range with temperature extremes increasing in severity with latitude in eastern Australia (Welbergen et al 2008).

A flying-fox is considered to be suffering from heat stroke once fanning and shade-seeking is no longer effective and must resort to panting and salivating to reduce body temperature. The point at which heat stroke develops varies with each individual's behaviour and metabolic rate (Bishop 2014). Heat stroke is the cell damage that occurs from enduring the effects of prolonged exposure to heat and the physical effort (exertion) involved to dissipate heat. Exertional heat stroke can lead to myopathy (muscle damage), rhabdomyolysis (breakdown of muscle causing kidney damage) or multi-systemic damage to gastrointestinal tract, renal, circulatory, nervous or respiratory systems as well as death.

The HSE plan consists of three parts:

1. Prediction and preparation
2. Coordination and mobilisation
3. Responding and treatment

1. Prediction and preparation

Factors that contribute to a HSE vary from colony to colony, depending on geographic location, weather, camp characteristics and demographics (table below)

Heat stress event variables

Weather / climate	Roost characteristics	Demographics
< 38ºC (with likely mortality at 42ºC)	Species composition	No. of lactating mothers
No. of consecutive hot days	Size of roost	No. and age of juveniles
Humidity	Understorey vegetation	Birthing season – early or late

The Lab of Animal Ecology (Western Sydney University) has developed the Flying-fox Heat Stress Forecaster to monitor weather conditions at known flying-fox camps and provide alerts when heat stress and heat-related mortality is likely. Those responsible for monitoring should set alerts through the forecaster to ensure they are notified of a potential HSE. When a potential HSE is predicted, weather conditions at the camp should also be monitored to determine the likelihood of a HSE occurring. Those responsible for monitoring will need to contact a HSE Response Coordinator when a HSE is predicted (see figure below).

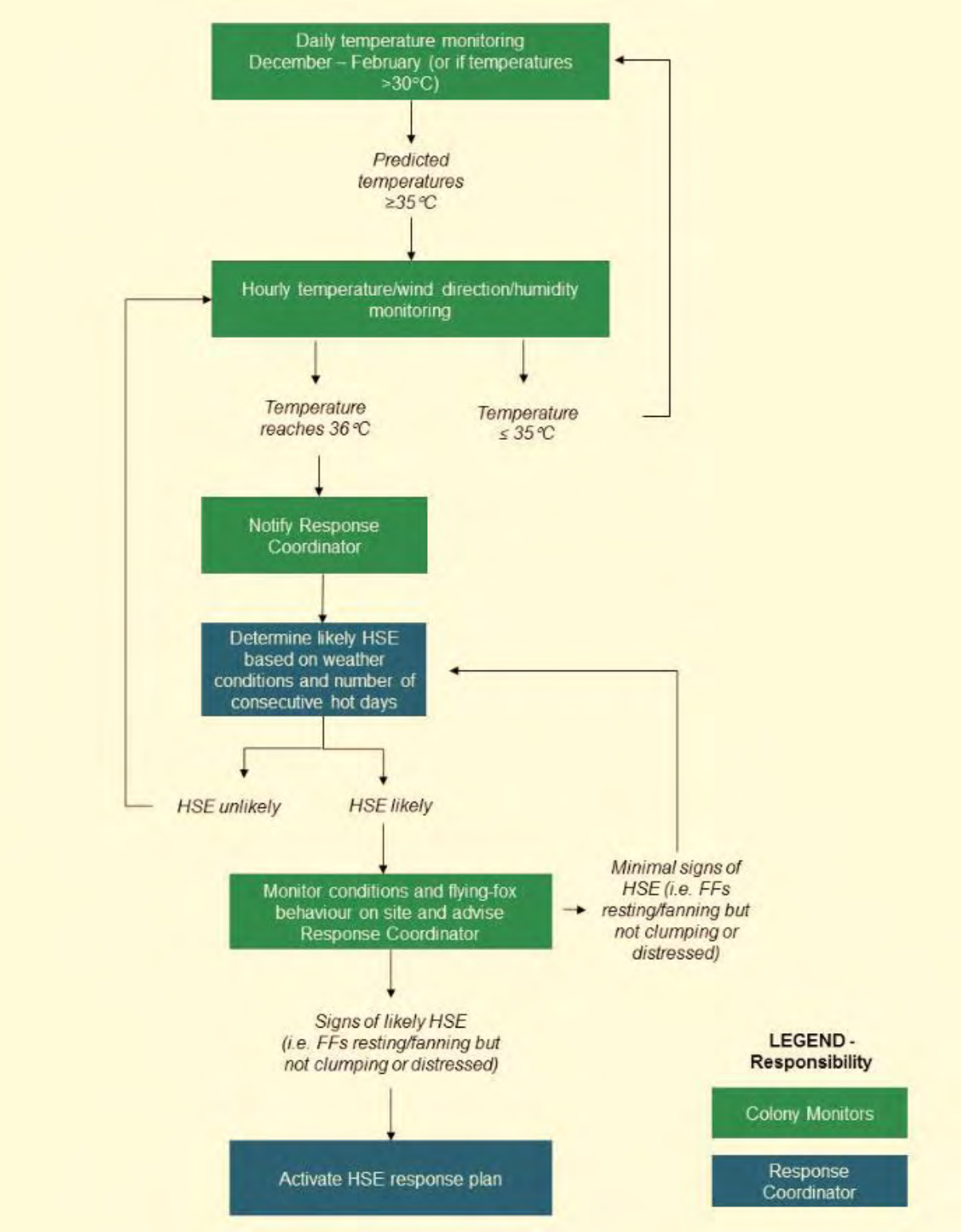
It is necessary to determine on-ground logistics before conditions for an HSE arise. A Site Response Plan should be prepared that includes:

- access points
- parking
- availability of water
- suitable locations for headquarters and triage tent
- liaising with neighbouring residents and providing information on potential management actions
- health and safety requirements.

The site response plan should identify hazards in and around the camp and the controls to be implemented to reduce risk to response plan participants. Identify the minimum requirements for personal protective equipment and ensure all participants are adequately provided with this equipment. Clear demarcation must be made for what actions ABLV-vaccinated and non-vaccinated participants can complete.

The site response plan will need to include a list of key personnel and support organisations with contact details. Documents such as sign in sheets and data recording sheets should be prepared in advance and held at the headquarters (which should be located away from the triage area to minimise activity at the triage tent). While Council is responsible for assisting risk mitigation, the safety plan and induction should identify that Council insurance policies only apply to paid Council staff.

Responding to an HSE is confronting and will be highly stressful for some participants. There is also a risk that people will be physically affected by heat. Preventative measures and support for people experiencing physical or emotional responses to conditions during the HSE should be included in the site health and safety plan.



HSE response tool

2. Coordination and mobilisation

Equipment required to effectively manage a HSE shown in the table below, including who will supply.

Resources required and supply responsibilities. *Note in the event Council is unavailable, responding wildlife carers/veterinarian will need to supply these items.

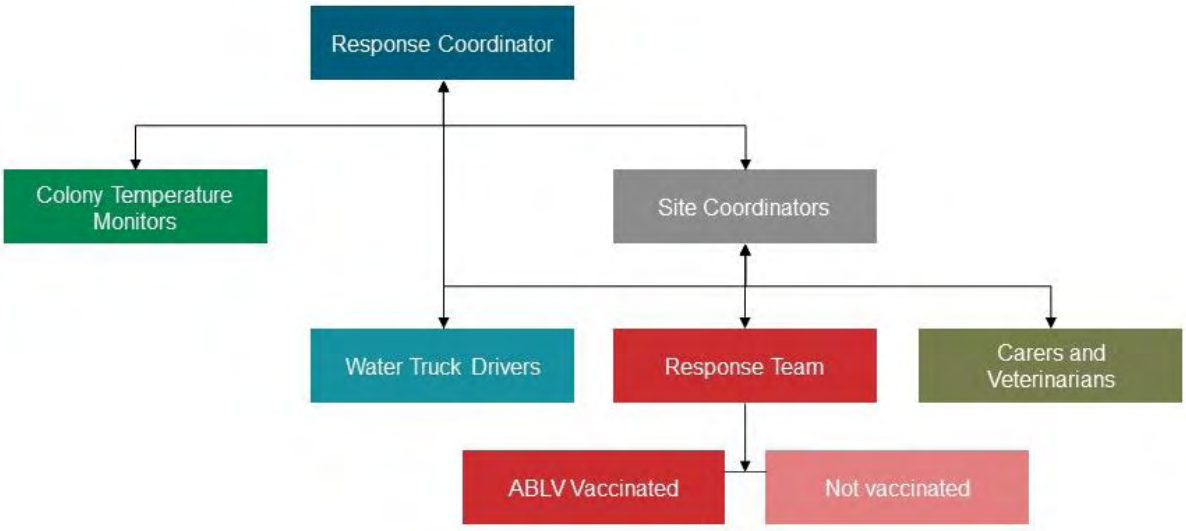
Resource	Supply		
	Personal	Council*	Carer/veterinarian
PPE			
hat	✓		
long pants	✓		
closed shoes	✓		
puncture-resistant gloves		✓	✓
sunglasses or protective eyewear	✓	✓	✓
water bottle	✓		
insect repellent	✓		
face masks when collecting bodies		✓	
Cooling equipment			
water tankers/trailer/sprinklers		✓	
back pack sprayers/hand-held pumps	✓	✓	✓
hand held sprayer	✓	✓	✓
First aid - human			
first aid kit		✓	
wash station		✓	
drinking water	✓	✓	
flying-fox transport cages			✓
First aid – flying-fox			
triage tent		✓	
towels	✓		✓
syringes			✓
fluids and other veterinary supplies			✓
garbage bags for disposal		✓	✓
folding tables		✓	
Communication			
mobile phones	✓		
safety plan with contact details		✓	

The role of Response Coordinator and Site Coordinators should be undertaken by suitably qualified personnel (table below). Communication lines between personnel are shown in the figure below.

Personnel and responsibilities. *Note in the event Council is unavailable, these roles will need to be filled by non-Council personnel.

Role	Responsibilities	Who*	Reports
Response Coordinator	· first point of contact for Colony Temperature Monitors · initiate heat response plan including notifying Site Coordinators and arranging other team members · coordinate data records (i.e. any incidents, numbers/species/status of sick, injured, treated or dead flying-foxes) · coordinate timing, resources (equipment and personnel) · prioritise sites	Council staff member/contractor (1 per heat stress event)	Direct reports: Site Coordinators Reports to: Council
Colony Temperature Monitors	· set alerts through the Flying-fox Heat Stress Forecaster and monitor weather sites for conditions in colony before a potential HSE and notify Response Coordinator if HSE is likely · set up sprinklers under the colony the day before possible heat stress event if requested by Response Coordinator · monitor colonies on site if directed by Response Coordinator, and provide feedback of flying-fox behaviour to inform heat stress response · participate as required in heat stress response	Volunteers (2 prior to heat stress event then 1 per roost during heat stress event)	Direct reports: Nil Reports to: Response Coordinator
Site Coordinator	· initiate and enforce safety protocols (as per site safety plan), including personnel inductions · maintain site communication protocols · delegate roles and position in and around the colony according to Australian Bat Lyssavirus (ABLV) vaccination status · supervise personnel · collect site data records and provide to Response Coordinator · coordinate all activities on site and prioritise site-specific activities · set up triage tent · administer first aid to personnel if required · debrief team · support to all team members · report regularly to Response Coordinator	Volunteer (1 per roost)	Direct reports: Response team Reports to: Response Coordinator
Water truck driver/s	· drive to priority roosts (as advised by Response Coordinator) and operate water trucks/trailers as required. Suitably experienced members of the Response	Council staff (preferably 1 per per roost)	Direct reports: Nil

Role	Responsibilities	Who*	Reports
	Team are to advise of water pressure, nozzle dimension and water direction.		Reports to: Response Coordinator
Response team	· monitor and observe flying-fox behaviour and report to Site Coordinator · spray water as advised by Carers/Veterinarians observe flying-foxes and take records · if vaccinated and trained, rescue flying-foxes as advised by Carers/Veterinarians · if vaccinated collect deceased flying-foxes, checking for attached young. · unvaccinated personnel must not handle flying-foxes in any circumstances. Such volunteers may: observe and collect weather/flying-fox behaviour information, register triaged animals, sign-in/sign-out participants, maintain human and flying-fox supplies.	Volunteers	Direct reports: Nil Reports to: Site Coordinator
Carers and Veterinarians	· provide advice to personnel for cooling/rescuing bats · triage · rehydration and treatment · euthanasia if necessary	Carers/veterinary staff (volunteer capacity)	Direct reports: Nil Reports to: Site Coordinator



Communication lines between HSE personnel

3. Responding and treatment

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

- wing fanning
- shade seeking
- clustering/clumping
- salivating
- panting
- falling from trees.

While clustering is considered a normal behaviour in little red flying-foxes, clumping is the term used when flying-foxes roost on top of each other in any of the following positions (Stanvic et al 2013):

- shaded side of the tree
- in the understorey
- at base of trees or on the ground
- under logs or in tree hollows.

When flying-foxes begin to suffer from the heat, they fan themselves and move lower down the trees to avoid direct sunlight. Females with young will fan more often than all other demographic groups at high temperatures.

When wing fanning and shade seeking no longer adequately disperse heat, flying-foxes may resort to panting and saliva spreading. Saliva spreading will result in significant loss of body water and should only be used when body temperature has risen close to lethal limits (Licht and Leitner 1967 in Welbergen et al 2012). Table 4.3 details how personnel assisting the roost should respond to each behavioural response.

Triage should be determined by the Site Coordinator in consultation with the Carer/Veterinarian on site and the Response Coordinator, and vaccinated personnel delegated to collect if required.

Do not touch flying-foxes without appropriate PPE. Only vaccinated and trained people should come into contact with flying-foxes. All bats should be viewed as potentially carrying ABLV. If disposing of a dead flying-fox, do not directly touch it, use a shovel or tongs and place into two plastic bags.

Table 4.3 Flying-fox behaviour and appropriate action

Stage	Bat behaviour	Action
Resting	Hanging from perch, wings wrapped around body, eyes closed.	No action required.
Normal clustering	May include fanning.	Do not approach. Continue to observe.
Bats fanning	Movement of wings in steady fanning motion. Note: not to be confused with wings outstretched when males broadcast their scent.	Do not approach. Continue to observe.
Clumping	Individuals moving in close proximity of each other. May appear hyperactive or distressed.	Observe from a distance so as not to disturb unnecessarily. Some clumps may be receptive to mist spraying.
Flying	Flying aimlessly, colliding with trees.	Retreat – flying will exacerbate HSE affects and risks females dropping young.
Moving down from canopy	Clumping in the understorey. Clumping at base of trees or on the ground. Clumping under logs or in tree hollows.	Spray and observe Even when in the understorey and base of trees, bats are capable of responding to spraying and can return to the canopy when conditions cool back down. If flying-foxes attempt to avoid spray, retreat to ensure HSE affects are not exacerbated.
Signs of heat stroke begin		
Panting	Rapid breathing with mouth open.	Spray and observe. If flying-foxes attempt to avoid spray, retreat to ensure HSE affects are not exacerbated.
Licking wrists	Individuals licking wrists or wing membranes.	Spray and observe. If flying-foxes attempt to avoid spray, retreat to ensure HSE affects are not exacerbated.
Bats on ground	Flying-fox on ground, lethargic.	Spray and observe. If flying-foxes attempt to avoid spray, retreat to ensure HSE affects are not exacerbated. Report to flying-fox coordinator/vet. Collect and take to first aid tent.
Falling to the ground	Disorientated.	Leave unconscious bats. If juveniles are attached to deceased mothers, they will need to be removed by carers.
Bats dead	Unresponsive.	Collect if disturbance to remaining camp can be minimised OR Leave and collect at night.

During the HSE, keep record of:

- flying-fox behaviour and time of day
- flying-foxes receiving treatment – species, sex and age (and volunteers who took each animal into triage)
- mortality data – species, sex and age.

Complete the Lab of Animal Ecology (Western Sydney University) Flying-fox Heat Stress Data Form for both affected and unaffected camps to support research into the affects, outcomes and appropriate response to future HSE.

Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	31/05/2018	Shire-wide flying-fox plan	Emily Hatfield Senior Wildlife Biologist	Jess Bracks Principal Wildlife Biologist	
01	03/08/2018	Eurobodalla flying-fox management plan - DRAFT		Eurobodalla Shire Council	Jess Bracks Principal Wildlife Biologist
02	31/08/2018	Eurobodalla flying-fox management plan – FINAL DRAFT		Emily Hatfield Senior Wildlife Biologist Jess Bracks Principal Wildlife Biologist	
03	06/09/2018	Eurobodalla flying-fox management plan – FINAL DRAFT R1		Eurobodalla Shire Council	Jess Bracks Principal Wildlife Biologist
04	12/11/2018	Eurobodalla flying-fox management plan – November 2018		Eurobodalla community (public submissions) Emily Hatfield Senior Wildlife Biologist	Jess Bracks Principal Wildlife Biologist

Distribution List

Copy #	Date	Type	Issued to	Name
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2	12/11/2018	Electronic	Ecosure	Administration

Citation: Ecosure (2018), Eurobodalla Flying-fox Management Plan, Report to Eurobodalla Shire Council, Publication Location – Brisbane.

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