FLYING-FOX CAMP MANAGEMENT PLAN

MURRURUNDI

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

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Disclaimer

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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.

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

Flying-foxes established a camp at Murrurundi on the Pages River in April 2017. Anecdotally, local residents suggest Flying-foxes have been utilising the area for many years, but in such small numbers that it has never been raised as an issue for Council to manage. The land occupied by the Camp is predominantly managed by Council, although private residences and the primary School have also experienced Flying-foxes roosting on their land when the Camp population reached 100,000 animals.

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 Murrurundi Flying-fox Camp Management Plan provides a tool to ensure appropriate management of the camp. This management plan outlines the issues of concern to the community caused by the presence of Flying-foxes, and measures that can 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 Murrurundi are primarily to manage 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

At present the Flying-foxes no longer occupy the site or are present in low numbers and as such many of the actions identified in this Plan may not be applicable at this time. However in the event that the Flying-fox camp returns to or occupies the site in large numbers this camp management plan may be more fully implemented.

1 Overview

1.1 Background

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, MidCoast 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.

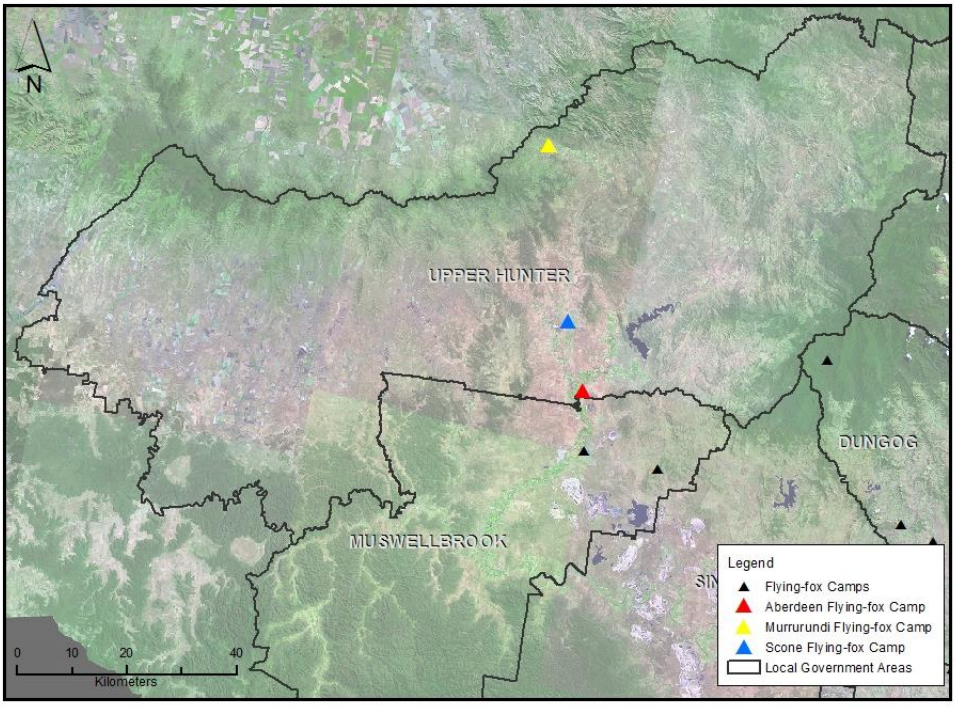
The Camp Management Plan has been compiled by Hunter Councils Environment Division, utilising the NSW Office of Environment and Heritage's "Flying-fox Camp Management Plan Template 2016" and input from all participating Councils, the Office of Environment and Heritage, responses from Community Consultation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

The plan outlines how the land occupied by the camp 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.

Map 1: Flying-fox Camps in the Upper Hunter Local Government 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 Murrurundi Flying-fox Camp.

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

- better understand the effects of and mitigate direct negative impacts on local residents
- educate and better inform local communities about the importance and benefits of flying-foxes
- conserve and protect, as required by law, flying-foxes and their habitat.

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).

1.3 Roles & Responsibilities

1.3.1 Upper Hunter Shire Council

Upper Hunter Shire Council is the primary land owner responsible for managing the Murrurundi site and subsequently final decisions about how to manage the flying-foxes using the site, in the main, fall with this agency. As the representative organisation of the local community Upper Hunter Shire Council plays an active role in developing management actions for the site.

1.3.2 NSW Office of Environment and Heritage

The Office of Environment and Heritage (OEH) is responsible for administering the *Threatened Species Conservation Act* 1995 (TSC Act), and for ensuring the impact of any action affecting threatened species is properly assessed. Any application by NSW Department of Industry - Lands & Forestry, under the TSC Act to disrupt the flying-foxes roosting site (the camp) would be assessed by the OEH Regional Operations Group Hunter Central Coast (ROG-HCC), Planning team with likely input from the Ecosystems and Threatened Species team.

1.3.3 Wildlife Rehabilitators

Injured or distressed flying-foxes are rescued and cared for by licenced wildlife rehabilitators.

2 Context

2.1 Local Context

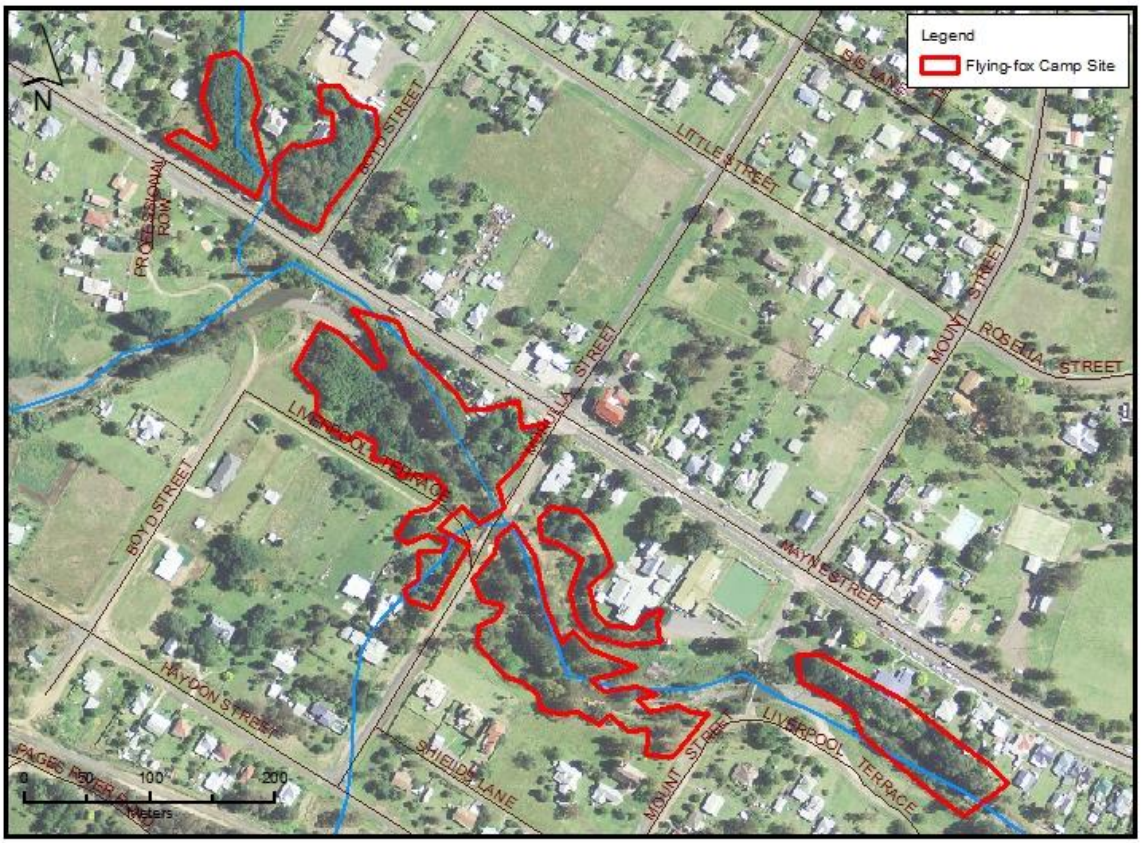
2.1.1 Murrurundi Flying-fox Camp and Surrounds

Flying-foxes in NSW were affected by a serious widespread food shortage in October 2016 that lasted until at least February 2017 and correlates to the establishment of new flying-fox colony sites closer to food sources.

Initially the colony was relatively small, although by Mid-April 2017 estimates suggest 100,000 individuals were utilising the site. The colony continued to increase and during late April and early May the site used by the flying-foxes expanded to include the Boyd Street Overflow and areas from the back of the Information Centre to the southern edge of the colony. Given the population utilising the site, it could be stated that the Camp site is important for the conservation of Grey-Headed Flying-foxes, as it probably supports some 14%-20% of the total national population of the species.

The colony is divided into 3 sections: a Core part which is the most densely occupied and two outlying sections that are apparently overflow areas as they became occupied after the main influx of flying-foxes came to the site in early to mid-April 2017. Flying-foxes tended to occupy all the canopy trees and many of the smaller trees along the river bank and in the wood on the western side of the Art Gallery on Boyd St. The extent of the Camp observed in April 2017 is described in Map 2.

Map 2 : Murrurundi Flying-fox Camp location and extent

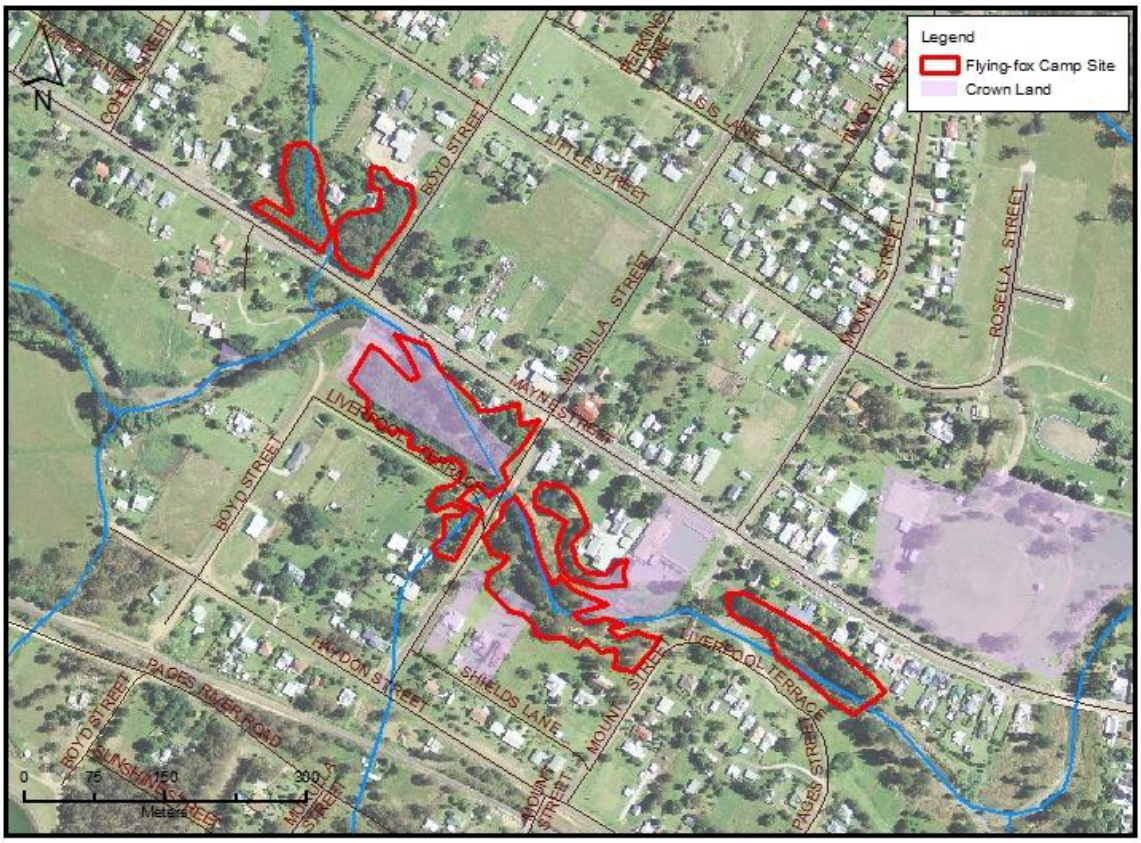


In addition to the Murrurundi Camp, Flying-foxes are known to roost intermittently at Scone and Aberdeen. Information on these Camps can be found in the Aberdeen & Scone Camp Management Plan 2017.

2.1.2 Land Tenure, Zoning and Land Use

The area where Flying-foxes were roosting in April / May 2017 was primarily on Crown Land between Mayne Street and Liverpool Terrace, although the population was large enough to require animals to roost in trees on private land and the local Primary School (see Map 3).

Map 3: Land tenure of the Murrurundi Flying-fox Camp and surrounds

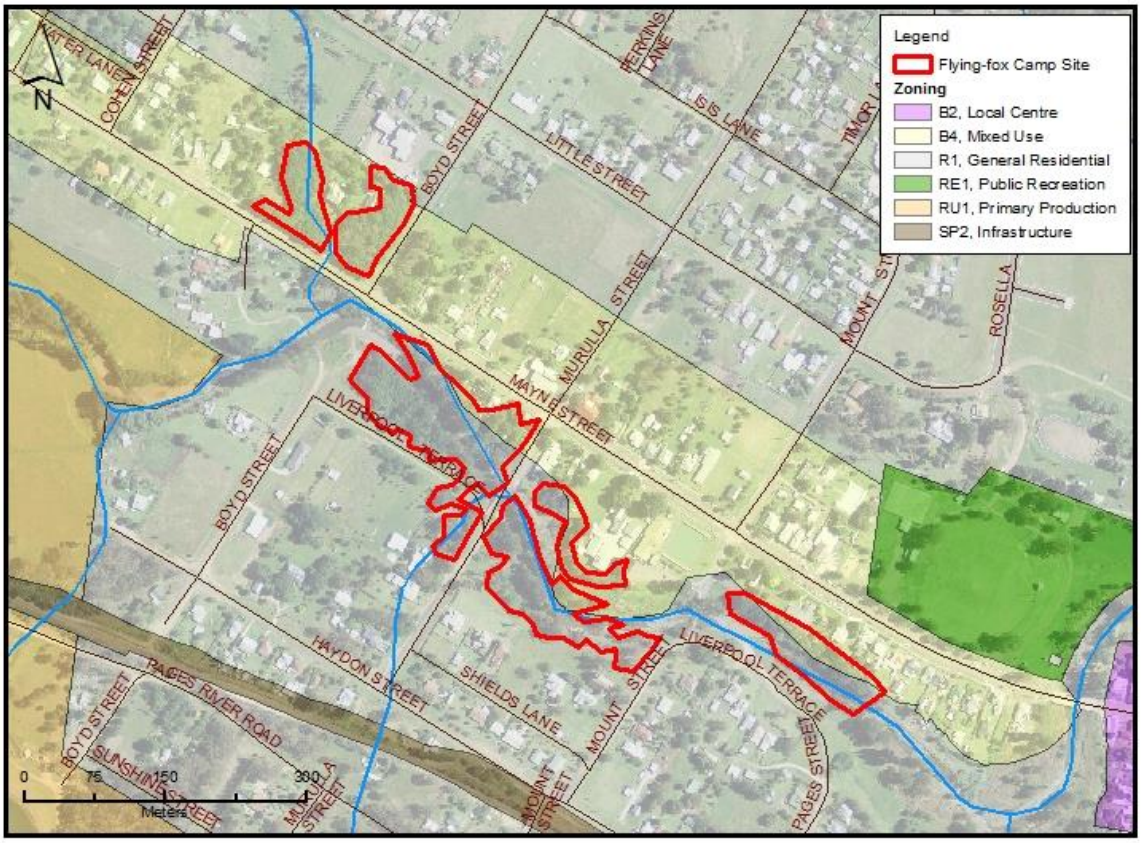


The area occupied by the Camp, and impacts from the noise and smell is zoned as either Mixed Use or general residential (see Map 4). It is also noted that the core area of the Camp (Between Mayne Street, Liverpool Terrace, Boyd Street and the Footbridge) is located over the town water inlet, although this was not utilised during the time of the Flying-fox occupation of the site.

While most of the town of Murrurundi is impacted in some way by this very large colony, six properties are heavily exposed, as they are located within the Camp and they have experienced hundreds of flying-foxes on their land. The properties are:

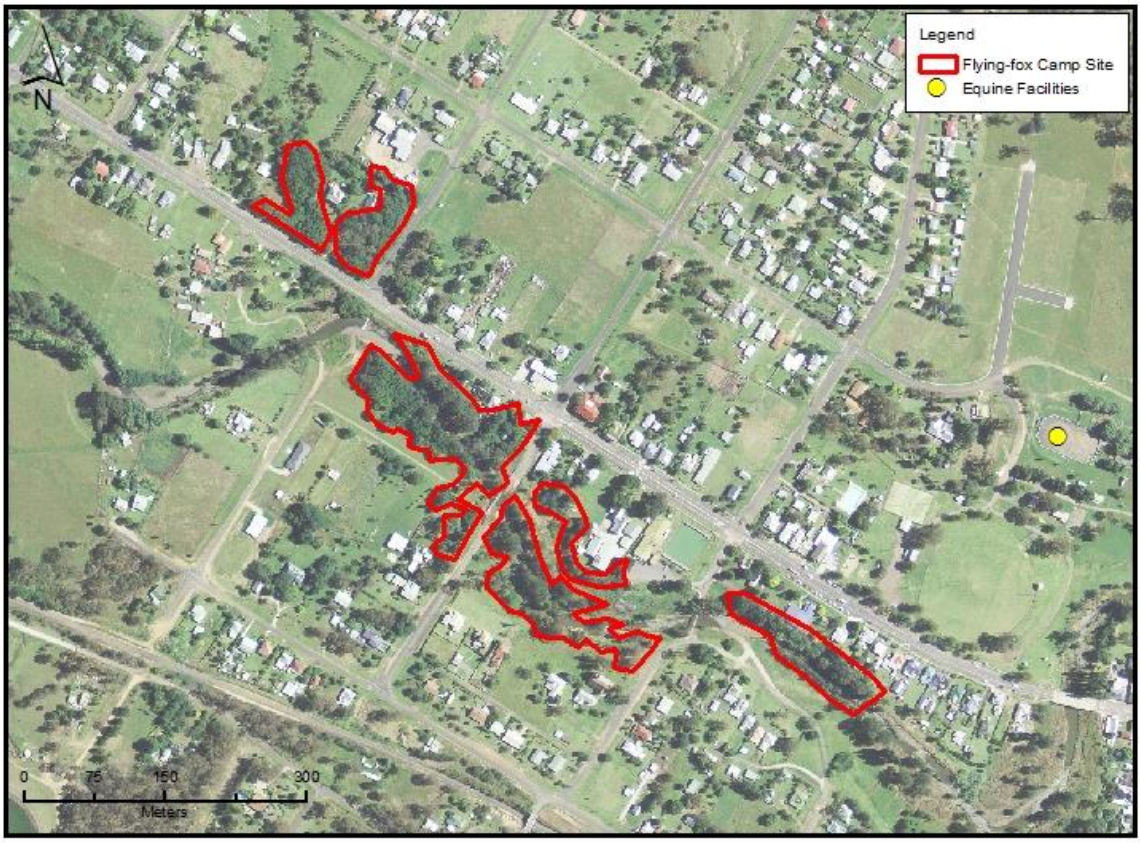
- the school,
- the three private properties located from the corner of Murulla St along Mayne St to the NW,
- the property to the W of Murulla St past the footbridge
- the Art Gallery on Boyd St.

Map 4: Land zoning of the area surrounding the Murrurundi Flying Fox Camp



Given the possibility of zoonotic transmission (disease spread) from Flying-foxes to horses, Map 5 provides details on the distance from the Camp location to the nearest equine facilities. It should be noted that in NSW there are no cases of bat to human, bat to dog, or bat to horse disease transmission.

Map 5: Nearest equine facilities to the Murrurundi Flying-fox Camp



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.

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

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 Murrurundi Flying Fox Camp

Local residents have provided anecdotal evidence suggesting small numbers of Flying-foxes roost along the Pages River during February to June each year. This site was not included in the National Flying-fox census until the 2017 occupation, as it was not considered to be a Camp due to the intermittent use and small numbers of animals observed on site.

Following the April 2017 occupation, the Camp is now included on the census and quarterly monitoring will now be undertaken by the CSIRO and volunteers to determine the extent the Camp may become more regularly used.

Observations by Flying-fox ecologists suggest some 100,000 animals utilised the Camp site in April / May 2017. The camp was only occupied for some 6 weeks prior to the animals leaving the site, and was directly related to the Flowering of White Box in the local area.

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
Residents' feedback sought	Hunter Valley News	29/03/2017	Informing the community about the Council's community engagement strategy.
Survey on flying foxes	Up Country Entertainer	30/03/2017	
Upper Hunter flying-foxes survey	Merriwa District Diary	31/03/2017	
We're hoping they move on once local food sources diminish: Council	Scone Advocate	13/04/2017	Article tries to provide information to address possible community fears in relation to the potential for flying-foxes to transmit diseases to humans.
Flying-foxes camp in Murrurundi	Quirindi Advocate	19/04/2017	
Flying fox camp sets up another home	Scone Advocate	20/04/2017	
Flying-foxes camp in Murrurundi	Up Country Entertainer	20/04/2017	
Going batty	Quirindi Advocate	26/04/2017	The camp is creating problems for residents including, noise, smell and safety concerns.
No quick fix on flying foxes	Scone Advocate	26/04/2017	"Dr Parry-Jones also said that in her opinion there is no effective way of completely dissipating a colony permanently and the Murrrurundi camp cannot currently be moved". "Efforts to disrupt flying fox camps will generally not relocate them, just make them more active!" "They will move when the food supply runs out or when the weather changes."
Bat plague frustrates town	Scone Advocate	27/04/2017	
Opportunity to ask questions	Scone Advocate	28/04/2017	
Session focus on 'batty' problem	Hunter Valley News	3/05/2017	

Public information session on flying foxes	Quirindi Advocate	3/05/2017	
Council meets with Murrurundi residents	Hunter Valley News	11/05/2017	
Flying-fox in Murrurundi update	Up Country Entertainer	18/05/2017	

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:

- noise as Flying-foxes depart or return to the camp leading to sleep deprivation, and loss of amenity
- noise from the camp during the day (especially during the breeding season)
- faecal drop on outdoor areas, swimming pools,, cars and washing lines, associated with cleaning areas adjacent to the camp
- Smell resulting in an inability to leave windows open and subsequent loss of breeze
- fear of disease
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- impacts on other fauna species (e.g. depletion of bird numbers)
- property devaluation
- diminished rental return and difficulty in renting properties
- Inconvenience, e.g. inability to leave washing outside, loss of amenity
- Elderly/disabled housebound - inconvenienced

2.1.5 Management Response to Date

Council has undertaken a number of management responses to date, these are described in Table 2.

Table 2: Management Actions undertaken at Murrurundi

Date	Action
04/05/2017	Community information session – attended by 150 people.
19/05/2017	Obtained LGNSW Funding of $25,000 for Taking Cover – Murrurundi Public School

2.2 Ecological Values of Flying-foxes, the Camp and Surrounding Areas

2.2.1 Grey-Headed Flying-fox Species information (*Pteropus poliocephalus*)

The only Flying-fox species observed utilising the Murrurundi Camp was the Grey-Headed Flying-fox.

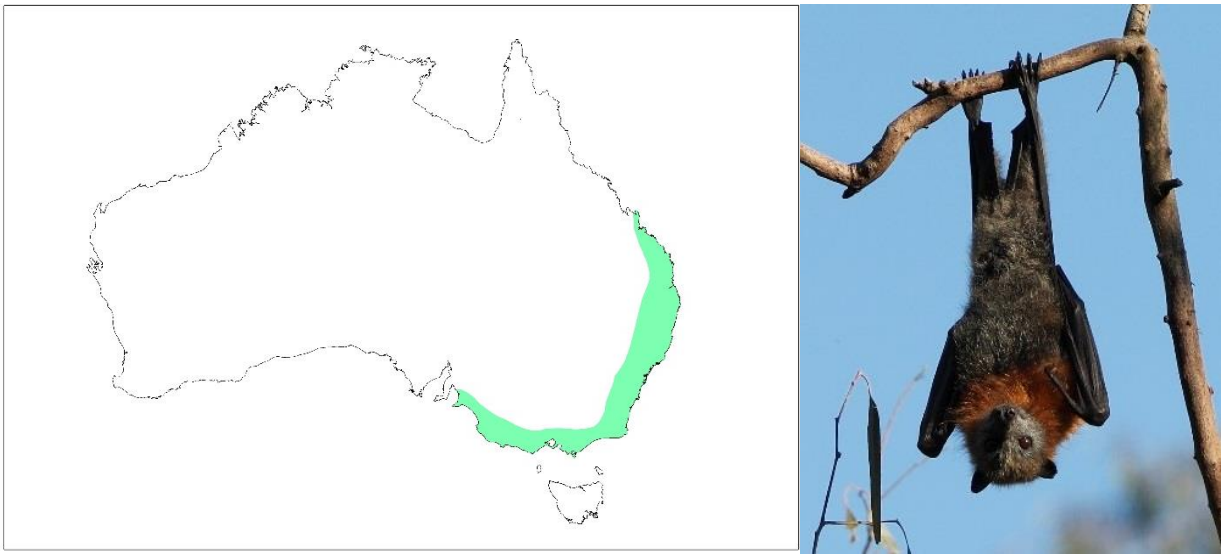


Figure 1: Grey-Headed Flying-fox indicative species distribution, adapted from OEH 2015a

The Grey-Headed Flying-fox (Figure 1) is found throughout eastern Australia, generally within 200 kilometers 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 kilometers in a single night with a foraging radius of up to 50 kilometers from their camp (McConkey et al. 2012). They have been recorded travelling over 500 kilometers 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 (see Section 4).

2.2.2 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 kilometer (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).

2.2.3 Murrurundi Flying-fox Camp Description

The colony is divided into 3 sections: a Core part which is the most densely occupied and two outlying sections that are apparently overflow areas as they became occupied after the main influx of flying-foxes came to the site in early to mid-April 2017 (see Map 2). Flying-foxes were observed in all the canopy trees and many of the smaller trees along the river bank and in the wood on the western side of the Art Gallery on Boyd St. There are four main areas where flying-foxes were roosting in trees located outside this area (The Church, The School, the Footbridge and Murulla St Corner). However all fall within the Core area of the site.

The core area is dominated by introduced tree species including Elms, Liquidambar, Canary Island Date Palm and Large-leaved Privet. Dominant native species include Swamp Oak and Rough-barked Apple. Flying-foxes were observed roosting in both exotic and native trees.

2.2.4 Flying-fox Habitat

Vegetation Communities

The dominant native species is *Casuarin glauca* however *Ulmus glabra* is probably the most dominant species overall. The entire site is highly degraded and weed infested. Most of the canopy trees are exhibiting defoliation caused by the flying-foxes as they remove the leaves to gain access to the sun.

The camp is located within a highly modified riparian zone. Most of the native species have been displaced with exotic trees and shrubs as a result of past clearing practices. There are pockets of remnant Swamp Oak Woodland along the southern side of the river. The mid storey and ground layer is highly modified and is dominated by environmental and noxious weeds including Wandering Jew, Purple Tops, Maderia Vine, Moth Vine and Erharta.

The roost site to the north of Mayne Street is comprised entirely of a well-established Elm Forest. The northern side of the river bank is dominated by dense and widespread Large-leaved Privet and exotic weeds.

Threatened Species & Endangered Ecological Communities

Based on the rapid flora assessments, the dominant species captured within the central section of the camp is consistent with Hunter Flood Plain Red Gum Woodland community.

Large continuous stands of Swamp Oak with moderately to severely disturbed understorey were also noted along the southern side of the creek bank between Murrulla and Mount Streets, these areas may be associated with Swamp Oak Floodplain Forest. Detailed vegetation assessments are required to confirm the presence and extent of these communities.

A list of threatened species likely to occur within the camp, which is based on habitat requirements and NSW BIONET database records within 10 km of the site, is provided in Table 3.

Table 3: Threatened species and ecological communities that are likely to occur at the site[2]

Species Name	Common Name	NSW Status	Commonwealth Status
Fauna			
Anseranas semipalmata	Magpie Goose	V,P	
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2	
Glossopsitta pusilla	Little Lorikeet	V,P	
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P	
Endangered Ecological Communities			
Swamp Oak Floodplain Forest of the NSW North Coast		Vulnerable	

Foraging Areas

Within the Flying Fox Camp (core and known overflow)

The Flying Fox camp contains limited foraging habitat throughout the riparian zone, favoured species include Rough barked Apple (*Angophora floribunda*), Blakely's Red Gum (*Eucalyptus blakelyi*) and Silky Oak (*Grevillea robusta*). Higher priority species present include Yellow Box (*Eucalyptus melliodora*) and Forest Red gum (*Eucalyptus tereticornis*) which occurs within the core roosting site.

Large-leaved Privet (*Ligustrum lucidum*) is also known to be part of the Flying Fox diet is widespread and densely infested in the mid storey layer, particularly within the overflow areas east of Mount Street behind the Information Centre.

White Cedar was also present within the road reserve along Murrull Street, however there was no evidence that Grey Headed Flying Foxes were actively feeding on the fruit.

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

Roosting Areas within the Flying Fox Camp

Core Camp Area

This site contains continuous dense tree canopy dominated by Swamp Oak (*Casuarina glauca*), Silky Oak and Rough-barked Apple. The gully offers adequate protection with the mid story dominated in some areas by Blackberry, exotic grasses and ground covers such as Wandering Jew. To the north of the core roosting site the vegetation is dominated by Elm Trees and Large leaved Privet. The trees observed being used for roosting are detailed in Table 4, and included in Photograph 1 and Photograph 2.

Table 4: Roosting trees observed in the Camp area

Species Name	Common Name	Status
Cedrela oderata	Cigar Box Cedar	Exotic
Fraxinus oxycarpa	Claret Ash	Exotic
Gleditsia triacanthos	Honey Locust	Exotic
Hedera helix	English Ivy	Exotic
Ligustrum vulgae	Large-Leaved Privet	Exotic
Liquidambar styraciflua	Liquidambar	Exotic
Phoenix canariensis	Canary Island Date Palm	Exotic
Pistacia chinensis	Pistacio Nut Tree	Exotic
Populus nigra	Black Poplar	Exotic
Quercus robur	English Oak	Exotic
Robinia pseudoacacia	Black Locust / Golden Robina	Exotic
Salix babyonica	Weeping Willow	Exotic
Salix discolor	Basket Willow	Exotic
Ulmus glabra	Golden Wych Elm	Exotic
Angorphora floribunda	Rough-barked Apple	Native
Casuarina glauca	Swamp Oak	Native
Eucalyptus blakelyi	Blakely's Red Gum	Native
Eucalyptus saligna	Sydney blue Gum	Native
Eucalyptus tereticornis	Forest Red Gum	Native
Melia azendarach	White Cedar	Native
Araucaria bidwillii	Bunya Pine	Out of Area
Grevillea robusta	Silky Oak	Out of Area

Photograph 1: Flying Foxes roosting closely in Elm Trees, within the northern end of the core site

Flying Fox Camp (known overflow roosting areas April 2017)

In April 2017 over 100,000 Grey Headed Flying Foxes utilised the Murrurundi Camp. The total Camp area including the core and overflow sites covers approximately 5.5 hectares of the riparian zone in the township of Murrurundi. It is believed the occupation of the site is directly related to the exceptional flowering event of White Box (*Eucalyptus albens*) in the local area which is higher priority food tree for Grey-Headed Flying-fox.

Photograph 2: Overflow site west of the footbridge adjacent to Mount Street

Potential Overflow Roosting Areas

The Pages River provides additional suitable roosting habitat (overflow areas) both to the north west and south east of the core roosting site. Details of these potential overflow areas are detailed on Map 6.

Map 6: Potential roosting overflow locations

2.2.5 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 Murrurundi Flying-fox Camp 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.
- Disturbance from local residents

2.2.6 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).

2.2.7 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.

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 (Some of these behaviours may occur outside of heat stress events), including:

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.

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

The March 2016 and February 2017 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

2.2.8 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.

The Murrurundi Flying-fox Camp is further protected under the EPBC Act as it is considered a Nationally Important Camp as it meets the following criteria:

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

The designation of the Camp as Nationally Important requires land managers to ensure all management activities meet the following standards:

- The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependent young that cannot fly on their own.
- The action must not occur during or immediately after climatic extremes (heat stress event3, cyclone event4), or during a period of significant food stress5.
- Disturbance must be carried out using non-lethal means, such as acoustic, visual and/or physical disturbance or use of smoke.

[3] A 'heat stress event' is defined for the purposes of the Australian Government's Referral guideline for management actions in GHFF and SFF camps as a day on which the maximum temperature does (or is predicted to) meet or exceed 38°C.

[4] A 'cyclone event' is defined as a cyclone that is identified by the Australian Bureau of Meteorology (www.bom.gov.au/cyclone/index.shtml).

[5] Food stress events may be apparent if large numbers of low body weight animals are being reported by Wildlife Rehabilitators in the region.

- Disturbance activities must be limited to a maximum of 2.5 hours in any 12 hour period, preferably at or before sunrise or at sunset.
- Trees are not felled, lopped or have large branches removed when Flying-foxes are in or near to a tree and likely to be harmed.
- The action must be supervised by a person with knowledge and experience relevant to the management of Flying-foxes and their habitat, who can identify dependent young and is aware of climatic extremes and food stress events. This person must make an assessment of the relevant conditions and advise the proponent whether the activity can go ahead consistent with these standards.
- The action must not involve the clearing of all vegetation supporting a nationally-important flying-fox camp. Sufficient vegetation must be retained to support the maximum number of Flying-foxes ever recorded in the camp of interest.

These standards have been incorporated into mitigation measures detailed in Section 10.3. If actions cannot comply with these mitigation measures, referral for activities at nationally important camps is likely to be required.

In NSW, the Grey-Headed Flying-fox is listed as vulnerable under the NSW *Biodiversity Conservation Act 2016*. 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 *Biodiversity Conservation Act 2016* 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 7), 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.

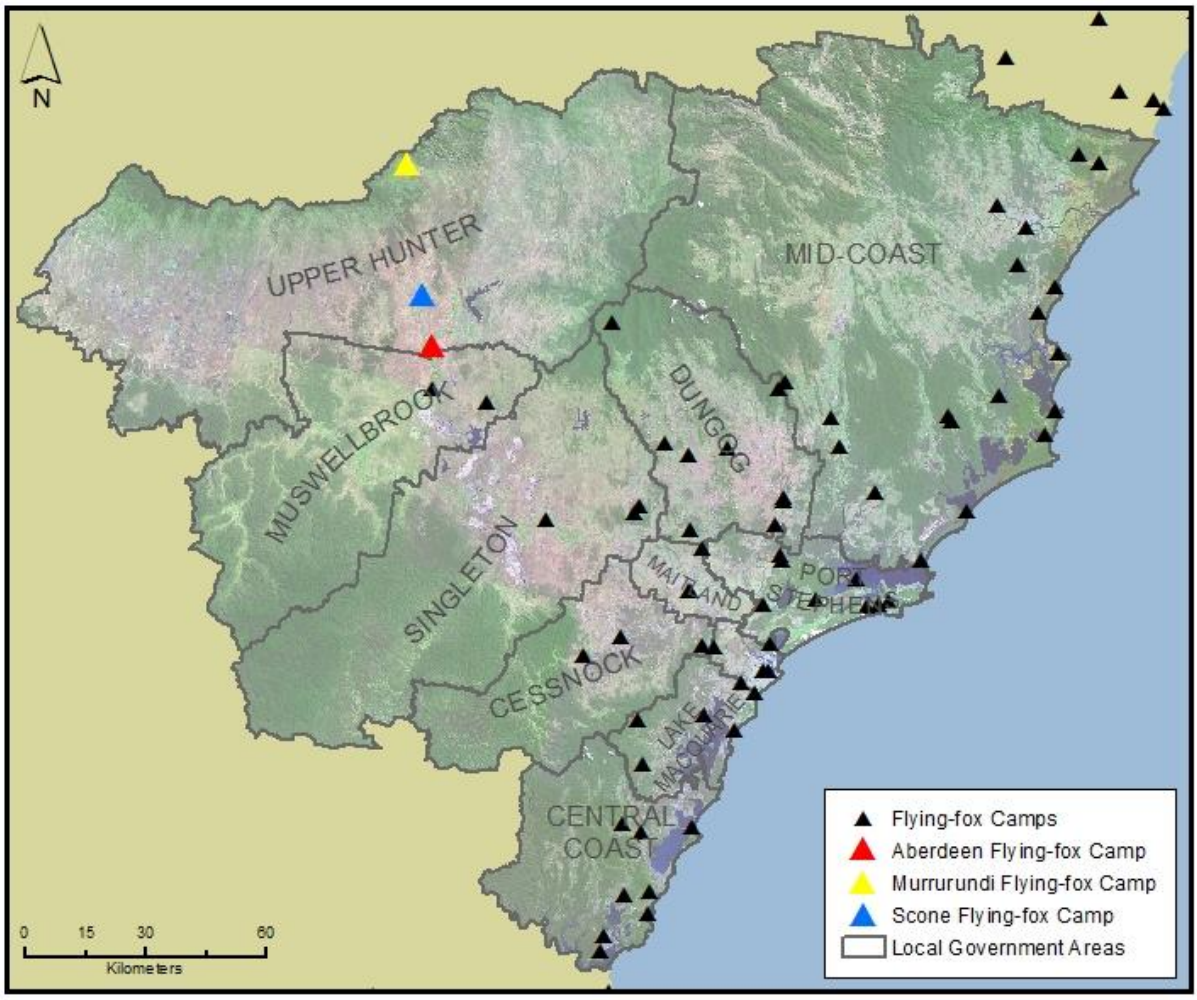
The 2013 Strategy also stated that a further six Camps (Black Hill, Belmont, Glenrock, Hannan Street, Italia Road and Raymond Terrace) were not critical to survival in the Lower Hunter, and reflecting on changes in Flying-fox roosting patterns in the past 4 years we now know that Black Hill and Hannan 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.

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.

Map 7: Aberdeen Flying-fox Camp location and Historical extent



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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 comprehensive community engagement process in the facilitation of this Camp Management Plan, details follow.

3.1 Stakeholders

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 5.

Table 5: 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 (Local Representative committee and Administrator)	Relaying community issues
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:

- promotion of contact details of responsible officers
- FAQ for frontline Council, OEH and DPI staff
- telephone conversations (record issues and complaints)
- 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
- Specific media and engagement activities are detailed in Table 6.

Table 6: Details of Community Engagement Activities undertaken in the development of the Murrurundi Camp Management Plan

Date	Consultation Activity
11/04/2017	• FB Post about the Survey being available to fill out
13/04/2017	• Media Release about camp landing in Murrurundi
13/04/2017	• FB Post sharing the Media Release about the camp landing
11/04/2017	• FB Post about the Survey being available to fill out
13/04/2017	• Media Release about camp landing in Murrurundi
13/04/2017	• FB Post sharing the Media Release about the camp landing
21/04/2017	• Householder Newsletter to Murrurundi Residents
26/04/2017	• Shire Notes printed in the Scone Advocate addressed the issue
28/04/2017	• Media release about the Murrurundi Flying Fox situation
01/05/2017	• FB Post sharing the Shire Notes
01/05/2017	• FB Post about upcoming Community Information Session

Date	Consultation Activity
04/05/2017	• Community Information Session
10/05/2017	• Mayor visited Murrurundi
10/05/2017	• FB Post from the Mayor about his visit
11/05/2017	• FB Post about how the Community Information Session went
15/05/2017	• Public Grant Announcement at Murrurundi with $12.5K contributed by Council
15/05/2017	• FB Post about the grant announcement
16/05/2017	• FB Post with the NBN video about the grant announcement
16/05/2017	• Shire Notes printed in the Scone Advocate addressed the issue
18/05/2017	• FB Post sharing the Shire Notes
19/05/2017	• Householder Newsletter to Murrurundi Residents
22/05/2017	• FB Post Survey Reminder
23/05/2017	• FB Post from Mayor reassuring residents
30/05/2017	• Shire Notes printed in the Scone Advocate addressed the issue
05/06/2017	• FB Post sharing the Shire Notes

FB = Facebook

Flying Fox Engage

The use of 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 April and remained open for submissions until June 2017.

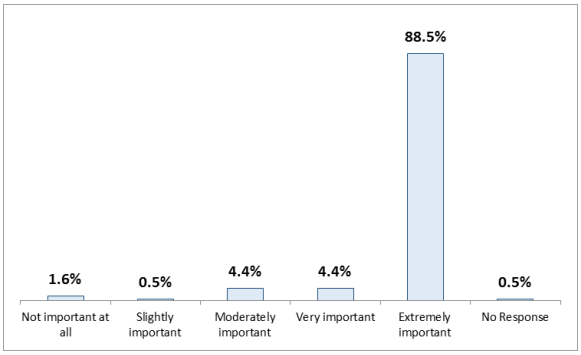
During this consultation period the Flying fox engage website received 183 valid submissions.

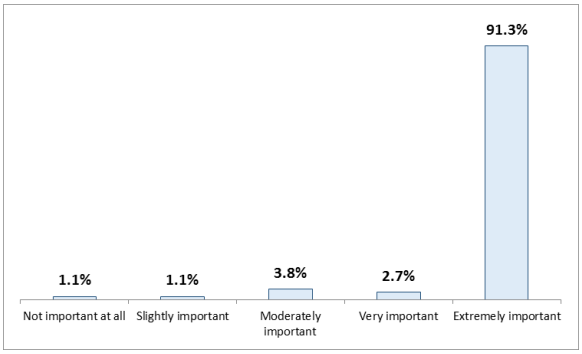
Flying fox engage is a relatively simple survey methodology that poses 12 questions to users, the responses to these questions then produces a ranked list of preferred management options that reflect reflect the values of the survey respondent. The list is then able to be manipulated by the user to manually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

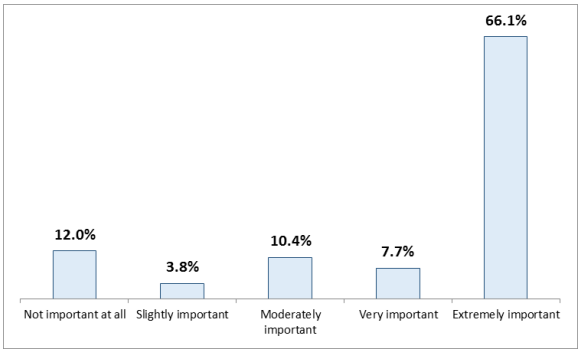
Table 7.

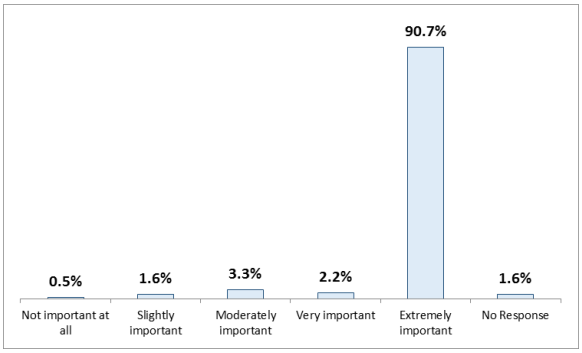
Table 7: Collated responses to the questions posed in Flying Fox Engage

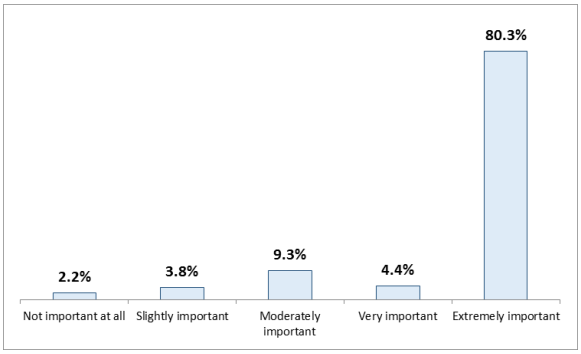
Question	Responses
How important is it to you that the flying-fox camp management option reduces the impact of noise and odour from Flying-foxes roosting at the camp on nearby residents?	How important is it to you that the flying-fox camp management option reduces the impact of the flying-fox excrement 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?

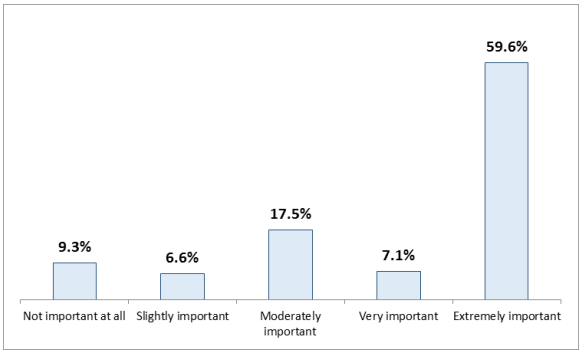


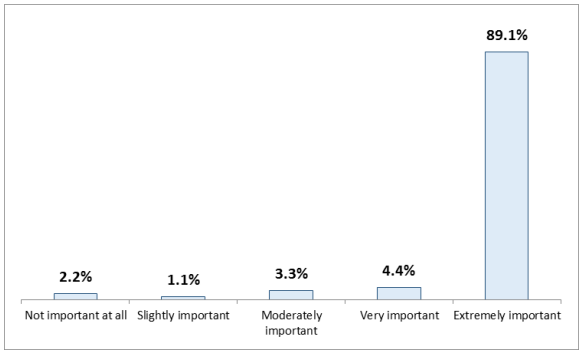
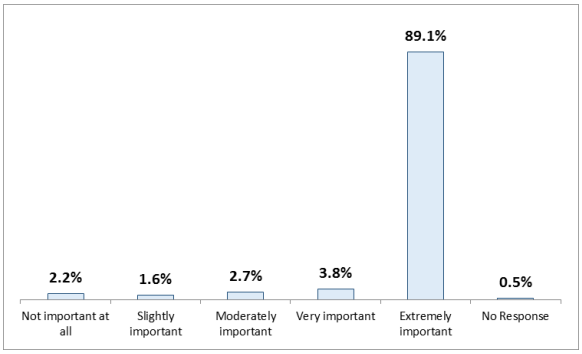
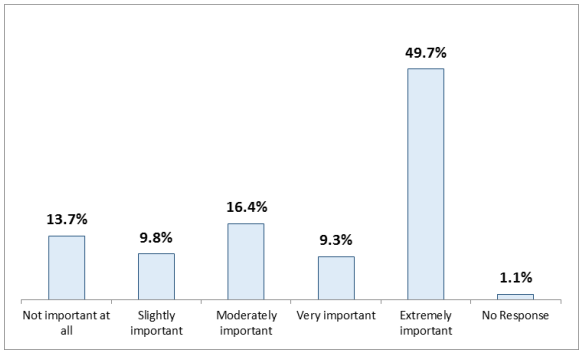
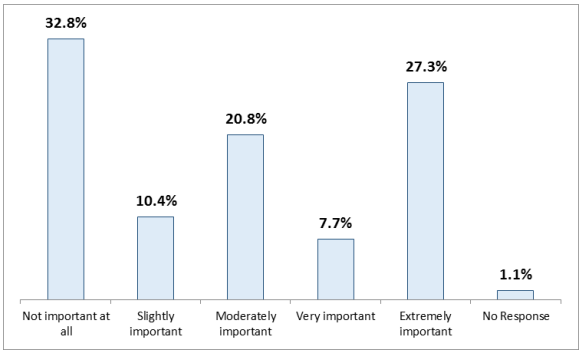
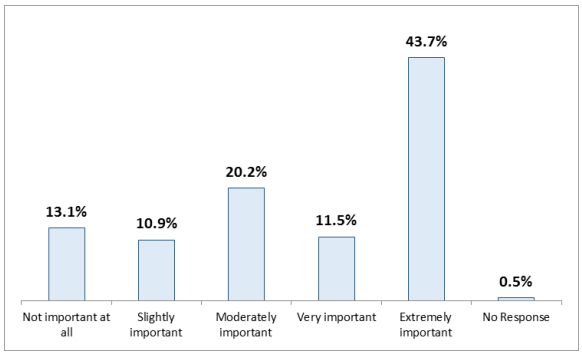
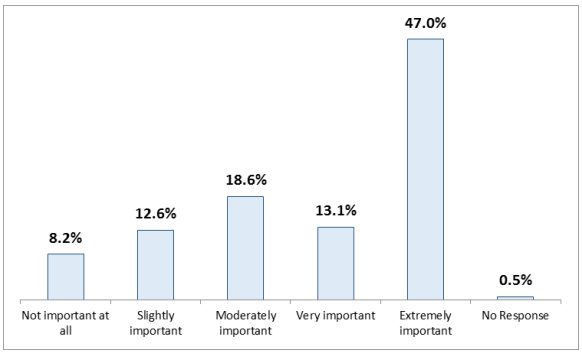










Question	Responses
How important is it to you that the flying-fox camp management option can be implemented quickly?	
How important is it to you that the flying-fox camp management option provides a long term solution?	
How important is it to you that the flying-fox camp management option does not disrupt 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?	

As expected given the significant number of animals that were utilising the Camp site in April / May 2017, the overwhelming majority of respondents were extremely concerned about the impacts from the Flying-foxes. Although alongside this concern was a request from 2/3rds of respondents that any management actions don't increase costs to residents (and Council). It is also noted that survey respondents were less interested in impacts to the animals or vegetation they are roosting in, as much as they want the impacts on their homes to be alleviated.

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 8.

Table 8: 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	Early dispersal before a camp is established at a new location
6	Do Nothing	Fully-funding property modification to reduce the impacts of flying-foxes
7	Fully-funding property modification to reduce the impacts of flying-foxes	Provision of flying-fox education and awareness programs
8	Research to improve knowledge of flying-fox ecology	Active dispersal of a flying-fox camp using disturbance
9	Revegetate and manage land to create alternative flying-fox habitat	Revegetate and manage land to create alternative flying-fox habitat
10	Routine maintenance to improve the condition of the site	Revegetating areas with plants that are unsuitable as roost habitat

As shown in Table 8, initial values based ranking suggests the community views are not as extreme as as initially thought from the results shown in

Table 7. All of the top 10 preferred actions are Level 1 activities. Once respondents were able to re-rank the management actions, a level 2 and level 3 action were added to the Top 10 with the suggestion of early dispersal, or active dispersal was added.

When considering just those residents within 300m of the Camp (directly impacted), the responses are included in Table 9

Table 9: 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	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	Early dispersal before a camp is established at a new location
6	Do Nothing	Fully-funding property modification to reduce the impacts of flying-foxes
7	Fully-funding property modification to reduce the impacts of flying-foxes	Provision of flying-fox education and awareness programs
8	Research to improve knowledge of flying-fox ecology	Active dispersal of a flying-fox camp using disturbance
9	Revegetate and manage land to create alternative flying-fox habitat	Revegetating areas with plants that are unsuitable as roost habitat
10	Routine maintenance to improve the condition of the site	Revegetate and manage land to create alternative flying-fox habitat

The results of the survey when considering those closest to the Camp mirror the broader views with initial results requesting only Level 1 activities, but re-ranked options including camp dispersal.

In addition to the 12 questions detailed in Table 7, 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 10.

Table 10: 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	55
	Yes, flying-foxes leaving and returning to the camp fly over my home	120
	Yes, flying-foxes stop me from using the area, surrounding services or businesses	99
	Yes, I enjoy visiting the flying-foxes	3
	Yes, my home is very close to the camp	97
Open ended Question and responses		
If you want to, you can comment on the flying-fox	• Respondents suggested a range of camp management options including providing alternative habitat, relocation of the camp and culling be used.	

Question	Responses	Number of Respondents
camp management options we have explored or you can suggest other solutions.		
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

4.1 Site-specific analysis of camp management options

Flying-fox Culling

Flying-foxes are a protected species under the *NSW National Parks and Wildlife Act 1974*, and Federally Listed Threatened Species, as such culling is an unlawful activity. Culling is not considered a viable Camp Management action as it is:

- Not a preferred management option by the majority of the Upper Hunter Shire community
- scientifically ineffective (due to the mobility of the species)
- inconsistent with the objectives of this Camp Management Plan.
- inconsistent with the *Commonwealth Environmental Protection & Biodiversity Conservation Act 1999*
- inconsistent with the *NSW National Parks and Wildlife Act 1974*
- inconsistent with the *Firearms Act 1996* or section 96G of the *Crimes Act 1900*
- inconsistent with the NSW Flying-fox Management Policy 2015

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 residential 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.

Table 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 also provides details of the assessment undertaken by 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 11: 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.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Service subsidies (e.g. rate rebates, access to water gurney, etc.)	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	May encourage tolerance of living near a camp, promotes conservation of FFs, can be undertaken quickly, will not impact on the site, would reduce the need for property modification.	May be costly across multiple properties and would incur ongoing costs, may set unrealistic community expectations for other community issues, effort required to determine who would receive subsidies.	Due to lack of funding, this option is not suitable in the short term. Should funding become available in the longer term, this action will be reconsidered.
Routine camp management	Health/wellbeing	$	Will allow property maintenance, likely to improve habitat, could improve public perception of the site, will ensure safety risks of a public site can be managed. Weed removal has the potential to reduce roost availability and reduce numbers of roosting FFs. To avoid this, weed removal should be staged and alternative roost habitat planted, otherwise activities may constitute a Level 3 action.	Will not generally mitigate amenity impacts for nearby landholders.	This action was deemed suitable.
Provision of artificial roosting habitat	All	$–$$	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.

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
Property acquisition	All for specific property owners Nil for broader community	$$$	Will reduce future conflict with the owners of acquired property.	Owners may not want to move, only improves amenity for those who fit criteria for acquisition, very expensive.	This action was not deemed suitable due to excessive cost.
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and unlikely to be considered acceptable by the community.	Due to commitment of Land Managers and Council, this action is not deemed suitable.
Level 2 Actions					
Buffers through vegetation removal	Noise Smell Health/wellbeing Property devaluation Lost rental return	$–$$	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					

Management Option	Relevant Impacts	Cost	Advantages	Disadvantages	Suitability Determination
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 and limited effectiveness. Note: Council has resolved to "seek approval from the NSW Department of Education to trial a flying-fox dispersal project at Murrurundi Public School, subject to the continued presence of flying-foxes within and around the school, and budget $13,000 towards its costs".
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 deemed suitable due to limited likelihood of success and possible shifting of the Flying-foxes to another section of the community.

4.2 Planned Management Approach

The planned management approaches included in Table 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 12 are directly linked to the management actions discussed in Table 11, 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 12: 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[6] 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 Murrurundi.	Council	This should be done in anticipation that the camps return to these areas in the future.	Within existing budget

[6] 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.	$2,000

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
5.3	Seek approval from the NSW Department of Education to trial a flying-fox dispersal project at Murrurundi Public School.	Subject to obtaining relevant approvals from NSW Office of Environment and Heritage	NSW Department of Education	Over 10,000 flying-foxes if they have camped there continuously for > 3 months and subject to funding.	$13,000 (Council contribution)
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
7.4	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		

Action ID	Issue	Actions & guidelines	Responsibility	Trigger / Catalyst for commencement	Budget
		Hospital	Hunter New England Health		
		Equine	Hunter Local Land Services		

5 Assessment of Impacts to Flying-foxes

5.1 Flying-fox Habitat to be Affected

Based on the actions included in Table , it is expected there would be little to no negative impacts on the Flying-fox population that utilises the Murrurundi Flying-fox Camp.

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 Murrurundi Camp 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 (as per reporting timing outlined in Section 10.3.1).

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 with Upper Hunter Shire Council.

7.1 Monitoring of the camp

Upper Hunter Shire Council / OEH / NPWS 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

Annual reports will be developed by Upper Hunter Shire Council staff 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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