FLYING-FOX CAMP MANAGEMENT PLAN

ABERDEEN & SCONE

Camp Management Plan

October 2017 | Upper Hunter Shire Council

NSW GOVERNMENT Office of Environment & Heritage

UPPER HUNTER SHIRE COUNCIL

Prepared by Hunter Councils Environment Division for Upper Hunter Shire Council

Contact Details:

Hunter Councils Environment Division
PO Box 3137
THORNTON NSW 2322
Phone: 02 4978 4020
Fax: 02 4966 0588
Email: envirodirector@huntercouncils.com.au

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Disclaimer

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We acknowledge the broader input received from Local Council Officers undertaking similar Flying Fox Camp Management Plans in the Hunter Region, as their efforts may have influenced the creation of this Camp Management Plan (CMP).

We acknowledge input by the NSW Office of Environment and Heritage, and consultants Ecosure, in developing the template on which this Camp Management Plan was based. Peggy Eby also provided advice which was included in the template.

Document Note

The NSW Office of Environment & Heritage is working closely with the Councils of the Hunter and Central Coast Region to develop a Hunter & Central Coast Regional Flying-fox Management Strategy that will seek to provide a regional management context that supports the individual Camp Management Plans, and provide greater coordination of resources.

Updated foraging models (from those created for the 2013 *Grey-headed Flying-fox Management Strategy for the Lower Hunter*) will be included in the Hunter & Central Coast Regional Flying-fox Management Strategy (expected to be completed in the later half of 2017) and may therefore supersede the information provided in Section 3.1.

Contents

Acronyms and Abbreviations

ABLV	Australian bat lyssavirus
BFF	black flying-fox (*Pteropus alecto*)
DoE	Commonwealth Department of the Environment
DPI	Department of Primary Industries (NSW)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	Environment Protection Authority (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
GHFF	grey-headed flying-fox (*Pteropus poliocephalus*)
the Guideline	Referral guideline for management actions in grey-headed and spectacled flying-fox camps 2015 (Commonwealth)
HeV	Hendra virus
LGA	local government area
LGNSW	Local Government NSW
LRFF	little red flying-fox (*Pteropus scapulatus*)
MNES	matters of national environmental significance
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPWS	National Parks and Wildlife Service (NSW)
OEH	Office of Environment and Heritage (NSW)
PEPs	protection of the environment policies
the Plan	Camp Management Plan
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
the Policy	Flying-fox Camp Management Policy 2015 (NSW)
SEPPs	State Environmental Planning Policies
SIS	species impact statement
TEC	threatened ecological community
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

Executive Summary

This Camp Management Plan has been developed as part of a Hunter Regional project that has developed Flying-fox Camp Management Plans for Central Coast Council, Mid Coast Council, Muswellbrook Council, Singleton Council, Port Stephens Council and Upper Hunter Shire Council. Participating in this project has enabled strong alignment with the actions of other Councils and the creation of active working relationships with these Councils, so that if any management action undertaken affects the roosting behaviours or Flying-foxes in one jurisdiction, a network of land management / ecology specialists can notify neighbouring Councils of any possible increased Flying-fox movements.

The Camp Management Plan has been compiled by the Hunter Joint Organisation of Councils' Environment Division, utilising the NSW Office of Environment and Heritage's "Flying-fox Camp Management Plan Template 2016" and input from all participating Councils, the Office of Environment and Heritage, responses from Community Consultation and key stakeholders.

The plan has been prepared to identify actions that are available to reduce the impact of flying foxes on residents, particularly adjacent to the land occupied by the camp, while maintaining suitable habitat on the site to support the population of the grey-headed flying-fox, a listed threatened species. The plan also provides general guidance throughout the Upper Hunter local government area for flying-fox camps.

The purpose of this plan is to undertake camp management in accordance with the Office of Environment and Heritage (OEH) Flying-fox Camp Management Policy (OEH 2015). The plan has been prepared in consultation with OEH. If approved by OEH (in combination with other relevant license applications and legislative requirements) this plan will enable appropriate vegetation management on the land under NSW state legislation to reduce impacts of the camp on residential areas.

This Plan provides details on Flying-fox Camps at both Aberdeen and Scone in Upper Hunter, as the Camps are in close proximity to each other, support a relatively small number of Flying-foxes intermittently, and largely have the same management activities recommended for implementation. A separate Camp Management Plan is being developed for the Murrurundi Camp.

The plan outlines how the land occupied by the camps will be managed, and actions that Council will take to reduce residential impacts as far as possible. Little or no direct impact to flying-foxes arising from the proposed management actions is anticipated, and no license is therefore expected to be required.

The plan operates for a period of 5 years.

1 Overview

1.1 Background

Flying-foxes (both Little Reds and Grey-Headed Flying Foxes) have utilised stands of vegetation to roost in Aberdeen and Scone intermittently since 2010. In particular, Flying-foxes had roosted in vegetation along the Hunter River, but in 2013, redevelopment of the bridge displaced the camp to its current location on the western side of the Hunter River opposite St Andrews Park, which is approximately 50 metres to the horse track. The maximum animals observed on site was 3,000 in April 2015, although this population level lasted less than 3 weeks, and very few animals have been observed on site since.

Flying-foxes were also observed roosting in the grounds of the Scone Golf Course in 2011-12 with some 10,000 animals observed in December 2011.

Grey-headed flying-foxes are listed as threatened species under both NSW and Commonwealth legislation, and disturbance to flying foxes and their habitat is limited by legislative requirements. This species is highly mobile and camp populations vary widely over time due to food resource availability.

The Aberdeen and Scone Flying-fox Camp Management Plan provides a tool to ensure appropriate management of both Flying-fox camps and also the management of potential new roosting sites within the residential areas of Scone. This management plan outlines the issues of concern to the community caused by the presence of flying-foxes, and measures that will be taken to manage the land and reduce conflict with the local community. This approach may guide Council's approach in other locations in the local government area if flying-fox issues arise.

Experience in other areas has shown that attempts to move camps are generally unsuccessful, expensive, and likely to result in relocation of problems. Therefore, management actions proposed at Aberdeen are primarily to manage any impacts on the community from the Camp.

Preparation of the Plan included a community survey of residents throughout the community; and consultation with the NSW Office of Environment and Heritage.

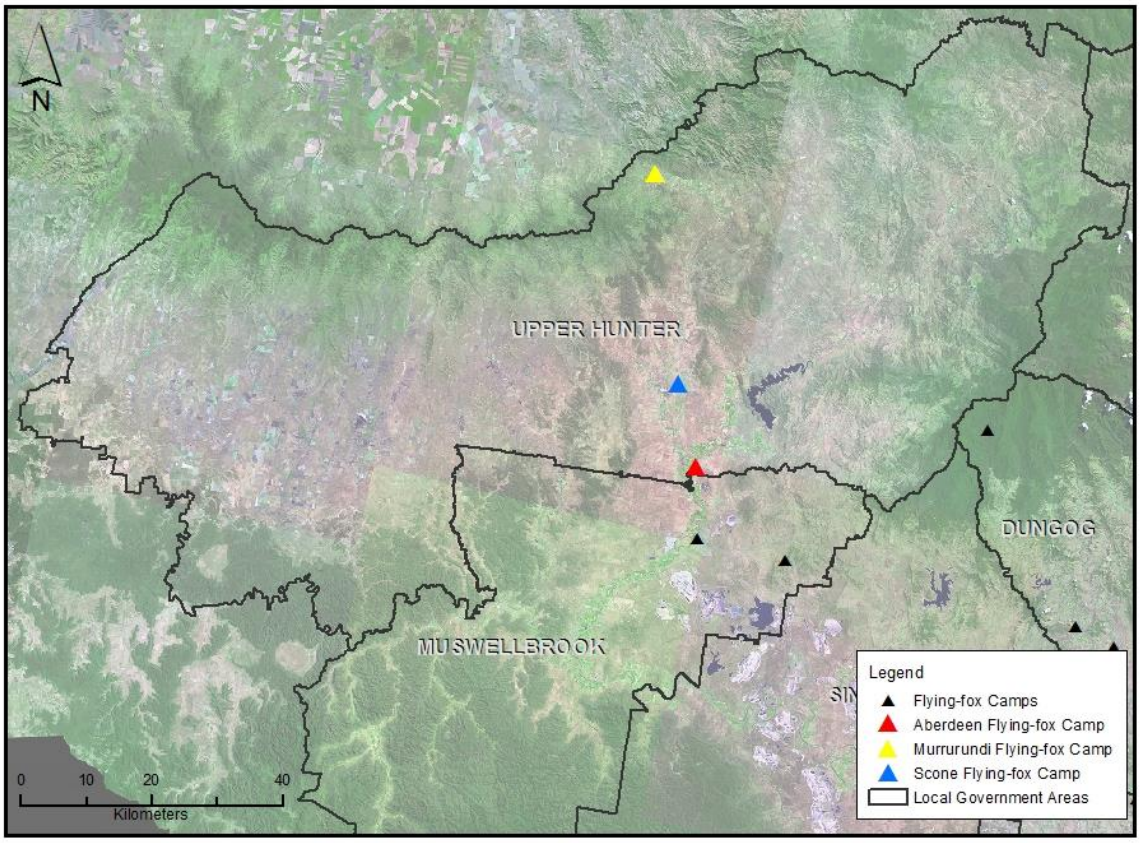
The Camp Management Plan provides the framework for guiding Council's management actions on the land, and in responding to concerns of nearby residents.

Given the mobility of flying-foxes and the expected variability of the population of the camp over time, the focus of implementation actions is on:

- Education and awareness programs
- Property modification
- Routine camp management
- Protocols to manage incidents
- Appropriate land use planning
- Buffers through vegetation removal
- Buffers without vegetation removal

In the event that the flying-foxes no longer occupy the site or are present in low numbers, then many of the actions identified in the Plan may not be required. Alternatively, if the number of individuals at the camp increases, then it may be necessary to review actions.

Map 1: Location of Flying-fox Camps in the Upper Hunter Shire Council area and surrounds



1.2 Objectives

Upper Hunter Shire Council has developed this Flying-fox Camp Management Plan to provide Council, and the community a clear framework for the management of the Aberdeen and Scone Flying-fox Camps.

The objectives of this Camp Management Plan (the Plan) are to:

- minimise impacts to the community, while conserving flying-foxes and their habitat
- enable land managers and other stakeholders to use a range of suitable management responses to sustainably manage flying-foxes

The following Plan provides details on the Camp site, Flying-fox species, community inputs, management opportunities and an agreed Management Plan designed to achieve the above stated objectives.

The objectives of the plan are consistent with the Office of Environment and Heritage Flying-fox Camp Management Policy (OEH 2015).

2 Context

2.1 Local Context

2.1.1 Flying-fox Camps and Surrounds

Grey-headed flying-foxes started visiting the Aberdeen site in late 2010 which correlated to food shortages in other areas of the Hunter). The Aberdeen flying-fox camp is located on Crown Land, on the western side of the Hunter River opposite St Andrews Park, approximately 50 metres from the horse track.

The Aberdeen Camp has been intermittently utilised since 2010, with a significant increase in animals noted in 2015 when the local "Camp Draft" was cancelled due to animal health concerns of having horses in such close proximity to flying-foxes. Large numbers of flying-foxes arrived in January 2015 and had left the site entirely by May 2015 (Pers. Comm NPWS May 2017). The maximum number of animals observed on the site was 3000 in April 2015, although this population level lasted less than 3 weeks. No breeding or mating activities were observed at the site.

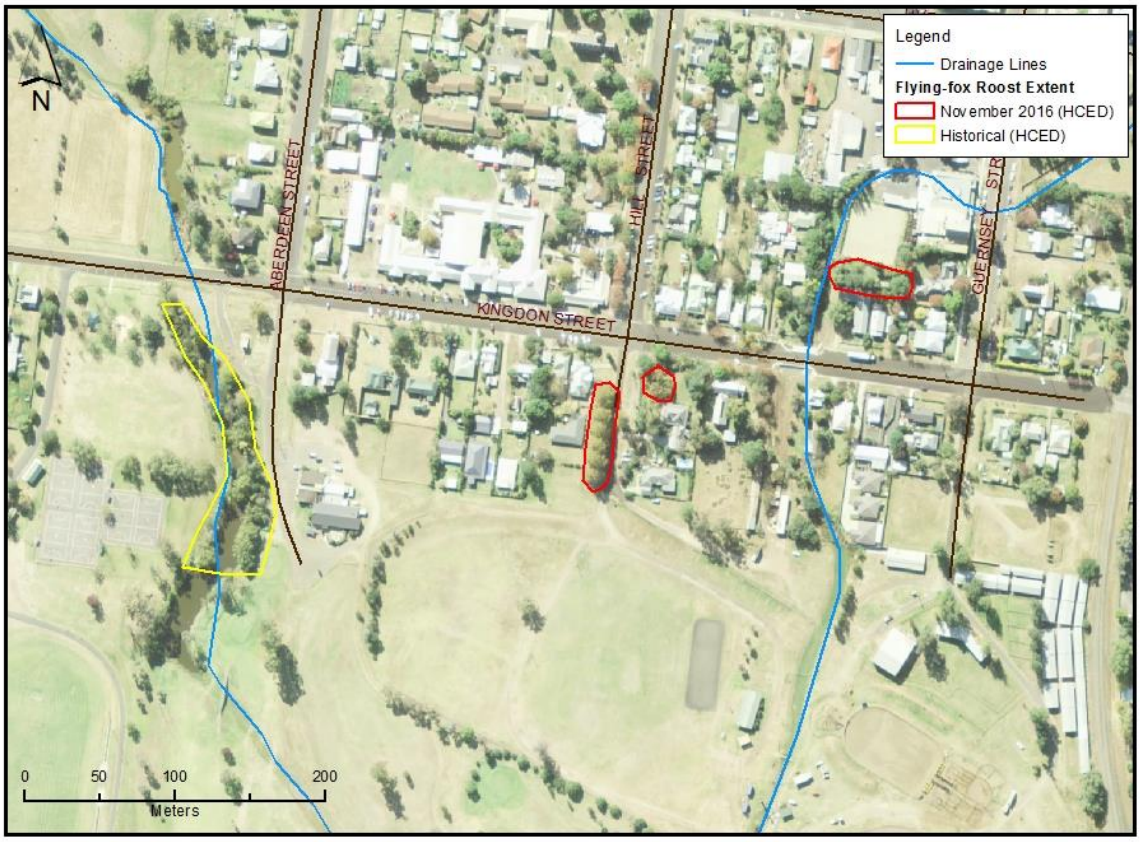
The approximate area of the camp is shown on Map 2. This area is not always fully occupied at any one time; and sometimes there have been no Flying-foxes. The number and frequency of Flying Fox occupancy is not clearly understood, regular monitoring of the camp is required to identify whether this site is utilised only during times of increased food availability.

Flying-foxes were first noted in the south western residential area of Scone in 2016 (predominantly in Hill Street, Kingdon Street and the Scone Golf Course). Given the proximity to Aberdeen and the high likelihood that Flying-foxes may use both Camp sites when in the region, the Scone Camp is included in this Camp Management Plan (see Map 3 for site map of the Scone Flying-fox Camp).

Map 2: Aberdeen Flying-fox Camp location

The Scone Camp, when occupied, has a higher likelihood of community concern when compared to the Aberdeen Camp, due to the close proximity to residential dwellings, and community sport and recreation areas.

Map 3: Scone Flying-fox Camp location and Historical extent



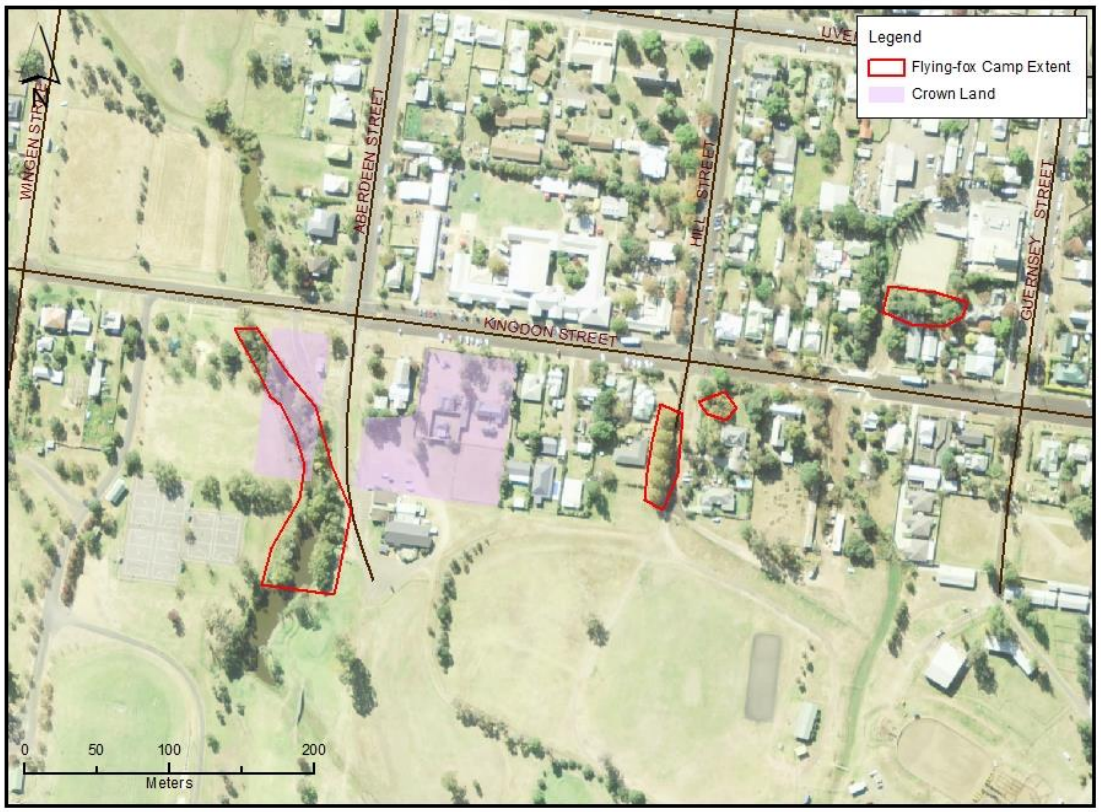
2.1.2 Land Tenure, Zoning and Land Use

The Aberdeen Flying-fox Camp is predominantly located on Crown Land under the care and control of Upper Hunter Shire Council as shown in Map 4. The site is on land Zoned public recreation and is directly adjacent to a field utilised primarily for equine events.

The Scone Flying-fox Camp, is relatively new and only utilised intermittently. Map 5 provides details of the Camp site and tenure, noting a small portion of the roosting area occurs on Crown Land, with the remainder occurring on privately owned land.

Map 4: Land tenure of the Aberdeen Flying-fox Camp and surrounds

Map 5: Land tenure of the Scone Flying-fox Camp and surrounds



2.1.3 Flying-fox Population & Statistics

Scientific Committee Recommendation for Listing as a Nationally Vulnerable Species

Advice to the Federal Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) recommended Grey Headed Flying-foxes should be listed as Vulnerable due to the decline in the National Population over the preceding years[1].

The Committee noted population size data obtained by fly-out count surveys contain a degree of error that is difficult to quantify (related to the survey methodology; and the comparability of the survey results for the purpose of calculating trends in population size or species abundance). Fly-out counts are acknowledged by the scientific community to be the best method currently available of obtaining reliable and reproducible estimates of abundance (if not actual population counts) for flying-foxes. The available data for 1989 and 1998-2001 has been obtained using the same survey techniques that are widely acknowledged to be appropriate for estimating the abundance of this species.

The data available from the fly-out counts conducted should be regarded as estimates of abundance, rather than precise population counts.

The surveys of 1998-2001 have been much more comprehensive than the 1989 survey in terms of the number of roosts and extent of geographical range included. Despite the significantly increased knowledge of the species roost sites and survey effort, the estimates of abundance obtained indicate a decline in the abundance of the species. Using the maximum estimate from the 1998-2001 surveys (400,000) and the minimum estimate of abundance in 1989 (566,000), the rate of decline since 1989 has been in the order of 30%.

A number of experts commented that the projected habitat clearance in northern NSW is the primary ongoing threat to Grey-headed Flying-foxes. One expert stated that annually reliable winter resources are limited in distribution to a narrow coastal strip in northern NSW and Queensland. These coastal areas are targeted for intensive residential development to cater for a projected 25% increase in the human population over the next decade. It was this argument that convinced the Editorial Panel of the Bat Action Plan to identify Grey-headed Flying-foxes as vulnerable, although the Editorial Panel was not unanimous in its decision.

Flying Fox Population at the Aberdeen and Scone Flying Fox Camps

The Aberdeen and Scone Flying-fox Camps have no official CSIRO Census data, as they were only officially added to the census in 2016, and no animals were present during the recent census periods.

As previously stated, observations provided by local Wildlife Rehabilitators and NPWS estimated the Aberdeen maximum population at 3,000 animals in 2015 and the Scone population at 10,000 animals in 2011.

[1] http://www.environment.gov.au/biodiversity/threatened/conservation-advices/pteropus-poliocephalus, accessed 27 March 2017.

2.1.4 Community Interests and Issues Related to the Camp

Flying-foxes have been a constant issue discussed in local papers and media over the years, specific media related to the Upper Hunter Flying-fox Camps is details in Table 1.

Table 1: Local media related to the Flying Fox Camps

Article	Outlet	Date	Issues
Hendra virus fears prompt cancellation of Aberdeen campdraft	ABC News	12 May 2015	• Fear of Hendra virus • 4 people and 90 horses have been killed by Hendra virus since it was discovered in 1994 • Bats are here to stay for a while • Close contact with flying fox faeces
Flying fox colony force campdraft to be postponed over Hendra worry	Sydney News	12 May 2015	• Hendra virus vaccination on agenda for local horse owners • Event cancelled • Danger to horse owners • Health hazards associated with flying foxes
It's making us batty	Hunter Valley News	12 May 2015	• Flying foxes are natural host for the Hendra virus • Illness responsible for deaths • High cost of horse vaccination • Council has erected warning signs • Flying foxes are not Council's responsibility • Assessment of risk • Penalties in place for harming flying foxes
Bat invasion occurs	Scone Advocate	14 May 2015	• They are dangerous • Angering local residents • Flocks of the dirty animals • Number have been growing • Campdraft cancelled • Major threat of virus • Bat colonies, schools and horses are not a good mix • Council has erected warning signs • Very little risk to humans or horses • Flying foxes are protected species
Bat invasion prompts fears for student a Upper Hunter school	ABC News	14 May 2015	• Campdraft cancelled • Risk to student health • Vets say concerns are legitimate • Prudent to minimize contact between horses and flying foxes • Finding a way to remove the animals
Bats 'out of control'	Muswellbrook Chronicle	15 May 2015	• Muswellbrook accommodation and tourist provider • Nothing is being done to address the issue • Natural host of the Hendra virus • 4 people and 90 horses have been killed by Hendra virus since it was discovered in 1994 guests at the park say the noise is deafening • Flying foxes are protected

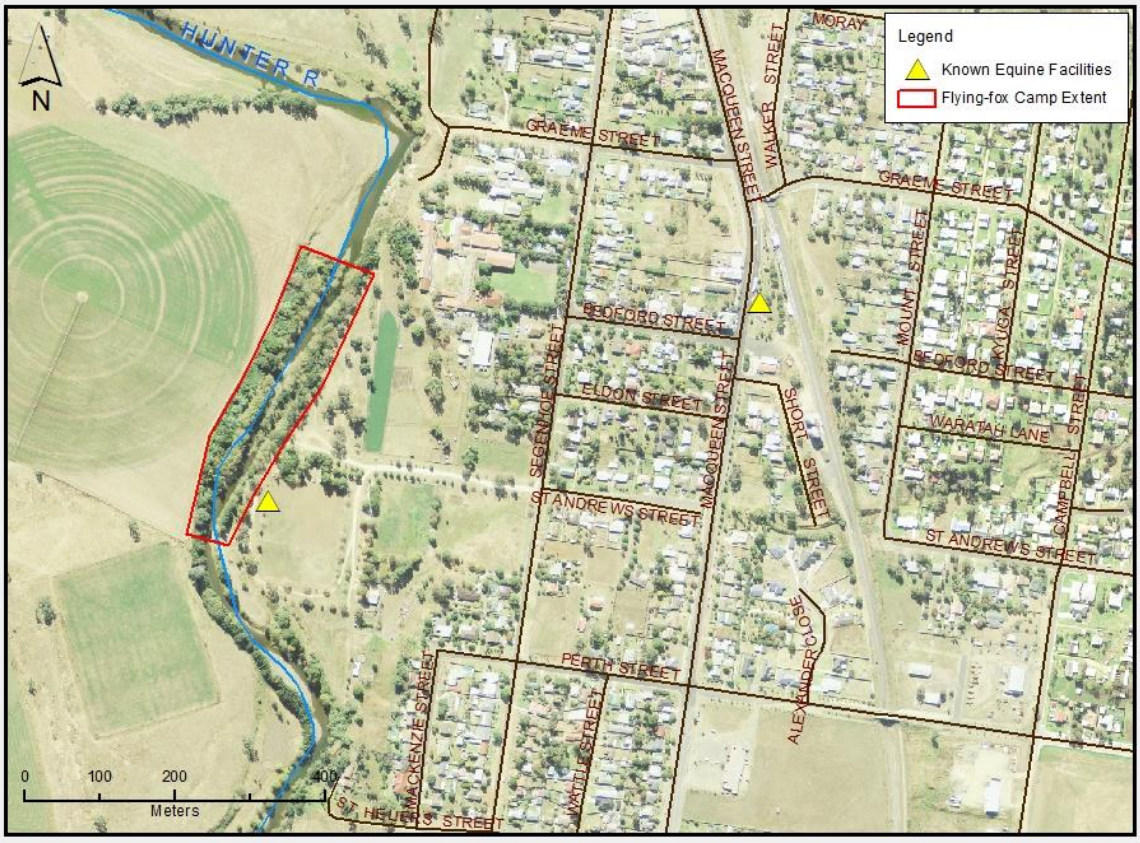
The following list is a collation of the issues related to the camp that have been reported by the community. The list has been compiled from information collected via a range of reporting and consultation methods. Further discussion about community engagement efforts and outcomes can be found in Section 3.

Reported issues include:

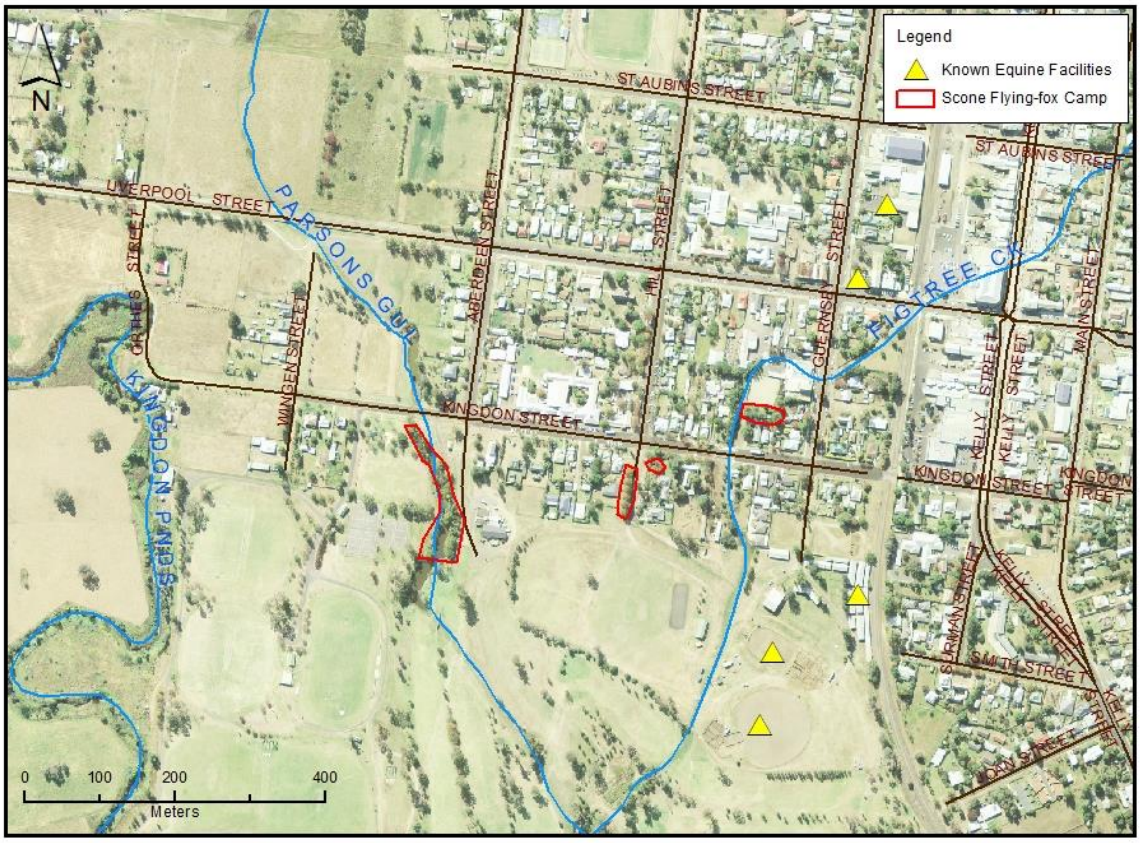
- **Bat lyssavirus** - if bitten or scratched by Flying Fox that has gone to ground due to malnutrition or sickness.
- **Hendra virus** – unknown to occur in this region however there is concern so precaution/prevention can be actioned.
- **Smell** – Camp draft competitors may complain when bats are in high numbers. Other people using the recreational area may dislike the odour.
- **Scats and spit pulp** – feeding in backyard trees leads to scats and spit pulp on cars and outdoor furniture which leads to outdoor areas not being occupied by residents. This often occurs when flying-foxes are present in large numbers or there are food shortages etc.
- **Noise -** in peak camp periods, particularly if males are trying to encourage mating with females. (J. Hopper pers.com 2017). Noise is unlikely to affect many people as very few residential houses are near the flying-fox camp. The Camp draft competitions are only at the site for short periods.

Given the community interest related to virus and animal health, an assessment of the equine facilities in close proximity to the Flying-fox Camps was undertaken and is detailed in Map 6 and Map 7

Map 6: Equine facilities in close proximity to Aberdeen Flying-fox Camp



Map 7: Equine facilities in close proximity to Scone Flying-fox Camp



2.1.5 Management Response to Date

Aberdeen Flying- Fox Camp

Installation of warning signs

Information to public

Scone Flying- Fox Camp

Information to public

2.2 Ecological Values of Flying Foxes, the Camp and Surrounding Areas

2.2.1 Flying-fox Species Profiles

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

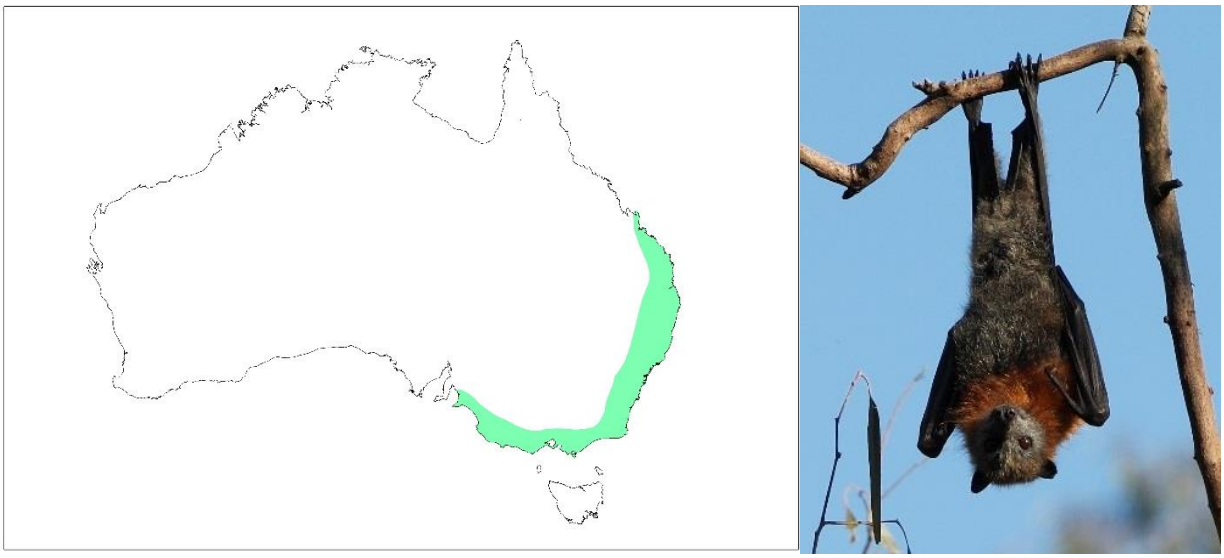


Figure 1: Grey-headed flying-fox indicative species distribution, adapted from OEH 2015a

The grey-headed flying-fox (GHFF) (Figure 1) is found throughout eastern Australia, generally within 200km 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 federal legislation.

Little red flying-fox (*Pteropus scapulatus*)

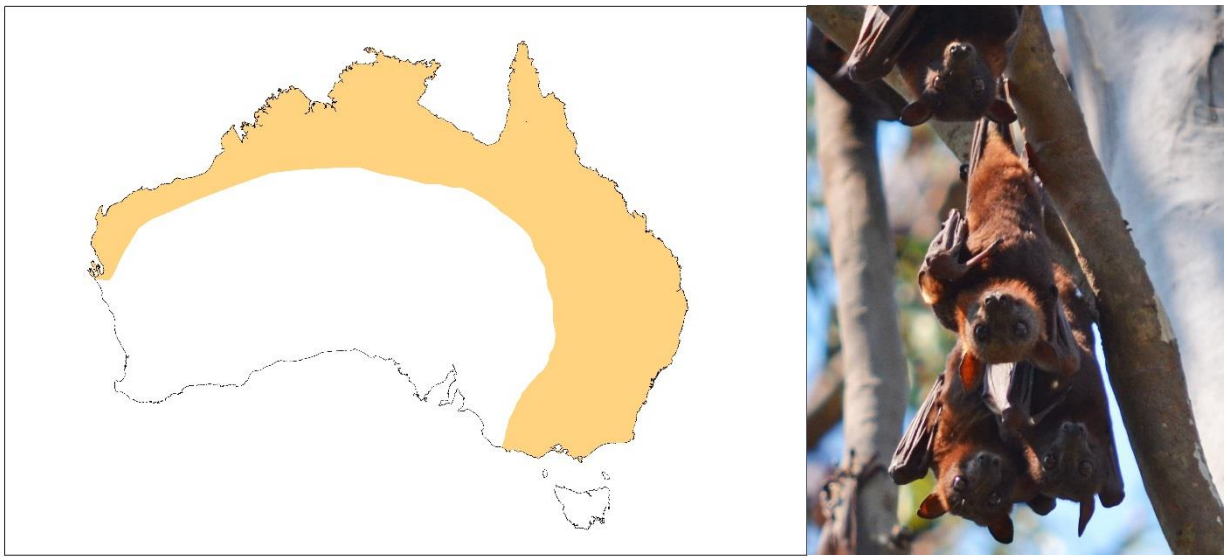


Figure 2: Little red flying-fox indicative species distribution, adapted from OEH 2015a

The little red flying-fox (LRFF) (Figure 2) 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).

2.2.2 Flying-fox Camp Description

Aberdeen Flying-fox Camp

The Aberdeen Flying-fox Camp is located approximately 320m west of the nearest residential properties, on a highly disturbed section of the Hunter River (dominated by Willow trees). Endemic tree species include River Oak, Rough-barked Apple and River Red gum. Flying-foxes have been observed roosting in Willow Trees, indicating a preference for this species over the nearby River Oak.

West of the Flying-fox camp is mostly cleared agricultural land (except for small pockets of vegetation along Dartbrook Creek). Within 5km of the Camp to the west, remnant Greybox- Ironbark Woodland and White Box Grassy Woodland occurs, along with Central Hunter Grey-box Ironbark Spotted Gum Forest, which are suitable foraging habitat for Flying-foxes, White Box is a known preferred feed tree for Flying-foxes.

Other locally found foraging species in the area include River Red Gum, Narrow-leaved Ironbark, Forest Redgum and Broad-leaved Ironbark.

Scone Flying-fox Camp

Grey-Headed Flying-Foxes have been observed roosting in low numbers at several sites within the township of Scone (see Map 3):

- Within a row of Liquid Ambars on Hill Street road reserve, and in a mature Poplar Tree on the same street
- Within a row of six Silky Oaks between residential properties and the Bowling Club
- Along Parson's Gully on the northern boundary of the Golf Course and east of the Golf Club
- South western edge of the residential areas of the Scone Township

2.2.3 Ecological role of Flying Foxes

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).

Grey-headed flying-foxes 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).

2.2.4 Flying Fox Habitat Aberdeen

Vegetation Communities

The vegetation community within the riparian zone of the Hunter River at Aberdeen has been highly modified; most of the original vegetation has been displaced with Willow Trees, Madeira Vine, Green Cestrum, Castor Oil and Brazilian Peppercorn, Pine Tree (*Pinus spp*). There is evidence of remnant native vegetation community including River Oak (*Casuarina cunninghamiana*), Rough-barked Apple (*Angophora floribunda*), River Redgum (*Eucalyptus camaldulensis*, an endangered population) and White Cedar (*Melia azedarach*). The original vegetation community is most likely Hunter Floodplain Red Gum Woodland, listed as an Endangered Ecological Community. Additional vegetation surveys are required to confirm the presence of the vegetation community

Rapid Vegetation Assessments were undertaken to capture the most dominant tree, shrub and ground cover species within the Aberdeen Flying-fox Camp (see Table 2).

Table 2: Dominant roosting tree species present at Aberdeen Camp

Species	Common Name	Stratum	Percentage Cover
**Anredera cordifolia*	Madeira Vine	Mid	25 to 50%
**Tradescantia albiflora*	Wandering Jew	Ground	50 to 75%
**Ligustrum lucidum*	Large-leaved Privet	Mid	<5%
Phragmites australis	Common Reed		<5%
**Salix spp.*	Willow Tree	Upper	>75%

*=Exotic species,

Percentage Cover - 1= <5%, 2=5-25%, 3=25-50%, 4=50-75%, 5=>75%

Roosting Areas

There are a number of tree species that provide suitable roosting habitat within the known Flying Fox camp extent (approximately 400m) along the Hunter River including; Willow Trees, Jacaranda, Large-leaved Privet (once it reaches an appropriate height), River Oak, Rough-barked Apple and River Redgum.

River Oak and Willows are the two dominant species which also continue in isolated patches to the north and also south of the Hunter River, (see Photograph 1).

Photograph 1: Roosting area for the Aberdeen Camp, Flying-foxes show a preference to roosting in Willow Trees when at this site

Foraging Areas

The number of flying-foxes present in a camp is primarily driven by the amount and quality of food available in the local area, relative to that available within migration distance (Tidemann 1999; Eby 1991; Roberts et al 2012). Flying-foxes typically feed within 20 km of their roost (Tidemann 1999), and digital maps of feeding habitat for Grey-headed Flying-foxes have been used to summarise feeding resources within 20 km of the Aberdeen camp (Eby and Law 2008).

The area surrounding the Aberdeen camp has been heavily cleared for agriculture and mining. Approximately 27% of land within 20 km of the site supports native forests and woodlands, primarily in small remnant patches. While some dry rainforest occurs in the area, it is rare and rainforest fruits provide sparse food resources for flying-foxes during late summer and autumn.

Within the Flying-fox Camp there is limited foraging habitat present along this stretch of the Hunter River. River Redgum (*Eucalyptus camaldulensis*) is the only species which occurs at the site which would provide suitable food tree. River Redgum extends further north and south of the Flying Fox camp.

Approximately 90% of forested land within 20km of Aberdeen contains flowering trees visited by flying-foxes. In total, 12 species of trees in the flower diet of Grey-headed flying-foxes occur within feeding range of the camp (Table 3). They vary considerably in the amount of nectar they secrete, the frequency and duration of flowering, their seasonal flowering schedules and their area of distribution. Interactions between these characteristics determine the influence they have on the presence of flying-foxes and the size of the population. Ten of the 12 diet species flower during late spring or summer.

Species with restricted distributions or that produce relatively low volumes of nectar are likely to have a minor influence on the number of flying-foxes roosting in the Aberdeen camp. However, two highly productive species are likely to attract flying-foxes to the roost (Table 3): White Box and Grey Ironbark. White Box grassy woodland has been heavily cleared throughout its range, but persists in the Hunter as highly fragmented remnants on fertile soils. By contrast, Grey Ironbark occurs in substantial woodland stands on steep slopes with relatively infertile soils. The arrival of flying-foxes to the Aberdeen camp in January 2015 and their persistence to autumn 2015 were associated with a significant flowering of Grey Ironbark in the Hunter region

Table 3: Characteristics of flowering trees in the diet of Grey-headed Flying-foxes that occur in the Greater Hunter Councils area and within 20 km of the Aberdeen camp. Nectar abundance is scored in 4 categories from 0 to 1; the approximate frequency of flowering is also scored in 4 categories relating to % of years; duration of flowering is scored in months. Species likely to play a significant role in determining the number of flying-foxes present in the camp, as assessed by nectar abundance and area of distribution, are highlighted in grey. Species found in <1% of native vegetation have been excluded. See Eby and Law (2008) for further details.

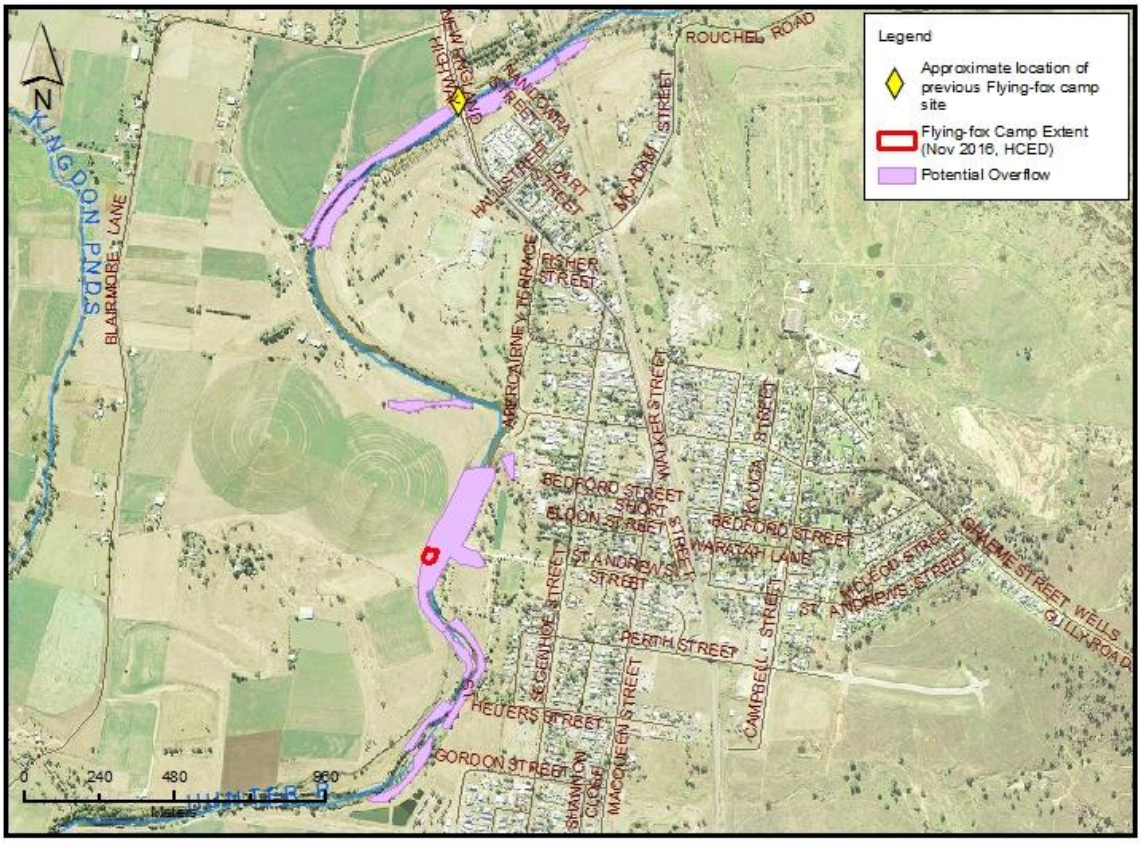
Species	Common Name	% Area of Native Vegetation	Flowering Characteristics			Bi-monthly Flowering Schedule					
			Nectar Abundance	Frequency (% yrs)	Duration (mth)	Dec-Jan	Feb-Mar	Apr-May	Jun-Jul	Aug-Sep	Oct-Nov
Eucalyptus Albens	White Box	17%	0.7	0.4	5			X	X	X	
E. siderophloia	Grey Ironbark	20%	1.0	0.7	2	X	X				X
Angophora floribunda	Rough-barked Apple	4%	0.5	0.4	1	X					
Corymbia eximia	Yellow Bloodwood	1%	0.7	0.4	1						X
C. maculate	Spotted Gum	11%	1.0	0.25	4-6		X	X			
E. acmenoides	White Mahogany	14%	0.3	0.7	1	X					X
E. camalduensis	River Red Gum	1%	0.7	0.7	2	X					
E. fibrosa	Broad-leaved Ironbark	9%	0.7	0.4	2	X					X
E. melliodora	Yellow Box	1%	0.7	0.4	4	X					X
E. moluccana	Grey Box	43%	0.3	0.5	2		X				
E. punctata	Large-fruited Grey Gum	40%	0.3	0.7	1	X	X				
E. tereticornis	Forest Red Gum	27%	0.5	0.7	2	X					X
						8	**4**	**2**	**1**	**1**	**6**

Potential Overflow Roosting Areas

A number of potential roosting habitat species (native and exotic) have been identified (see Map 8 and Photograph 2).

Given the Camp currently accommodates a very small number of animals; it is believed that any increase in population could be accommodated in vegetation along the river without any major expansion into residential areas (numbers dependent).

Map 8: Potential Camp overflow areas at Aberdeen



Photograph 2: Potential Overflow Site (mix of Casuarina and River Redgum)

2.2.5 Flying Fox Habitat Scone

Vegetation Communities

A rapid vegetation assessment was undertaken at the Camp sites within private property and the road reserve which identified that the sites comprise of formal gardens and mature exotic trees.

There was no evidence of remnant native vegetation at any of the current roosting sites, as most of the vegetation has been cleared in the past for residential development and recreational use. The creek line at the golf course contains scattered native trees including River Redgum and River Oak. Exotic species including Jacaranda and Willows dominated the riparian zone.

Roosting Areas

Three separate roost sites were observed on the southern edge of the residential area of Scone:

1. A row of mature liquid Ambers within the road reserve on the southern end of Hill Street
2. Mature Poplar trees on private property in Hill Street
3. A row of mature Silky Oaks on private property in Guernsey Street adjacent to the RSL.

The overall distance across all the roosting sites is approximately 200m. The most dominant roosting trees predominantly consist of mature exotic trees including Liquid Ambar, Jacaranda, Poplar and Norfolk Island Pines. Silky Oaks are endemic to south east Queensland

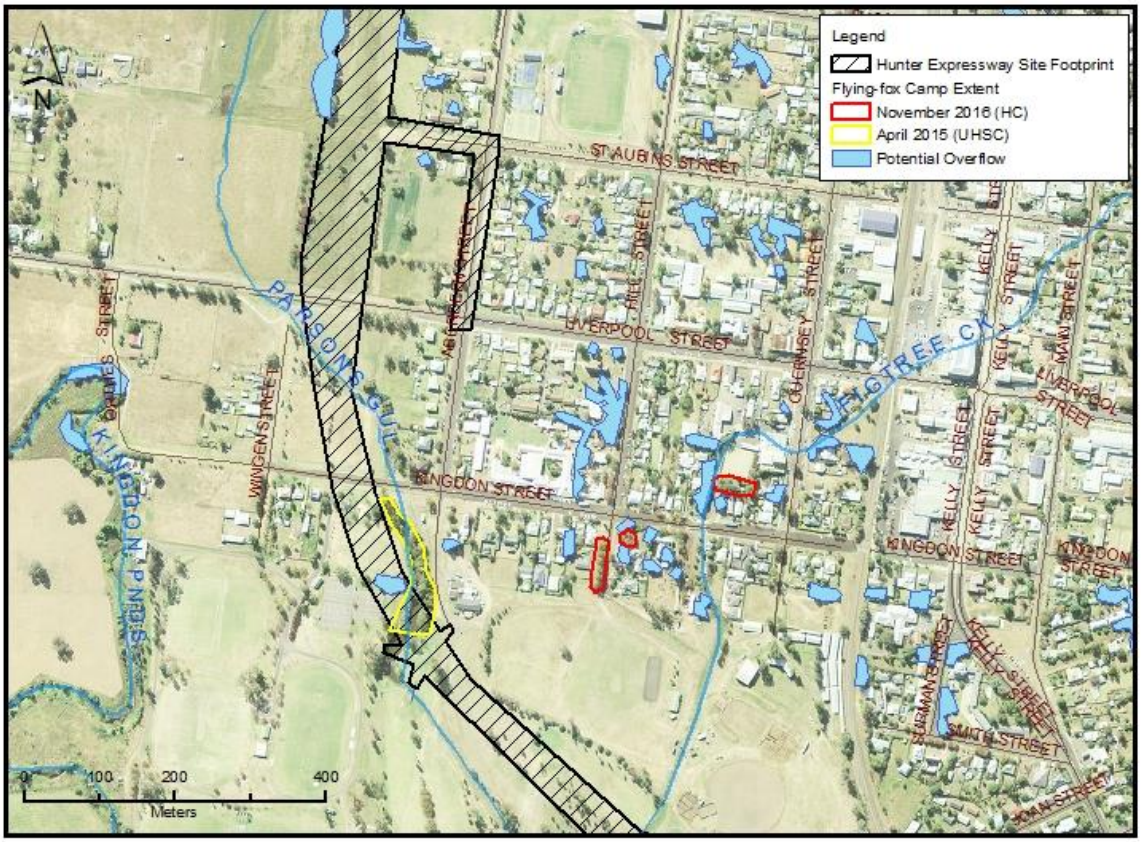
Foraging Areas

There is limited suitable and natural foraging habitat within the residential areas of Scone; the main dominant species is Silky Oak. Local residents have observed Flying Foxes forage on planted Cadaghi trees (*Corymbia torelliana*) a native to Queensland which is favoured by Flying Foxes (pers, comm. December 2016).

Potential Overflow Roosting Areas

There are a number of potential roosting sites within the residential areas of Scone that could be utilised in the event of a significant influx of GHFF and Little Reds (see Map 9). Many private properties contain suitable mature exotic species including Jacaranda, Norfolk Island pine, Poplars, Elms and Silky Oaks. Potential overflow sites include Hill Street (north side), Liverpool Street and Kingdon Street.

Map 9: Potential Camp overflow areas at Scone



2.2.6 Threatened Species & Endangered Ecological Communities (both Aberdeen and Scone)

The Aberdeen Camp contains River Redgum an endangered population in the Hunter Catchment under the NSW Threatened Species Conservation Act.

A list of threatened species likely to occur on-site and within 10 km of the site and are likely to be found on site is provided in Table 4 and Table 5.

Table 4: Threatened species and ecological communities that are likely to occur at Aberdeen[2]

Species Name	Common Name	NSW Status	Commonwealth Status
Fauna			
Falco subniger	Black Falcon	V,P	
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P	
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	
Mormopterus norfolkensis	Eastern Freetail-bat	V,P	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	
Miniopterus australis	Little Bentwing-bat	V,P	
Hieraaetus morphnoides	Little Eagle	V,P	
Myotis macropus	Southern Myotis	V,P	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P	
Flora			
Eucalyptus camaldulensis	Eucalyptus camaldulensis population in the Hunter catchment	E2	
EEC			
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions		EEC	

Table 5: Threatened species and ecological communities that are likely to occur at Scone

Species Name	Common Name	NSW Status	Commonwealth Status
Fauna			
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V
Hieraaetus morphnoides	Little Eagle	V,P	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E
Lathamus discolor	Swift Parrot	E1,P,3	CE
Flora			
Eucalyptus camaldulensis	Eucalyptus camaldulensis population in the Hunter catchment	E2	

[2] Source: Atlas of Living in Australia 08/11/2016

2.2.7 Flying-foxes in Urban Areas

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

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

In and around the Aberdeen and Scone Flying-fox Camps the following threats and hazards have been noted:

- Natural food shortages – due to land clearing in combination with poor flowering seasons
- Fruit tree netting – females with young have been observed trapped in netting (2017)
- Heat events – recent heat waves have seen animal deaths throughout the region.
- Barbed wire – fencing across dams in particular is an unnecessary death trap for Flying-foxes. Flying-foxes get caught on barbs, wings are damaged and the wing membrane dies.
- Disturbance from local residents – numerous attempts to set fire to the camp occurred in 2016.
- Powerlines – Often when there are food shortages flying-foxes forage in urban areas and so are at higher risk of electrocution

2.2.8 Flying-foxes Under Threat

Flying-foxes roosting and foraging in urban areas more frequently can give the impression that their populations are increasing; however, the grey-headed flying-fox is in decline across its range and in 2001 was listed as vulnerable by the NSW Government through the TSC Act.

At the time of listing, the species was considered eligible for listing as vulnerable as counts of flying-foxes over the previous decade suggested that the national population may have declined by up to 30%. It was also estimated that the population would continue to decrease by at least 20% in the next three generations given the continuation of the current rate of habitat loss and culling.

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

There is a wide range of ongoing threats to the survival of the Grey Headed Flying-fox, including:

- habitat loss and degradation
- conflict with humans (including culling at orchards)
- infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.)
- predation by native and introduced animals
- exposure to extreme natural events such as cyclones, drought and heat waves.

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

2.2.9 Flying-foxes and Heat Stress

Heat stress affects flying-foxes when temperatures reach 42°C or more. Over the past two decades, a number of documented heat stress events have resulted in significant flying-fox mortality.

While there is conflicting advice about how or whether to intervene during a heat stress event at a flying-fox camp, it should be noted that human presence in a camp at such times can increase the stress and activity levels of flying-foxes present, potentially leading to greater harm. Any response to a heat stress event should be undertaken as an organised and monitored response. It is recommended that data is collected after the heat stress event and provided to scientists able to analyse the data and to help the Office of Environment and Heritage share best practice management techniques as they are developed. The data collected will help improve future advice on intervention during these events.

When ambient temperatures rise above 35°C flying-foxes tend to alter their behaviour to reduce exposure to heat. A range of behaviours may be exhibited, depending on multiple variables in their environment. The impacts of heat stress events are likely to vary site by site, and can depend on conditions in the preceding days. Ambient temperature alone may thus not be a sound indicator of a heat stress event, and flying-fox behaviour may provide more reliable information. As flying-foxes experience heat stress, they are likely to exhibit a series of behaviours indicating progressive impact of that stress, including:

- clustering or clumping,
- panting,
- licking wrists and wing membranes
- descending to lower levels of vegetation or to the ground.

Some of these behaviours may occur outside of heat stress events.

The March 2016 Heat Wave saw temperatures exceed 46.8^{O}C in the Hunter, with a large number of recorded Flying-fox deaths at the Singleton Camp. Grey-Headed Flying-foxes tend to perish when temperatures exceed ~43°C

2.2.10 Human and Animal Health

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

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

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

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

Outside of an occupational cohort, including Wildlife Rehabilitators and vets, human exposure to these viruses is extremely rare and similarly transmission rates and incidence of human infection are very low. In addition, HeV infection in humans apparently requires transfer from an infected intermediate equine host and direct transmission from bats to humans has not been reported. Thus 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 judged to be low (Qld Health 2016).

2.3 Legislative and Regulatory Context

The Grey-Headed Flying-fox (*Pteropus poliocephalus*) is listed as a vulnerable species under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is therefore considered a 'Matter of National Environmental Significance' and is therefore protected under federal law.

It is recognised that at the time of developing this Camp Management Plan, the NSW State Government was preparing to overhaul environmental protection legislation and some of the references below are likely to change post July 2017.

In NSW, the grey-headed flying-fox was listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* in 2001. This listing is based on scientific evidence indicating a significant decline in the population of the species and that it is "likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate" (NSW Scientific Committee 2001).

This means that if present processes continue the species could become extinct. A draft national recovery plan has also been prepared for the species (DECCW 2009, Geolink 2013). Provisions in the *Threatened Species Conservation Act 1995*, *National Parks and Wildlife Act 1974* and *Environmental Planning and Assessment Act 1979* mean that actions likely to adversely affect the species generally require approval or licensing, and that impacts on the species require assessment.

The NSW Office of Environment and Heritage (OEH) has prepared the 'Flying-fox Camp Management Policy' 2015, intended 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. The Policy encourages local councils and other land managers to prepare camp management plans for sites where the local community is affected.

Additionally, any activities undertaken on Department of Education property, will also need to comply with Local Development Consent and the Infrastructure SEPP.

Parliamentary Inquiry into flying-fox management in the eastern states

In 2016-17 the House of Representatives Standing Committee on the Environment and Energy undertook and inquiry into the increasing tensions being experienced by residents affected by flying-fox camps.

In order to gather evidence from the relevant stakeholders and experts within the agreed timeframe, the Committee conducted a roundtable public hearing in Canberra (February 2017). This enabled productive engagement with a wide range of experts and representatives of affected communities. The Committee also received a range of written submissions and correspondence outlining stakeholder experiences and community concerns about local flying-fox issues.

The Committee agreed that Flying-foxes act as important pollen and seed dispersers for a wide range of native vegetation across the east coast of Australia. Due to their ecological importance in maintaining some of Australia's most significant ecosystems, work needs to be undertaken to ensure the preservation of flying-fox species across the country.

The Committee further noted the reduction in suitable foraging and roosting habitat, among other factors, has impacted on the population size of several species, leading the Spectacled Flying-fox and Grey-headed Flying-fox to be listed as 'Vulnerable' under the Environment Protection and Biodiversity Conservation Act 1999. The expansion of human populations across coastal New South Wales and Queensland has led to flying-fox camps becoming increasingly located in urban and rural residential areas, possibly from movements of camps due to loss of natural habitat, or the expansion of human settlement into traditional flying-fox habitats.

The Committee produced a number of recommendations that have been forwarded to the Commonwealth Department of Environment & Energy for consideration and action:

1. The Committee recommends that the Australian Government propose a national or eastern states flying-fox consultative committee or working group to the Council of Australian Governments. The consultative committee or working group would be responsible for centrally compiling information on referrals and management actions, and identifying priorities for legislative harmonisation, research and funding.
2. The Committee recommends that the Australian Government establish a dedicated funding pool for flying-fox research and conservation actions.
3. The Committee recommends that the Department of the Environment and Energy develop, in consultation with relevant state and local governments, a tool that assists councils to make decisions on action, referral and education in the most appropriate way, relevant to the flying-fox impacts in their jurisdiction
4. The Committee recommends that the Department of the Environment and Energy, in consultation with other relevant organisations, develop a suite of education resources for Australian communities regarding flying-fox ecology, behaviour, environmental significance, health impacts, and management options. These resources should be promoted by the Australian Government to local councils, communities, businesses and all relevant stakeholders in affected jurisdictions and potentially affected jurisdictions

2.4 Regional Context

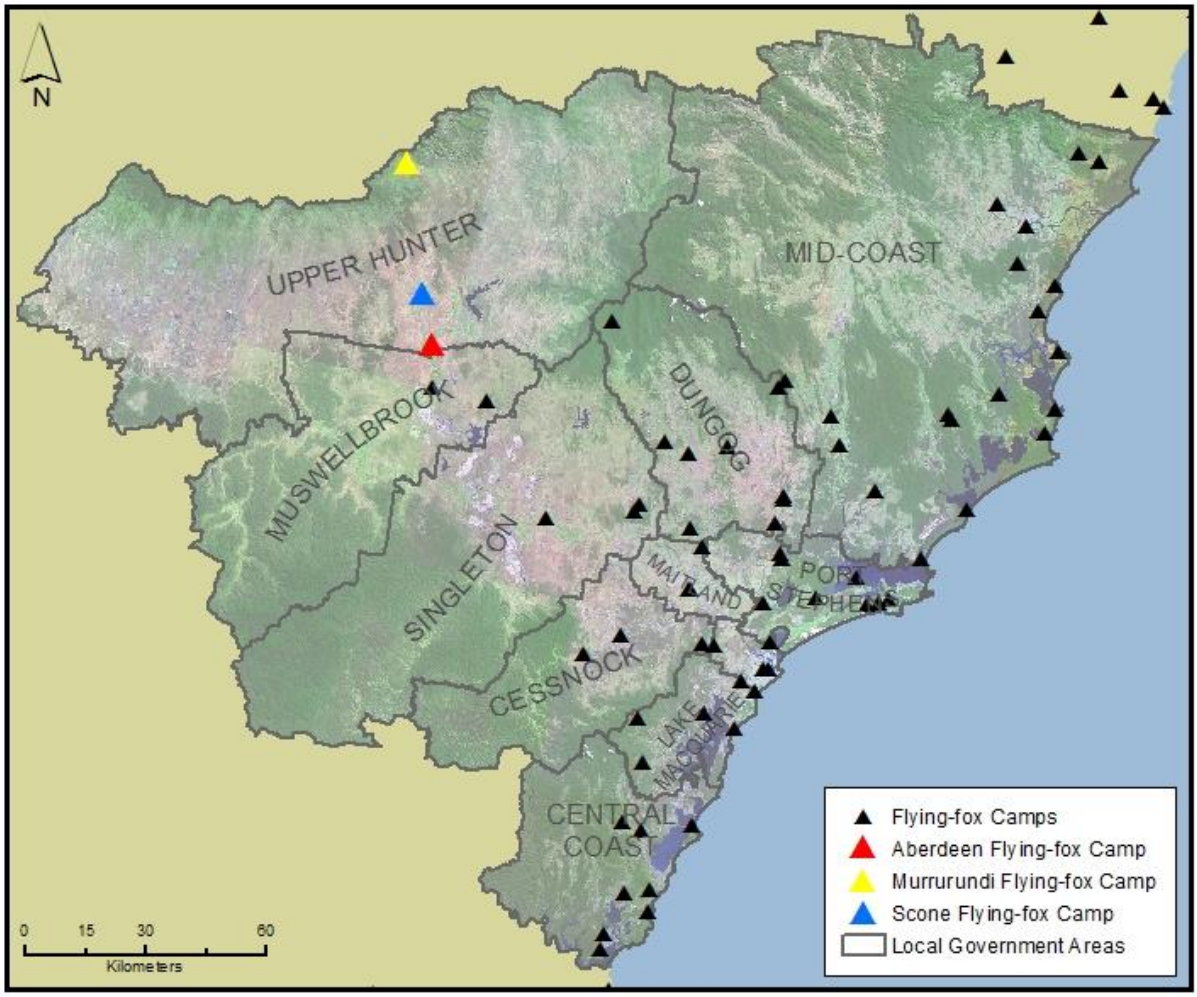
The Hunter & Central Coast Region is home to 59 known Flying-fox Camps (see Map 10), 54 of which have observed Flying-foxes roosting in them since 2012. It is highly likely that there are additional Camps throughout the vegetated areas (private land and National Parks / State Forest) of the region that are well away from human settlements and are currently unaccounted in the CSIRO National Flying-fox Camp Census.

The 2013 "Grey-headed Flying-fox Management Strategy for the Lower Hunter" developed by GEOlink stated that in the lower Hunter there were 6 Camps considered critical to Flying-fox survival in the Lower Hunter (these being: Millfield, Martinsville, Morisset, Blackbutt Reserve, Anna Bay, Medowie and Tocal) None of these Critical sites are managed via a Camp Management Plan and are currently not subject to conflict with Human settlements.

The 2013 Strategy also stated that a further six Camps (Black Hill, Belmont, Glenrock, Hannan Street, Italia Road and Raymond Terrace) were not critical to survival in the Lower Hunter, and reflecting on changes in Flying-fox roosting patterns in the past 4 years we now know that Black Hill and Hannan Street are no longer utilised as Camps, and the Raymond Terrace Camp is now listed as a Nationally Significant site given the number of Flying-foxes now utilising the site for roosting and mating / maternity activities.

During 2012-2017 Flying-fox roosting patterns have changing rapidly throughout the region, with a number of previously important Camps being abandoned, and small Camps becoming much more significant for roosting and breeding of Flying-foxes. The development of local Camp Management Plans, and a Regional Strategies will assist Councils to address community concerns and work to reduce the possibility of new areas of conflict arising with increased growth of the Hunter Region.

Map 10: Known Flying-fox Camps throughout the Hunter & Central Coast region



Ongoing research into Flying-fox behaviours appears to indicate that food shortages precede the abandonment of traditional camps, and the creation of new camps, and many more. Following the 2010 Flying-fox food shortage the number of Camps in Sydney increased from 7 to 22. Occupancy of these new camps did not appear to reduce when food supply increased, suggesting that once roosting and feeding patterns change, the roosting behaviour has been adapted and in most cases does not revert back to previous behaviours. This has also been played out in the Hunter region.

Overall the location and scale of Flying-fox Camps in NSW has changed significantly since 2002, when Camps were mostly found in the North of the State, in 2015 following both food shortages, and preferred food flowering events, the Flying-fox populations have spread both South and west, with a number of new camps being created inland, and on the NSW South Coast. Since 2015, the majority of new Camps created have been in vegetated areas quite close to human populations.

2.4.1 Regional Flying-fox Foraging Preferences

Work is currently being undertaken to identify key flying-fox foraging areas throughout the Region to progress work conducting in 2013. The incorporation of this information into Councils land use plans (and equivalent planning documents) will assist Council to, where possible, preserve areas of high value Flying-fox foraging vegetation, and potentially protect areas suitable for Flying-fox roosting that may have reduced conflict issues (i.e. not be located in close proximity to human settlements). Although Flying-foxes are wild animals and it is not possible to predict where they will choose to roost, if there are no alternatives to the current conflict Camp sites, it can be guaranteed the animals will not move on of their own accord.

Foraging models will be included in the Hunter & Central Coast Regional Flying-fox Management Strategy (expected to be completed in the later-half of 2017).

Management Actions at other Flying-fox Camps

As mentioned, there are 59 known Flying-fox Camps across the region, with occupation of the camps varying each season and across each year. Presently 7 Councils in the region are developing Flying-fox Camp Management Plans, to address Flying-fox / Human conflict issues.

The management of Flying-foxes across Councils is a prime issue at present, with Councils in the region participating in the development of a Regional Flying-fox Strategy (project being led by the NSW Office of Environment & Heritage), party to regional Flying-fox education projects, and participants in a National Australian Research Council Grant project seeking to “link” existing Flying-fox research and solidify knowledge about the species, its value to Australian ecology and how the species can best be supported.

All Councils in the Hunter & Central Coast are currently proceeding on the basis that Flying-fox management activities will not include Level 3 actions (dispersal or culling). There is an active understanding amongst Council staff and senior managers that any move to disperse Flying-foxes from one Camp will undoubtedly place stress on other Camps in the region, or more likely (based on research on previous dispersal activities) create a splinter Camp nearby and ultimately cause a new residential area to be in conflict with the Flying-foxes.

The region, Local Councils, the Office of Environment & Heritage, Hunter Local Land Services, NSW Department of Industry – Lands and wildlife rehabilitators are all actively working together to develop regionally consistent community engagement and education products in the hope that this can assist residents to understand why the Flying-foxes are in the region, how long they will stay on their migration, and ways that people can manage their property and level of interaction with them. Part of the engagement project will be to address previous negative media stories related to Flying-foxes.

3 Community Engagement

Upper Hunter Shire Council undertook a community engagement process in the facilitation of this Camp Management Plan, details follow.

3.1 Stakeholders / Interest Groups

There are a range of stakeholders who are directly or indirectly affected by the flying-fox camp, or who are interested in its management. Stakeholders include those shown in Table 6.

Table 6: Stakeholders in the camp and Plan

Stakeholder	Action / Messaging to Engage Stakeholders
All community members	• Promote Flying-fox Engage (FFE) Survey through media release Host survey on council website • Promote on Council Facebook page. *Note - inform Customer Services prior to commencement of engagement activities*

Zone A Residents (immediately adjacent to Camp)	• Letter informing residents that Council staff will be in the area door-knocking and offer option for a face-to-face meeting if timing does not suit.
	• Meeting to include:
	  ○ Go through Flying Fox Engage with resident
	  ○ Bring information pack including OEH fact sheets
	  ○ Bring citizen science info (e.g. how to do flyover counts) if resident is interested
	  ○ Get email address to add to mailing list
	Flyer for FFE if resident is not in attendance and Council representative's contact details

Zone B Residents **(Between 300m – 6km from Camp)**	Letter and flyer to residents offering an opportunity for face-to-face meeting if desired. Letter to also promote FFE website
Zone C Residents (all residents further than 6km)	Letter and flyer promoting FFE website
Councillors	Relaying community issues
Airports	No airports within 10km radius
Wildlife rehabilitators	Direct phone call to discuss project and direct them to the Flying Fox engage website
OEH	OEH is responsible for administering the Threatened Species Act 1995, and for ensuring the impact of any action affecting threatened species is properly assessed. Any application to disrupt the flying-foxes roosting site (the camp) is assessed by OEH Regional Operations Group Hunter Central Coast (ROG-HCC), Planning and Ecosystems and Threatened Species teams.
OEH (NPWS)	NPWs is responsible for quarterly surveys of the flying fox camp. Council to ensure that NPWS are aware of engagement activities.
Commonwealth Department of the Environment and Energy (DoEE)	Relevant to camps with grey-headed flying-foxes or other matters of national environmental significance. Flying-fox policy https://www.environment.gov.au/biodiversity/threatened/species/flying-fox-policy-statement Flying-fox monitoring https://www.environment.gov.au/biodiversity/threatened/species/flying-fox-monitoring

3.2 Engagement Methods

Extensive effort was made to engage with the community regarding the flying-fox camp to:

- understand the issues directly and indirectly affecting the community
- raise awareness within the community about flying-foxes
- correct misinformation and allay fears
- share information and invite feedback about management actions and responses to date
- seek ideas and feedback about possible future management options
- invite people to join advisory and/or planning committees.

The types of engagement undertaken included:

- direct contact with adjacent residents including letters, brochures, fact sheets and emails
- face-to-face meetings and telephone calls with adjacent residents / kitchen table discussions/ one to one and small groups / open house
- online survey (Flying-fox Engage)
- media (radio, television, print, social media) / managed by CCC / OEH / consistent messaging from both organisations

Table 7: Details of Community Engagement Activities undertaken in the development of the Camp Management Plan

Date	Consultation Activity
December 2016	• Media release asking local residents to report sightings of flying fox camps
December 2016	• Site visits and meetings with affected property owners in Scone
1 March 2017 – 31 May 2017	• On-line survey – Flying-Fox Engage
	• Mail-out to properties within close proximity to the Aberdeen Camp.
	• Promotion on social media and Council's website
	• Advertisement of Flying-Fox Engage in local newspaper

Flying Fox Engage

The use the Flying Fox Engage online survey was the key engagement tool to enable Council to receive direct feedback from the community on their experiences living near Flying-foxes and the values they place on them to provide some insight to Council on the management actions they would find acceptable to be employed on site.

Details of the analysis of responses are provided in Section 3.3.

3.3 Community Feedback on Management Options

The main community feedback related to the development of the Camp Management Plan was received through the Flying fox engage system.

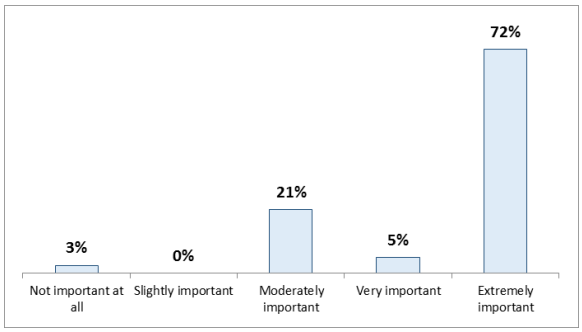
Flying fox engage is an innovative engagement decision support system. The online Flying fox engage consultation tool was launched in March 2017 and was available for responses until May 2017.

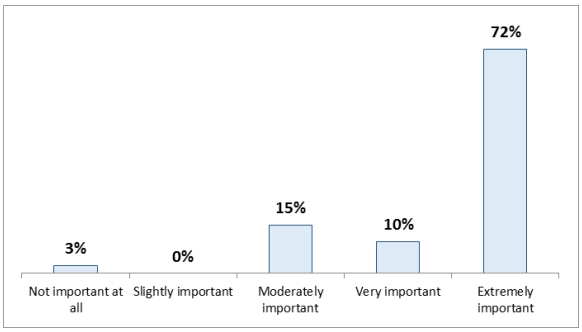
During this consultation period the Flying fox engage website received 39 valid submissions.

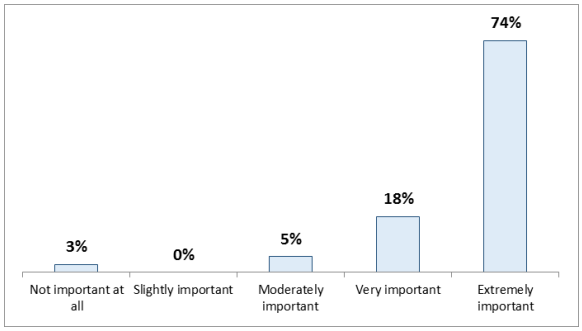
Flying fox engage is a relatively simple survey methodology that poses 12 questions to users, the responses to these questions then produces a ranked list of preferred management options that reflect the values of the survey respondent. The list is then able to be manipulated by the user to manually reorder the preferred list. Collated responses to the questions are included in Table 8.

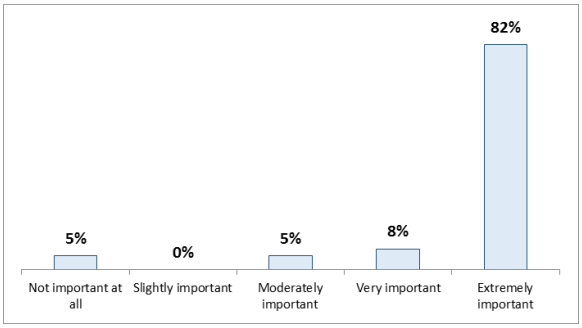
Table 8: Collated responses to the questions posed in Flying Fox Engage

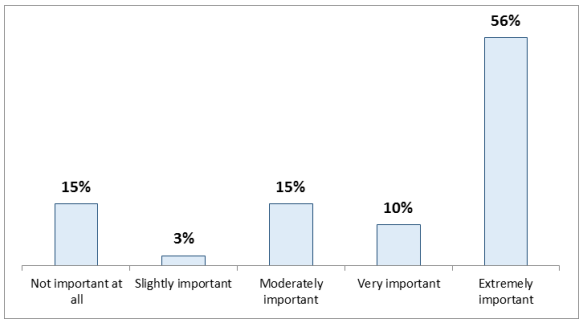
Question	Responses
How important is it to you that the flying-fox camp management option reduces the impact of noise and odour from Flying-foxes roosting at the camp on nearby residents?	How important is it to you that the flying-fox camp management option reduces the impact of the flying-fox excrement on the property of nearby residents?
How important is it to you that the flying-fox camp management option does not move the flying-fox camp to other areas that may also be near residents or businesses?	How important is it to you that the flying-fox camp management option ensures the risk of disease transmission remains low?
How important is it to you that the flying-fox camp management option has a low financial cost to residents living near the flying-fox camp?	How important is it to you that the flying-fox camp management option has a low financial cost to Council ratepayers?
How important is it to you that the flying-fox camp management option can be implemented quickly?	How important is it to you that the flying-fox camp management option provides a long term solution?

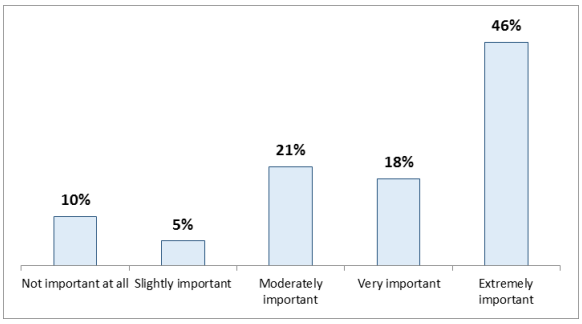


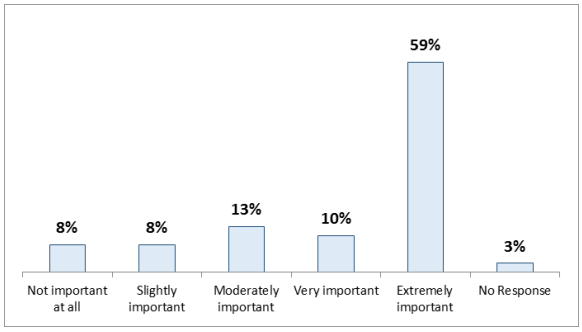


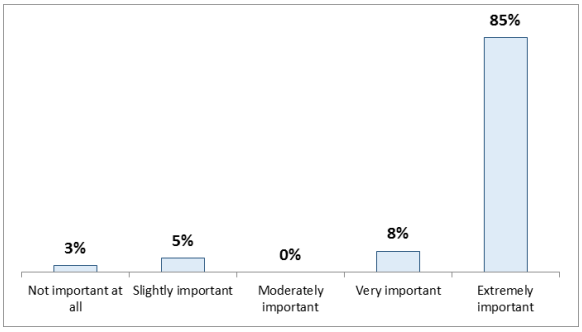




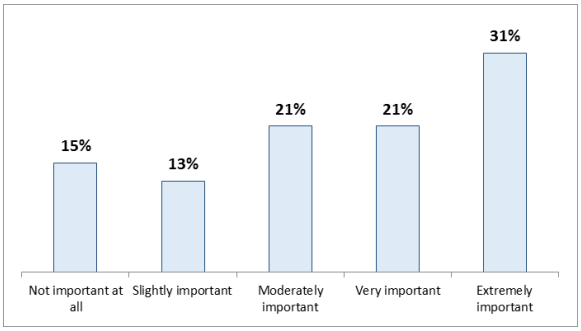


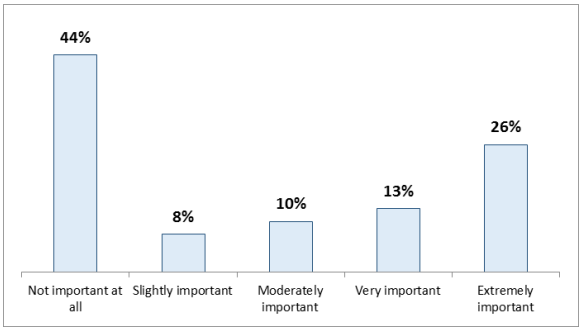


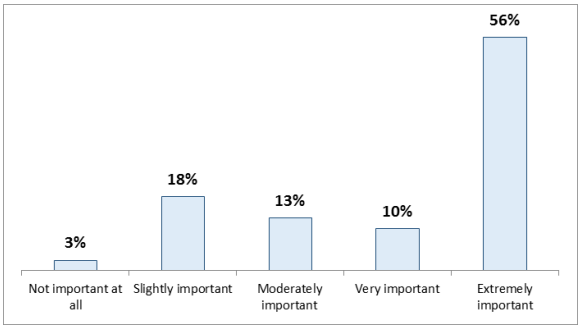


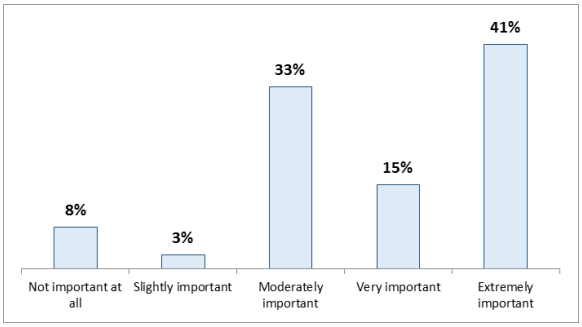


Question	Responses
How important is it to you that the flying-fox camp management option does not disrupt residents and businesses during implementation?	How important is it to you that the flying-fox camp management option does not harm the Flying-foxes?
How important is it to you that the flying-fox camp management option does not degrade the natural or ecological values of the site?	How important is it to you that the flying-fox camp management option does not change the visual appeal or recreational opportunities currently undertaken at the site?









Respondents to the Flying Fox Engage survey indicate that the majority of respondents agree that any management actions should seek to reduce the impact (amenity) on residents. It is noted with interest that 44% of respondents were unconcerned that management actions may harm Flying-foxes. This is a significant departure from the general community view expressed by all other areas of the Hunter Region where residents (both affected and interested) are keen to ensure reduced impacts from Flying-foxes, and ensuring no harm would come to Flying-foxes from the management. It is also noted that respondents are happy for residents and businesses to be negatively affected during any management actions.

Based on the responses to the questions, Flying Fox Engage was able to rank the various management options that match the responses. Details of the preferred management actions before and after re-ranking is allowed is provided in Table 9.

Table 9: Top 10 community ranked Management Options based on Flying Fox Engage responses

Rank	Initial Result (values based ranking)	Re-ranked result (emotion based ranking)
1	Land-use planning	Land-use planning
2	Subsidising property modification to reduce the impacts of flying-foxes	Subsidising property modification to reduce the impacts of flying-foxes
3	Guidelines for carrying out operations adjacent to camps	Health and safety guidelines to manage incidents related to the camp
4	Health and safety guidelines to manage incidents related to the camp	Guidelines for carrying out operations adjacent to camps
5	Provision of flying-fox education and awareness programs	Provision of flying-fox education and awareness programs
6	Fully-funding property modification to reduce the impacts of flying-foxes	Fully-funding property modification to reduce the impacts of flying-foxes
7	Do Nothing	Research to improve knowledge of flying-fox ecology
8	Research to improve knowledge of flying-fox ecology	Revegetate and manage land to create alternative flying-fox habitat
9	Revegetate and manage land to create alternative flying-fox habitat	Routine maintenance to improve the condition of the site
10	Routine maintenance to improve the condition of the site	Do Nothing

As shown in Table 9, initial values based ranking suggest that residents realistically do not want Council to undertake significant management activities that may harm the animals, this may largely be a reflection of the majority of respondents no wanting management to add increased costs on the community, and Level 3 Actions are quite costly. Interestingly, when provided the opportunity to re-rank the values based responses, the order of the preferred management options changed, but no Level 3 actions were introduced to the preferred management list.

When considering just those residents within 300m of the Camp (directly impacted), the responses are included in Table 10.

Table 10: Top 10 ranked Management Options based on Flying Fox Engage responses from directly affected residents

Rank	Initial Result (values based ranking)	Re-ranked result (emotion based ranking)
1	Land-use planning	Land-use planning
2	Subsidising property modification to reduce the impacts of flying-foxes	Subsidising property modification to reduce the impacts of flying-foxes
3	Guidelines for carrying out operations adjacent to camps	Guidelines for carrying out operations adjacent to camps
4	Health and safety guidelines to manage incidents related to the camp	Health and safety guidelines to manage incidents related to the camp
5	Provision of flying-fox education and awareness programs	Provision of flying-fox education and awareness programs
6	Fully-funding property modification to reduce the impacts of flying-foxes	Research to improve knowledge of flying-fox ecology
7	Do Nothing	Fully-funding property modification to reduce the impacts of flying-foxes
8	Research to improve knowledge of flying-fox ecology	Revegetate and manage land to create alternative flying-fox habitat
9	Revegetate and manage land to create alternative flying-fox habitat	Early dispersal before a camp is established at a new location
10	Routine maintenance to improve the condition of the site	Active dispersal of a flying-fox camp using disturbance

When considering only those residents within 300m of the Camp (typically those that are directly impacted via noise or smell) the values based responses are the same, but both early dispersal and active dispersal are included in the preferred management actions.

In addition to the 12 questions detailed in Table 8, residents were asked some additional questions about how they are impacted by Flying-foxes, and were provided the opportunity to provide comment on the issue, details of these responses are included in Table 11.

Table 11: Additional Flying Fox Engage Questions

Question	Responses	Number of Respondents
Have you experienced the flying-foxes in the camp?	No, I have not experienced the flying-foxes	5
	Yes, flying-foxes from the camp roost in trees that are next to or overhang my home	7
	Yes, flying-foxes leaving and returning to the camp fly over my home	11
	Yes, flying-foxes stop me from using the area, surrounding services or businesses	6
	Yes, I enjoy visiting the flying-foxes	5
	Yes, my home is very close to the camp	3
Open ended Question and responses		
If you want to, you can comment on the flying-fox camp management options we have explored or you can suggest other solutions.	Some respondents acknowledged that the flying-foxes were no longer present at Aberdeen. Respondents suggested a range of camp management options including providing alternative habitat, relocation of the camp and culling be used.	
If you want to, please provide comments about this flying-fox camp	Respondents raised a number of issues related to the flying fox camp including noise, odour, tree damage, human health, animal health, water quality and loss of property value.	

4 Management Opportunities

Flying-fox Culling

All Flying-fox species are protected species under the *NSW National Parks and Wildlife Act 1974*, and the Grey-Headed Flying-fox is both a federally listed and NSW listed threatened species, and as such, culling of any Flying-foxes is an unlawful activity.

Culling is not considered a viable camp management action as it is inconsistent with the:

- Commonwealth *Environment Protection & Biodiversity Conservation Act* 1999;
- NSW *National Parks and Wildlife Act* 1974;
- NSW *Threatened Species Conservation Act* 1995
- *Firearms Act* 1996 or section 96G of the *Crimes Act* 1900;
- NSW Flying-fox Management Policy 2015; and
- Objectives of this Management Strategy.
- Culling is considered scientifically ineffective (due to the mobility of the species) and not a preferred management option by the majority of the Upper Hunter community.

4.1 Site-specific analysis of camp management options

The NSW Flying-fox Camp Management Policy 2015 and Camp Management Plan Template 2016 provide details on acceptable management activities to manage and mitigate human / bat conflict at Camp Sites. The management actions are grouped into three levels, as discussed following.

Routine camp management actions (Level 1 actions)

Routine camp management actions should be clearly identified as Level 1 camp management actions in the camp management plan.

These include:

- 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 noxious weeds under the Noxious Weeds Act 1993 or species listed as undesirable by a council
- trimming of under-storey vegetation or the planting of vegetation
- minor habitat augmentation 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 or removal of leaf litter or other material on the ground.

Creation of buffers (Level 2 actions)

Creation of buffers can be effective as management actions to nudge flying-fox populations away from urban settlements. The intention is to create a physical or visual separation from the camp and actively manage vegetation structure and composition to discourage flying-foxes from roosting close to built areas.

Actions include:

- clearing or trimming canopy trees at the camp boundary to create a buffer
- disturbing animals at the boundary of the camp to encourage roosting away from human settlement.

Camp disturbance or dispersal (Level 3 actions)

Camp dispersal is an action that aims to intentionally move entire camps from one location to another by clearing vegetation or dispersing animals through disturbance by noise, water, smoke or light.

Camp dispersal can remove impacts on local communities and is supported by this policy. However, camp dispersal is challenging for a number of reasons:

- it can be expensive and can have uncertain outcomes.
- dispersal may result in relocating the animals rather than resolving the issue. Past disturbances in Australia have sometimes failed to remove flying-foxes from the area or have resulted in flying-foxes relocating to other nearby areas where similar community impacts have occurred.
- attempts to disperse camps are often contentious.
- disturbing flying-foxes may have an adverse impact on animal health.
- the cumulative impacts of flying-fox camp dispersals may negatively impact on the conservation of the species and the ecosystem services flying-foxes provide.

Table 12 provides details on the various management options available, an assessment of cost and effectiveness of the action to address the various conflict issues. The Table provides details of the assessment undertaken by Upper Hunter Shire Council as to the suitability of the actions to be included in the Camp Management Plan. Section 4.2 provides details of the management actions that will be undertaken through the implementation of the Camp Management Plan.

Table 12: Analysis of management options

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Level 1 Actions					
Education and awareness programs	Fear of disease Noise Smell Faecal drop	$	Low cost, promotes conservation of FFs, contributes to attitude change which may reduce general need for camp intervention, increasing awareness and providing options for landholders to reduce impacts can be an effective long-term solution, can be undertaken quickly, will not impact on ecological or amenity value of the site.	Education and advice itself will not mitigate all issues, and may be seen as not doing enough.	This action was deemed suitable. Responses from Flying Fox Engage indicated a strong desire from the community for more information on Flying Foxes.
Property modification (e.g. car cover, pool cover, clothesline cover, air conditioners, double glaze windows, etc.)	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	Property modification is one of the most effective ways to reduce amenity impacts of a camp without dispersal (and associated risks), relatively low cost, promotes conservation of FFs, can be undertaken quickly, will not impact on the site, may add value to the property.	May be cost-prohibitive for private landholders, unlikely to fully mitigate amenity issues in outdoor areas.	This action was deemed suitable for residents adjacent to the Camp
Fully-fund/subsidise property modification	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	Potential advantages as per property modification, but also overcomes issue of cost for private landholders.	Costs to the land manager will vary depending on the criteria set for the subsidy including proximity to site, term of subsidy, level of subsidy. Potential for community conflict when developing the criteria, and may lead to expectations for similar subsidies for other issues.	This action has limited applicability due to funding constraints. Should funding become available, this option can be further explored. This was the second preference from Flying Fox Engage
Service subsidies (e.g. rate rebates, access to water gurney, etc.)	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	May encourage tolerance of living near a camp, promotes conservation of FFs, can be undertaken quickly, will not impact on the site, would reduce the need for property modification.	May be costly across multiple properties and would incur ongoing costs, may set unrealistic community expectations for other community issues, effort required to determine who would receive subsidies.	Due to lack of funding, this option is not suitable in the short term. Should funding become available in the longer term, this action will be reconsidered.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Routine camp management	Health/wellbeing	$	Will allow property maintenance, likely to improve habitat, could improve public perception of the site, will ensure safety risks of a public site can be managed. Weed removal has the potential to reduce roost availability and reduce numbers of roosting FFs. To avoid this, weed removal should be staged and alternative roost habitat planted, otherwise activities may constitute a Level 3 action.	Will not generally mitigate amenity impacts for nearby landholders.	This action was deemed suitable
Provision of artificial roosting habitat	All	$–$$	If successful in attracting FFs away from high conflict areas, artificial roosting habitat in low conflict areas will assist in mitigating all impacts, generally low cost, can be undertaken quickly, promotes FF conservation.	Would need to be combined with other measures (e.g. buffers/alternative habitat creation) to mitigate impacts, previous attempts have had limited success.	This action was not deemed suitable
Protocols to manage incidents	Health/wellbeing	$	Low cost, will reduce actual risk of negative human/pet–FF interactions, promotes conservation of FFs, can be undertaken quickly, will not impact the site.	Will not generally mitigate amenity impacts.	This action will be included as a risk management response by all responsible land managers
Research	All	$	Supporting research to improve understanding may contribute to more effectively mitigating all impacts, promotes FF conservation.	Generally cannot be undertaken quickly, management trials may require further cost input.	This action was deemed more suitable to be included in a regional strategy or plan
Appropriate land-use planning	All	$	Likely to reduce future conflict, promotes FF conservation. Identification of degraded sites that may be suitable for long-term rehabilitation for FFs could facilitate offset strategies should clearing be required under Level 2 actions.	Will not generally mitigate current impacts, land-use restrictions may impact the landholder.	This action was deemed suitable
Property acquisition	All for specific property owners Nil for broader community	$$$	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.	This action was not deemed suitable due to excessive cost. In addition there is no suitable funding available for this option.
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and unlikely to be considered acceptable by the community.	Due to commitment of Land Managers and Council, this action is not deemed suitable.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Level 2 Actions					
Buffers through vegetation removal	Noise Smell Health/wellbeing Property devaluation Lost rental return	$–$$	Will reduce impacts, promotes FF conservation, can be undertaken quickly, limited maintenance costs.	Will impact the site, will not generally eliminate impacts, vegetation removal may not be favoured by the community.	This action was deemed suitable
Buffers without vegetation removal	Noise Smell Health/wellbeing Damage to vegetation Property devaluation Lost rental return	$$	Successful creation of a buffer will reduce impacts, promotes FF conservation, can be undertaken quickly, options without vegetation removal may be preferred by the community.	May impact the site, buffers will not generally eliminate impacts, maintenance costs may be significant, often logistically difficult, limited trials so likely effectiveness unknown.	This action was deemed suitable, however its applicability to the site may be limited
Level 3 Actions					
Nudging	All	$$–$$$	If nudging is successful this may mitigate all impacts.	Costly, FFs will continue attempting to recolonise the area unless combined with habitat modification/ deterrents. It can disturb the camp so that the FFs become noisier and some may move into adjoining properties.	Not deemed suitable due to excessive cost.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Passive dispersal through vegetation management	All at that site but not generally appropriate for amenity impacts only (see Section 8)	$$–$$$	If successful can mitigate all impacts at that site, compared with active dispersal: less stress on FFs, less ongoing cost, less restrictive in timing with ability for evening vegetation removal.	Costly, will impact site, risk of removing habitat before outcome known, potential to splinter the camp creating problems at other locations (although less than active dispersal), potential welfare impacts, disturbance to community, negative public perception, unknown conservation impacts, unpredictability makes budgeting and risk assessment difficult, may increase disease risk (see Section 7.1), potential to impact on aircraft safety.	Not deemed suitable due to the nature of the vegetation (Endangered Ecological Community), the likelihood of shifting the problem onto another section of the community, and cost.
Passive dispersal through water management	All at that site but not generally appropriate for amenity impacts only (see Section 8)	$$–$$$	Potential advantages as per with passive dispersal through vegetation removal, however likelihood of success unknown.	Potential disadvantages as per passive dispersal through vegetation removal, however likelihood of success unknown.	Not deemed suitable for the site due to the impacts on threatened vegetation communities.
Active dispersal	All at that site but not generally appropriate for amenity impacts only (see Section 8)	$$$	If successful can mitigate all impacts at that site, often stated as the preferred method for impacted community members.	May be very costly, often unsuccessful, ongoing dispersal generally required unless combined with habitat modification, potential to splinter the camp creating problems in other locations, potential for significant animal welfare impacts, disturbance to community, negative public perception, unknown conservation impacts, unpredictability makes budgeting and risk assessment difficult, may increase disease risk (see Section 7.1), potential to impact on aircraft safety.	Not deemed suitable due to excessive cost and limited likelihood of success.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Early dispersal before a camp is established at a new location	All at that site	$$–$$$	Potential advantages as per other dispersal methods, but more likely to be successful than dispersal of a historic camp.	Potential disadvantages as per other dispersal methods, but possibly less costly and slightly lower risk than dispersing a historic camp. Potential to increase pressure on FFs that may have relocated from another dispersed camp, which may exacerbate impacts on these individuals.	Not suitable

4.2 Planned Management Approach

The planned management approaches included in Table 13 have been determined after consideration of community views, ecological requirements and legislative / policy controls. The Actions have been grouped into the major thematic areas of:

- Governance
- Routine Management
- Infrastructure
- Restoration & Rehabilitation
- Monitoring
- Flying-fox Species Management
- Resident Assistance
- Community Education

The actions included in Table 13 are directly linked to the management actions discussed in Table 12, but have been directly tailored to actions that will be planned for implementation at the Flying-fox Camp, depending on conditions and funding provision. Responsibility for the implementation of these actions will be shared across the various land managers as required, details of these responsibilities are included in the table.

Table 13: Management Actions

Action ID	Issue	Actions & guidelines	Responsibility	Trigger / Catalyst for commencement	Budget
1. Resident Assistance					
1.1	Car / Clothes-line / swimming pool covers.	Provision of these items based upon selection criteria during times of high population occupancy	Council	Over 10,000 flying-foxes if they have camped there continuously for > 1 month and subject to funding.	$10,000 (dependent on the availability of external funding)
1.2	Assistance with costs for tree removal.	Based on limited species, and proximity to camp – roosting trees only	Council	Over 10,000 flying foxes if they have been camped continuously for >3 months and subject to funding.	$50,000 (dependent on the availability of external funding)
1.3	Faecal material getting into rainwater tanks	Installation of first-flush devices[3] on rainwater tanks.	Council	Subject to funding and only where there is no Council reticulated water supply service.	$10,000 (dependent on the availability of external funding)
2. Livestock Health and Management					
2.1	Prevention of livestock becoming infected with Hendra virus	Development Council webpage with information on flying-foxes with links to information from other organisations such as NSW Health and Local Land Services.	Council	To be completed within 2017-2018 financial year.	Within existing budget
2.2	Prevention of livestock becoming infected with Hendra virus	Signage for Council equine facilities in Scone and Aberdeen.	Council	This should be done in anticipation that the camps return to these areas in the future.	Within existing budget

[3] First flush devices prevent the first portion of roof run-off from entering the tank and will reduce the amounts of dust, bird droppings and leaves etc, that can accumulate on roofs from being washed into tanks. The use of these devices is recommended (NSW Health Guideline – *Rainwater Tanks*).

Action ID	Issue	Actions & guidelines	Responsibility	Trigger / Catalyst for commencement	Budget
3. Community Education					
3.1	Advice on backyard vegetation management	Factsheet/website information on which trees residents may wish to remove (introduced or naturalised foraging species such as Cocos Palms, Poplars and Silky Oaks)	HCED	Included in Regional Flying-Fox education kit	Funded through NSW Environmental Trust 2017-2019
3.2	Advice on backyard vegetation management	Factsheet on native fragrant trees that will assist to screen smells from Camp	HCED	Included in Regional Flying-Fox education kit	Funded through NSW Environmental Trust 2017-2019
3.3	Health and disease management	Develop consistent regional information regarding health concerns	HCED	Included in Regional Flying-Fox education kit	Funded through NSW Environmental Trust 2017-2019
3.4	Lifecycle and nomadic timing of bat arrival	Develop consistent regional information regarding Flying-fox nomadic behaviour	HCED	Included in Regional Flying-Fox education kit	Funded through NSW Environmental Trust 2017-2019
3.5	Implement Regional Flying-fox educational kit	Develop a community education kit to assist residents to understand Flying-fox movement patterns and reduce conflicts with Camps	HCED	Project expected to deliver Regional Flying-Fox education kit in November 2017	Funded through NSW Environmental Trust 2017-2019
3.6	How to manage dead or injured Flying-foxes	Information on who to call when sick, injured or dead Flying-foxes are seen	Upper Hunter Shire Council	Immediate action required.	Within existing budget
3.7	Weed Control	Noxious and environmental weed control throughout the Camp area - targeting exotic tree species known to act as potential roosting and foraging habitat (e.g. Camphor Laurel as most on site are immature or have not reached maximum height)	Upper Hunter Shire Council or Upper Hunter Weeds Authority	Weed control to be undertaken as part of approved Rivercare program.	Dependent on funding.
4. Restoration & Rehabilitation					
4.1	Rehabilitation of damaged areas (from Flying-fox occupation on Council land	Removal of damaged vegetation and establishment of replacement vegetation.	Upper Hunter Shire Council	Where dead and damaged trees are likely to be a danger to the public.	Within existing budget
4.2	Manage buffer zone (APZ) to reduce conflict between residents and Flying-foxes on Council land	Planting of native fragrant trees and shrubs adjacent to dwellings to reduce the noise and smell directly behind	Upper Hunter Shire Council	Part of annual works program	Within existing budget
5. Infrastructure					
5.1	Signage on Council land.	Interpretive Signage	Upper Hunter Shire Council	If flying-fox camp re-established.	$10,000

Action ID	Issue	Actions & guidelines	Responsibility	Trigger / Catalyst for commencement	Budget
5. Flying-fox Species Management					
5.1	Flying-fox carer response	Respond to calls of injured or dead Flying-foxes	Wildlife Carer Group	As required	NA
5.2	Carer alerts (notification of upcoming events, e.g management activities, heat stress, etc.)	Notification of residents and Carers of any events that will impact on Camp Site or Flying-fox population.	NSW Office of Environment and Heritage	As required	Within existing budget
7. Monitoring					
7.1	Flying-fox Census	Quarterly Flying-fox animal counts to assist with determining likely national population	CSIRO	Quarterly	Funded by CSIRO
7.2	Wildlife / Rehabilitation carer data collection	Collection and provision of count information, and other data collected when responding to calls	Wildlife Carer Group	As responding to issues at the camp.	NA
7.3	Hunter Bird Observers data collection	Collection and provision of count information, and other data collected	Hunter Bird Observers	When aware of flowering event that may signal an increase in the Flying-fox population.	NA
7.3	Upper Hunter Shire Council management data	Collection and dissemination of data related to Flying-foxes, and vegetation that may impact on local or regional Flying-fox populations	Upper Hunter Shire Council	As Council becomes aware of issues.	Recurrent budget
8. Governance					
8.1	Land Use Planning	Review Land Use Planning provisions that impact on the Camp site (e.g. Re-zoning, DCP, s149 considerations)	Upper Hunter Shire Council	Incorporation into planning processes	NA
8.2	Camp Management Plan review	Review in 5 years / when FF numbers increase past current capacity	Upper Hunter Shire Council	2022	NA
8.3	Protocol Development	Fire	Fire and Rescue NSW	Work with Councils in the Hunter region to develop.	NA
		Heat Stress	Office of Environment & Heritage / Wildlife Rehabilitators		
		Community Response to dead / injured animals	Wildlife Rehabilitators		
		Hospital	Hunter New England Health		
		Equine	Hunter Local Land Services		

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5 Assessment of Impacts to Flying Foxes

5.1 Flying-fox Habitat to be Affected

Based on the actions included in Table 13, it is expected there would be little to no negative impacts on the Flying-fox population that utilises the Aberdeen and Scone Flying-fox Camps.

The majority of actions approved in this Camp Management Plan are considered Level 1 (routine management actions), as the Land Managers have determined the cost and ongoing issues with drastic management actions including nudging, dispersal or culling are inappropriate for the Aberdeen and Scone Camps and will not be undertaken whilst this current Camp Management Plan is in force.

Further assessment of environmental impacts should be undertaken prior to any physical works being implemented on the sites.

6 Evaluation and Review

The Plan will have a scheduled review annually, which will include evaluation of management actions.

The following will trigger a reactive review of the Plan:

- completion of a management activity
- progression to a higher level of management
- changes to relevant policy/legislation
- new management techniques becoming available
- outcomes of research that may influence the Plan
- incidents associated with the camp.

Results of each review will be included in reports to OEH.

If the Plan is to remain current, a full review including stakeholder consultation and expert input will be undertaken in the final year of the Plan's life prior to being re-submitted to OEH.

7 Plan administration

This Camp Management Plan has been developed in partnership by Upper Hunter Shire Council.

7.1 Monitoring of the camp

Upper Hunter Shire Council will continue to assist the CSIRO to undertake their quarterly Flying-fox census activities. Wildlife Rehabilitators can access the site as required to attend to the animals, and record information of relevance to Council, the Office of Environment & Heritage and CSIRO.

Additional monitoring and data collection will occur as opportunities arise.

7.2 Reporting

Quarterly reports (following publication of the CSIRO Census Count) will be developed by Upper Hunter Shire Council and submitted to Council providing details on management activities at the site, and the Flying-fox population during the quarter.

7.3 Funding commitment

Upper Hunter Shire Council has a responsibility to ensure appropriate funding is available to undertake management actions included in this plan. The Plan will operate from 2017 – 2027 and therefore each organisation should ensure ongoing funding, and forward planning for management actions be included in their annual budget development.

It is expected that an annual work plan, including budget items will be developed by the project team and implemented as required.

8 References and additional resources

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