MIDCOAST council

NSW GOVERNMENT Office of Environment & Heritage

Draft Flying-fox Camp Management Plan

May 2021

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Acknowledgement of Country

We acknowledge the traditional custodians of the land on which we work and live, the Gathang-speaking people and pay our respects to all Aboriginal and Torres Strait Islander people who now reside in the MidCoast Council area. We extend our respect to elders past and present, and to all future cultural-knowledge holders.

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We recognise the traditional custodians of the land which makes up the MidCoast Council area - the Gathang-speaking (Biripi and Worimi) people and pay respects to their Elders, past, present and emerging.

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Acronyms and abbreviations

ABLV	Australian bat lyssavirus
APZ	(Bushfire) Asset Protection Zone
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BFF	Black Flying-fox (*Pteropus alecto*)
the Code of Practice	Flying-fox Camp Management Code of Practice 2018 (NSW)
Council	MidCoast Council
DPIE	Department of Planning, Industry and Environment (NSW)
DoAWE	Department of Agriculture, Water and the Environment (Australian Government)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Australian Government)
FM Act	*Fisheries Management Act 1994* (NSW)
GHFF	Grey-headed Flying-fox (*Pteropus poliocephalus*)

Acronyms and abbreviations

the Guideline	Referral guideline for management actions in grey-headed and spectacled flying-fox camps 2015 (Australian Government)
LGA	local government area
LGNSW	Local Government NSW
LRFF	Little Red Flying-fox (*Pteropus scapulatus*)
MNES	matters of national environmental significance
NPWS	National Parks and Wildlife Service (NSW)
PCT	Plant Community Type
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

1. Overview

1.1 Introduction

The MidCoast Council Local Government Area (LGA) is home to over 93,000 people, many of whom live in the growing communities along the coast. Three species of flying-fox also include the LGA as part of their broader range, including the Black Flying-fox (*Pteropus alecto*), Grey-headed Flying-fox (*Pteropus poliocephalus*), and Little Red Flying-fox (*Pteropus scapulatus*). All three species are native animals that are protected under the NSW *Biodiversity Conservation Act 2016* (BC Act). The Grey-headed Flying-fox is listed as a threatened species under the BC Act and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act; Australian Government).

Of the 18 known flying-fox camps in the LGA, five are located (at least partially) on Council land, within or adjacent to residential areas (refer to **Figure 1**). This *MidCoast Council Flying-fox Camp Management Plan* (the Plan) has been prepared to guide future management of these five flying-fox camps referred to herein as:

- Karloo Street Reserve camp
- Cocos Crescent Reserve camp
- Pacific Palms camp
- Smiths Lake camp
- Hawks Nest camp.

This Plan is consistent with the NSW *Flying-fox Camp Management Policy* (OEH 2015) in identifying appropriate management actions and follows the NSW Department of Planning, Industry and Environment (DPIE) *Flying-fox Camp Management Plan Template 2019*.

General information about flying-fox ecology and behaviour is provided in **Appendix 1**. Flying-fox disease and health information is provided in **Appendix 2**.

1.2 Objectives

The objectives of this Plan are to:

- minimise impacts to the community associated with the relevant flying-fox camps, while conserving flying-foxes and their habitat
- provide a reasonable level of amenity for the community surrounding the relevant flying-fox camps
- manage public health and safety risks associated with the relevant flying-fox camps
- effectively communicate with stakeholders during planning and implementation of management activities
- enable long-term conservation of flying-foxes
- ensure management is sympathetic to flying-fox behaviours and requirements, especially during on-ground works
- improve community understanding and appreciation of flying-foxes, including their critical ecological and economic values
- ensure camp management is consistent with broader conservation management strategies that may be developed to protect threatened species/communities

- ensure camp management does not contribute to loss of biodiversity or increase threats to threatened species/communities
- Outline the camp management actions that have been approved and will be utilised at the camp
- ensure management activities are consistent with the NSW Flying-fox Camp Management Policy (OEH 2018) and relevant legislation
- implement an adaptive management approach to camp management based on the evidence collected.

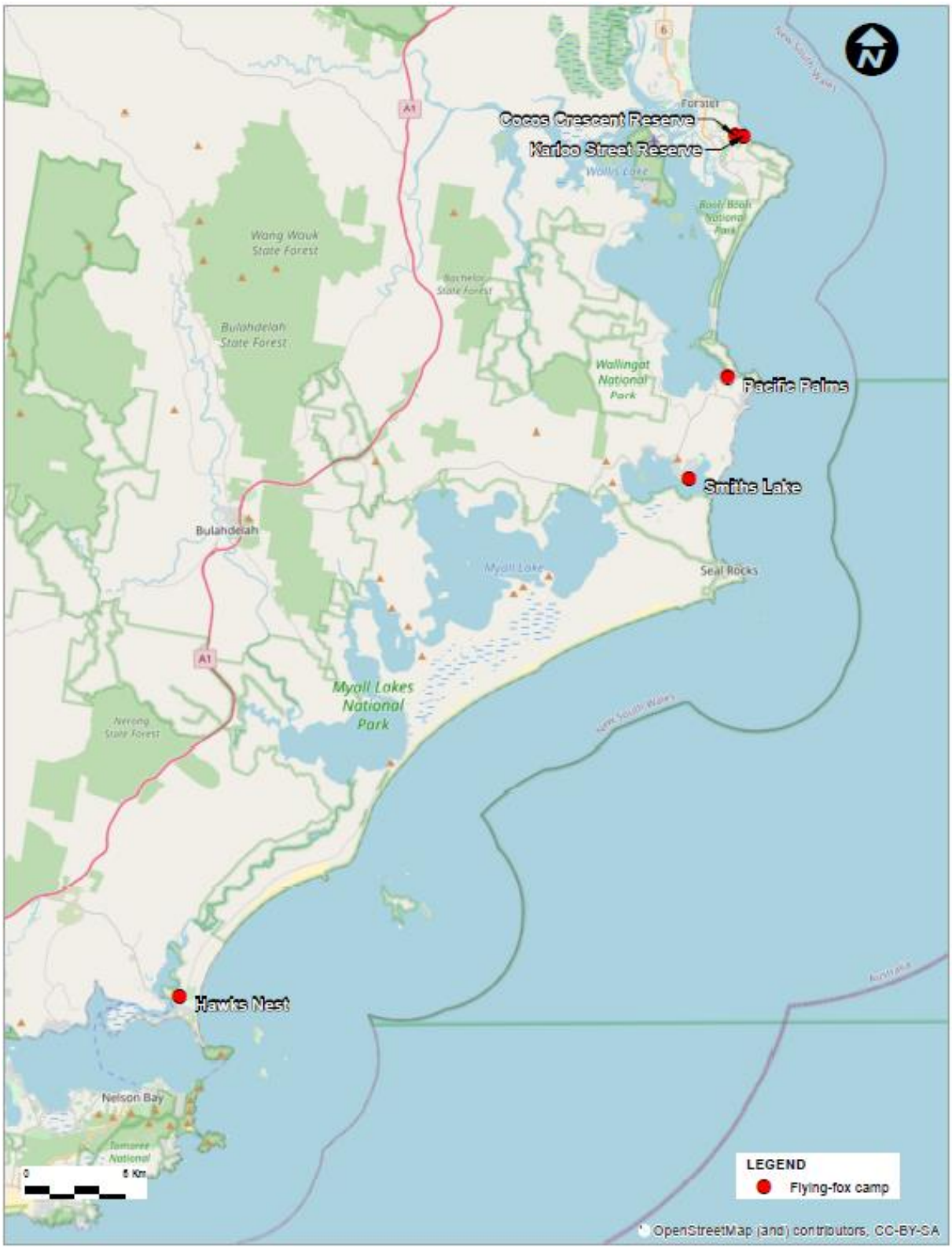


Figure 1 Location of subject flying-fox camps

2. Context

2.1 Regional flying-fox camps

The 20 recorded flying-fox camps in the MidCoast Council LGA are listed in Table 1 and displayed in **Figure 2**. There are likely to be other camps located in remote areas, with small numbers of flying-foxes or that are used intermittently. The focal camps of this Plan are located in the south-eastern portion of the MidCoast Council LGA.

Table 1 Known flying-fox camps in the MidCoast Council LGA (DoAWE 2021)

Camp Name	Nationally Significant Flying-fox Camp	Frequency of Occupation
Bulahdelah, Boolambayte Creek	No	No known recent usage
Black Head	No	Seasonal (irregular)
Cocos Crescent Reserve	**No**	**Seasonal**
Darawank	No	No known recent usage
Hawks Nest	**No**	**Seasonal**
Karloo Street Reserve	**Yes**	**Semi-permanent**
Kiwarrak	No	No known recent usage
Lansdowne State Forest (Pipeclay Creek)	No	Seasonal
Mammy Johnson, Stroud Road	No	No known recent usage
Monkerai	No	No known recent usage
Moorland	No	No known recent usage
North Red Head	No	Rare
Pacific Palms	**No**	**Seasonal (irregular)**
Smiths Lake	**No**	**Seasonal**
Stroud	No	No known recent usage
Tamboi	No	Unknown
Taree, Coocumbac Island	No	Seasonal (irregular)
The Branch	No	No known recent usage
Wingham Brush	Yes	Permanent
Wootton	No	Rare

***Bold** denotes subject flying-fox camps of this Plan.*

Figure 2 Regional MidCoast Council flying-fox camps

2.2 Cultural environment

The Biripi and Worimi people are the traditional custodians of the land within the MidCoast Council LGA. The five focal flying-fox camps covered in this Plan are located on land within the Worimi nation and covered by the Forster Local Aboriginal Land Council (LALC).

2.3 Karloo Street Reserve camp

2.3.1 Location and setting

Karloo Street Reserve is located in Forster at the eastern end of Karloo Street. The reserve is Council managed land and has an area of 14 ha, covering both sides of Karloo Street refer to **Figure 3**). An unnamed drainage line runs north-south through the reserve. In this Plan, the name 'Karloo Street Reserve' incorporates Kentia Drive Reserve, Lakeview Crescent Reserve and The Southern Parkway Reserve.

The reserve is surrounded by private residential land to the west, north and east. Private land with similar vegetation to that within the reserve occurs to the immediate south. A recently constructed residential subdivision occurs to the south-west.

The maximum recorded camp extent as of March 2021 covers a total area of 12 ha, as shown in **Figure 3**. The primary (or core) roost footprint covers approximately 4 ha within the reserve boundary. The secondary (or overflow) roost footprint covers approximately 8 ha, extending beyond the reserve boundary onto adjoining private property within similar vegetation located to the north and south. The actual occupied roost area is dynamic and moves over time, although the core area is centred around Karloo Street.

Vegetation mapping showing indicative DPIE BioNet Plant Community Types (PCTs) at the camp are displayed in **Figure 4** and include:

- Swamp sclerophyll forests:
  - PCT 1235 Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
  - PCT 1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast
- Wet sclerophyll forests:
  - PCT 1562 Tallowwood - Sydney Blue Gum shrub - grass tall open forest on ranges of lower North Coast
  - PCT 1567 Tallowwood - Brush Box - Sydney Blue Gum moist shrubby tall open forest on foothills of the lower North Coast
- Rainforest:
  - PCT 751 Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion.

Maintained lawns cover approximately 10% of the reserve. The mapped PCTs comprise potential flying-fox roosting habitat and the total area of contiguous potential roosting habitat at the camp is 18.1 ha.

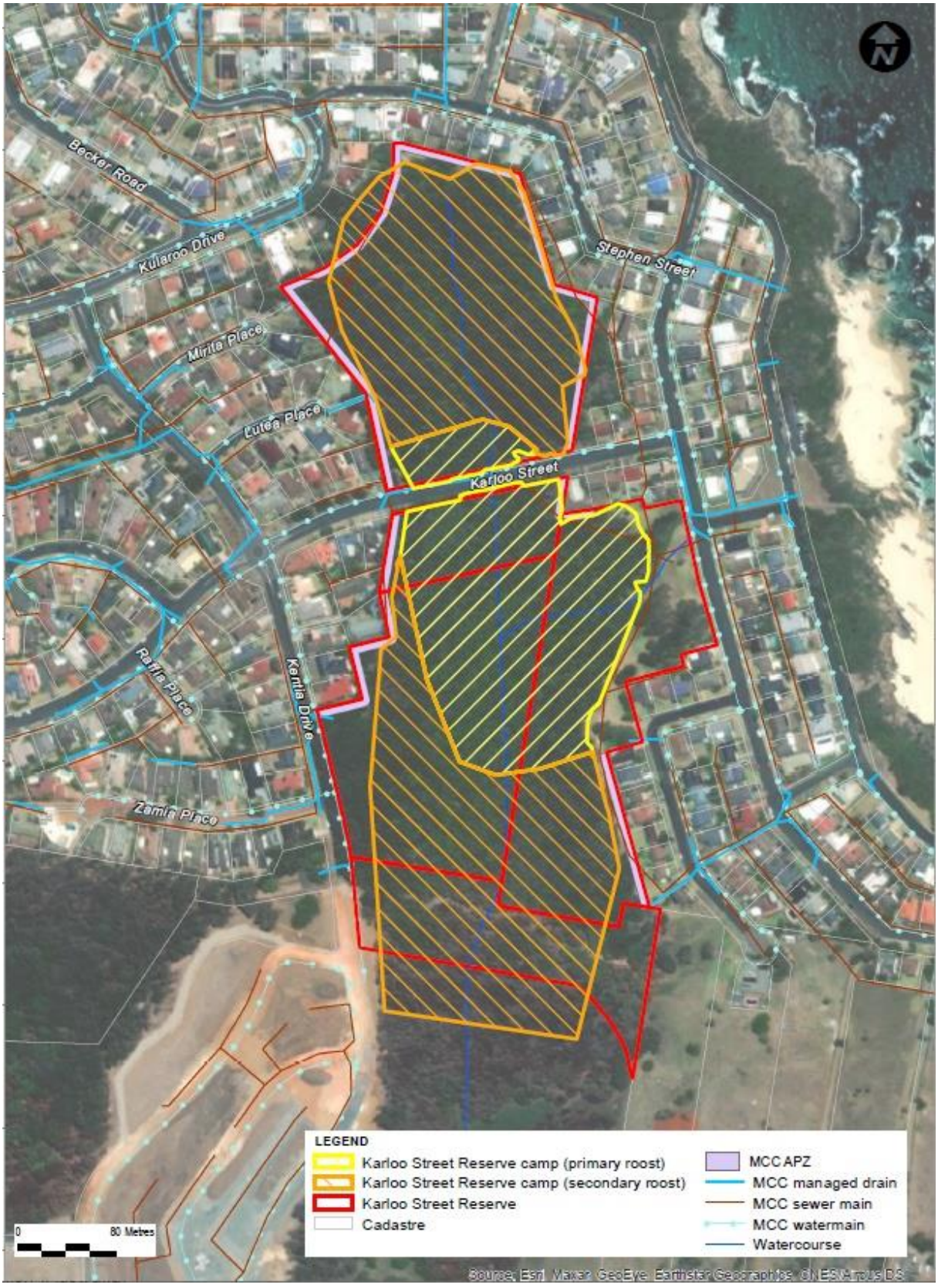


Figure 3 Karloo Street Reserve camp

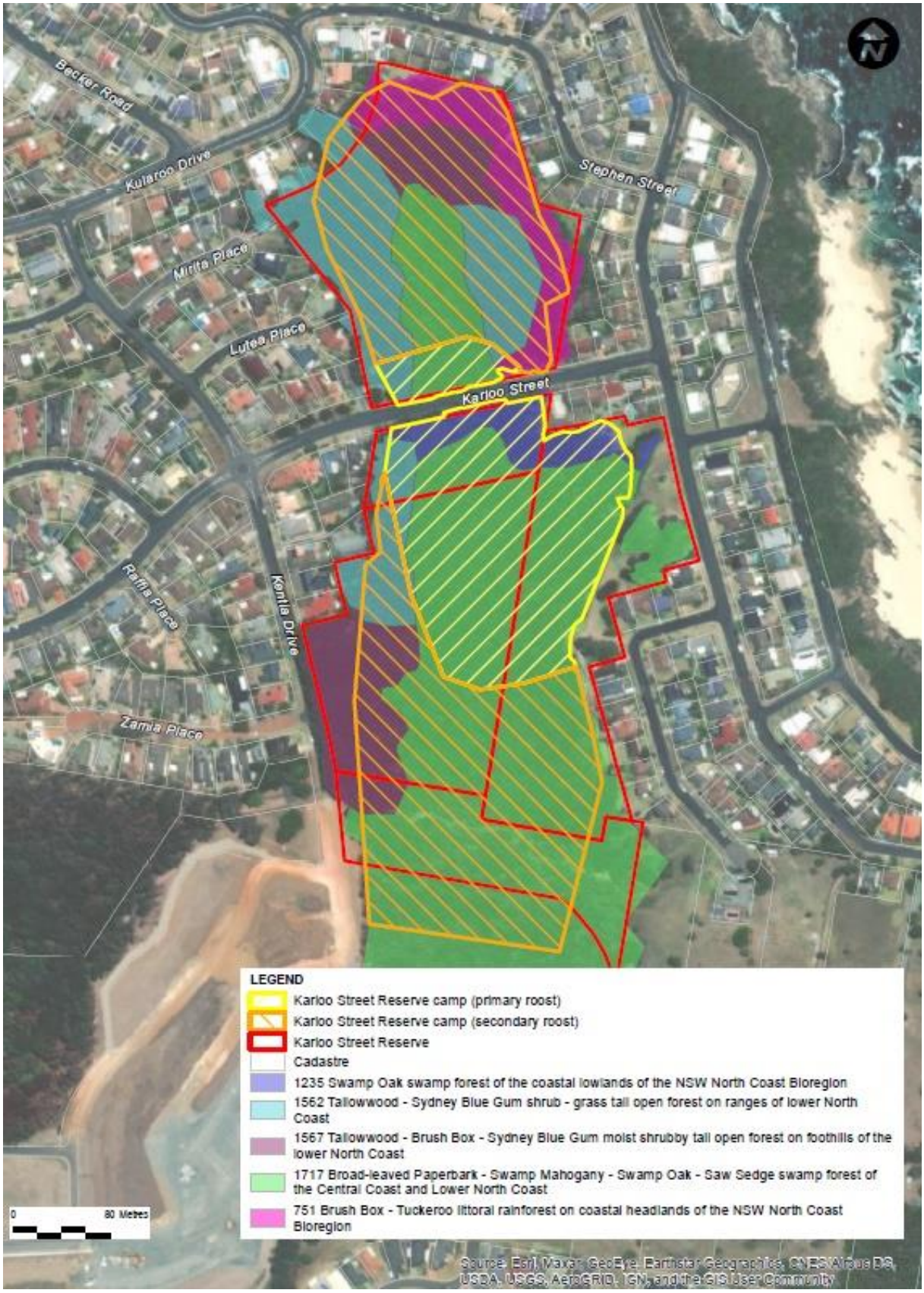


Figure 4 Karloo Street Reserve camp vegetation map

2.3.2 History of the camp

The earliest reports of flying-foxes roosting at Karloo Street Reserve are from the 1990s. Occupation was reportedly irregular with flying-foxes mainly occurring in low numbers and causing minimal impacts to surrounding residential properties. Since 2010, the camp has been occupied by flying-foxes on a semi-permanent basis, with the largest numbers of flying-foxes recorded during summer and autumn (refer to **Figure 5**). There are reports from the community that the camp established as a replacement to a historic camp located approximately 2.6 km south at Cape Hawke, off Sweet Pea Road.

The camp is mostly occupied by Grey-headed Flying-foxes. Infrequent sightings of both Little Red Flying-foxes and Black Flying-foxes have been recorded.

The camp population size is variable with irregular peaks. On 15 April 2013, in excess of 125,000 animals were recorded, although these numbers were only present for a short period (a few days). The frequency of usage has reduced since 2018 which coincides with the establishment of the Cocos Crescent Reserve camp.

The Karloo Street Reserve camp satisfies the criteria as a nationally significant Grey-headed Flying-fox camp (refer to **Section 4.4.1**). Breeding/ maternity camp usage has also been observed for this species.

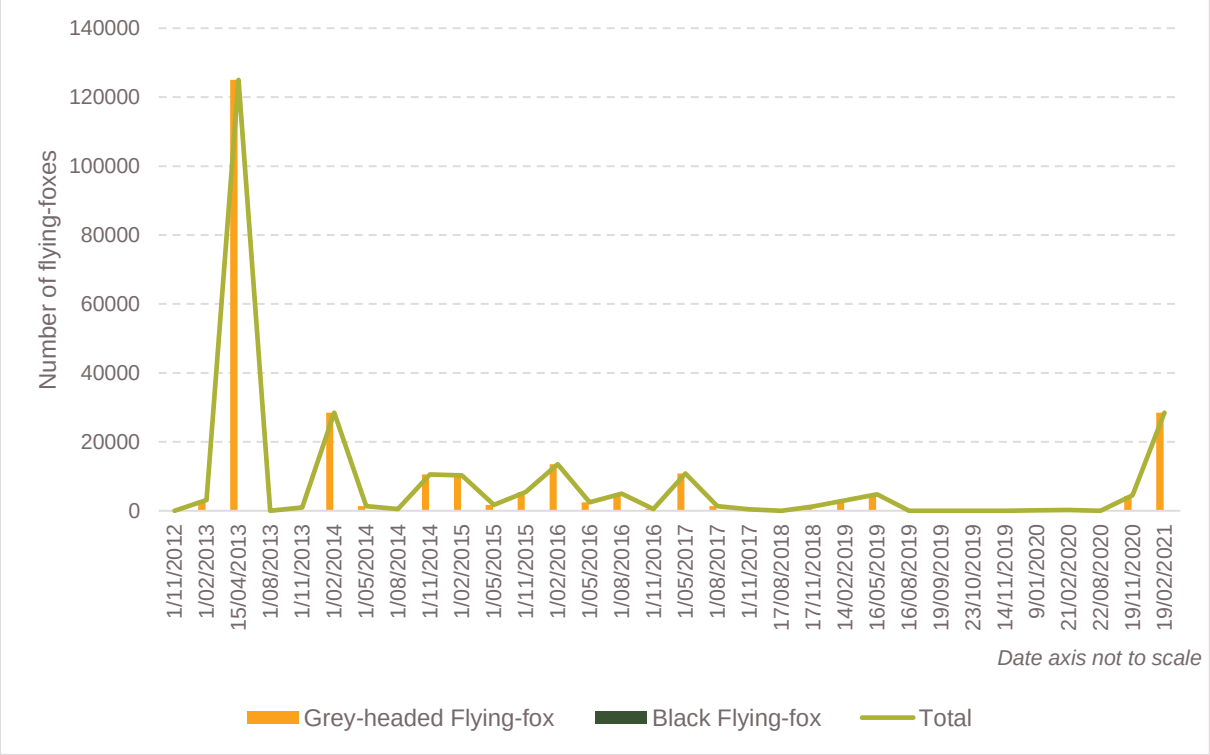


Figure 5 Flying-fox count numbers for Karloo Street Reserve camp

2.3.3 Land tenure and zoning

Karloo Street Reserve comprises five Council managed lots that are listed in **Table 2** and displayed in

Figure 6. Private land where flying-foxes are also known to roost as part of the secondary roosting area is also displayed.

The reserve and surrounding land is located on land that the *Great Lakes Local Environmental Plan 2014* applies. The reserve is zoned *E3 – Environmental Management* which has the following objectives:

- *To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.*

- *To provide for a limited range of development that does not have an adverse effect on those values.*

Residential land zoned *R2 - Low Density Residential* is the primary freehold land use within 300 m of the camp. A localised area of rural land zoned *RU2 Rural Landscape* occurs to the south-east of the reserve.

Other land within a 300 m radius of the camp comprises Council reserves managed for environmental protection or recreation. This includes the Cape Hawke Surf Life Saving Club, located approximately 250 m north of the camp.

Table 2 Karloo Street Reserve camp land tenure and zoning

Lot and DP	Tenure	Zoning	Property Name
38/DP260437	Council	E3 – Environmental Management	Karloo St Reserve
80/DP262684	Council	E3 – Environmental Management	Lakeview Crescent Reserve
140/DP224909	Council	E3 – Environmental Management	Lakeview Crescent Reserve
347/810426	Council	E3 – Environmental Management	Kentia Drive Reserve
6179/1151512	Council	E3 – Environmental Management	The Southern Parkway Reserve
102 DP1269752	Private	R2 – Low Density Residential	-
22 DP240064	Private	R2 – Low Density Residential	-
23 DP240064	Private	R2 – Low Density Residential	-
24 DP240064	Private	R2 – Low Density Residential	-
25 DP240064	Private	R2 – Low Density Residential	-

Figure 6 Karloo Street Reserve land zoning and proximate residences

2.3.4 Sensitive receptors

Residential dwellings are the primary sensitive receptors to the Karloo Street Reserve camp. Within a 300 m radius of the camp there are approximately 470 residential lots, including:

- four residential lots at the northern end of the camp that provide secondary roosting habitat, including three lots with existing houses

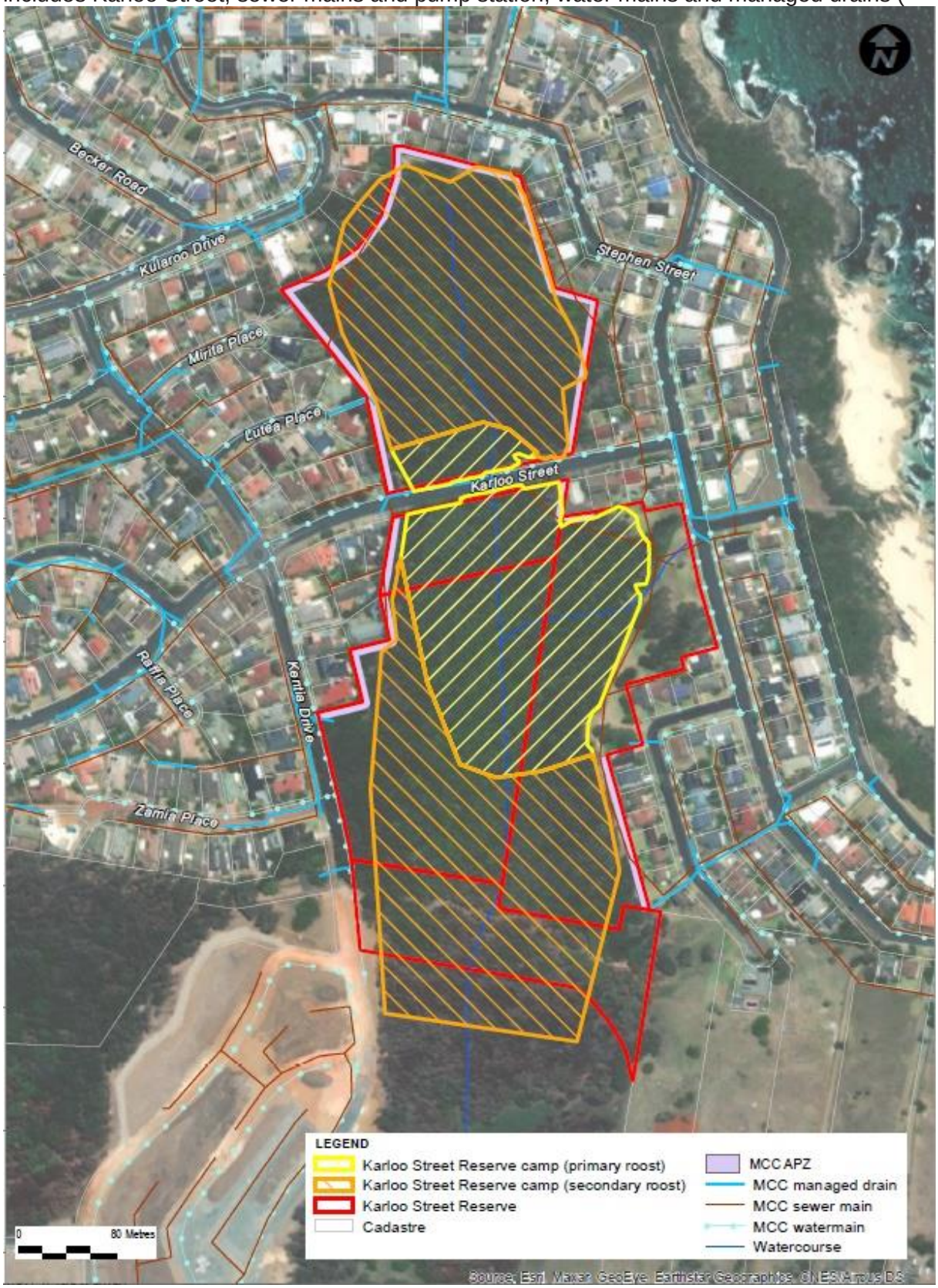
- 46 other residential lots that directly adjoins the camp
- 148 residential lots that are also within 300 m of the Cocos Crescent Reserve camp
- 53 lots located in the new residential development to the south-west of the camp.

The previously mentioned rural land (zoned RU2 Rural Landscape) located to the south-east of the reserve has been identified for potential future rezoning and residential development.

There are no other known sensitive receptors to flying-fox camps (such as hospitals, airports, schools, childcare centres and equine facilities) within 300 m of the Karloo Street Reserve camp.

2.3.5 Council assets and activities

Council managed infrastructure within and directly adjacent to Karloo Street Reserve includes Karloo Street, sewer mains and pump station, water mains and managed drains (



). This infrastructure requires periodic maintenance and can result in flying-fox disturbances. Other Council management activities at the reserve include:

- maintaining a ten metre Asset Protection Zone (APZ) behind residential properties along the northern, eastern and western boundaries of the reserve
- maintaining lawns within the reserve
- bush regeneration works, with a focus on weed management
- Squirrel Glider (*Petaurus norfolcensis*; BC Act listed vulnerable species) nest box monitoring.

There are no formal walking tracks through the reserve, although access is possible via Kentia Drive, Karloo Street, Lakeview Crescent and Burrawan Street, and via the APZs and mown area in the east. Other utilities adjacent to the camp include underground communications infrastructure and electricity (above and below ground).

2.3.6 Community reported issues related to the camp

The following list is a collation of the issues related to the Karloo Street Reserve camp that have been reported by the community. The list has been compiled from information collected via a range of reporting and consultation methods. Key reported issues include:

- noise as flying-foxes depart or return to the camp
- noise from the camp during the day and seasonally during the night
- faecal drop on houses and outdoor areas, roofs that have associated water tanks, cars and washing lines, and associated time spent cleaning areas adjacent to the camp
- odours, particularly following wet conditions
- disease concerns to residents and pets
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- lifestyle impacts as a result of reduced amenity/odour/disease concerns (e.g. housebound, inability to leave windows open)
- reduced general amenity
- damage to vegetation
- impacts on other native animals, particularly birds
- pollution of waterways
- diminished rental return
- property devaluation.

Council has received periodic complaints about the camp from surrounding residences since the early 2010s and a petition requesting the removal of the flying-foxes was first received in 2011. A particularly large number of complaints, including a second petition with 117 signatures requesting removal of the camp was received in response to the significant April 2013 flying-fox influx event. Since then the majority of issues related to the camp are recorded in summer and autumn, coinciding with seasonal increases in flying-fox numbers at the camp.

Recent and potential future residential development to the south-west and south-east of the reserve poses an emerging issue, with more residents living in proximity to the camp.

Maintenance of infrastructure and features (e.g. APZs) has been identified as an issue for managers planning and implementing works at the reserve due to flying-fox interaction, approval and welfare considerations, as well as disturbance to flying-foxes from on-ground works. This has potential to exacerbate noise impacts to residents.

2.3.7 Management response to date

Council's management responses implemented for the Karloo Street Reserve camp to date have included:

- responding to community complaints and providing information on flying-foxes, legislative considerations and Council's actions
- seasonal flying-fox monitoring four times a year as part of the national flying-fox monitoring program to increase Council's understand flying-fox use of the camp
- applying for State government funding to prepare a flying-fox camp management plan for the site commencing in 2011. Earlier attempts (pre-2020) were not successful.
- preparation of a draft flying-fox camp management plan for Karloo Street and Cocos Crescent reserves (2015-19; prepared by Council internally with funding received by Hunter Councils Environment Division)
- APZ enhancement (2013) and management with the dual benefit of improved bushfire protection and providing separation between roosting flying-foxes and residences
- weed management works.

State government funding was secured in the 2020/21 financial year and Council funding from the environmental rate has enabled the development of this plan.

There are some reports that the APZ management has helped some residents, while others have not reported any benefit.

2.4 Cocos Crescent Reserve camp

2.4.1 Location and setting

Cocos Crescent Reserve is located in Forster on Council land and covers an area of 1.4 ha (refer to **Figure 7**). It is officially known as Bangalow Place Reserve however is better known as Cocos Crescent Reserve due to its prominent frontage along Cocos Crescent.

The reserve is located approximately 350 m west of the Karloo Street Reserve camp and contains both vegetated and maintained (mown) areas. Private residential land surrounds the reserve. This includes an approved aged care facility located to the immediate north-west of the camp which is partly constructed.

The total area of forest vegetation at the reserve is 0.9 ha. Vegetation mapping showing indicative DPIE BioNet PCTs at the camp are displayed in **Figure 8** and include:

- Swamp sclerophyll forest: PCT 1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast
- Dry sclerophyll forest: PCT 1602 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter.

All of the 0.9 ha of forest vegetation at the reserve has been occupied by roosting flying-foxes. The vegetation on site is isolated from other stands of native vegetation and there are no areas of potential roosting habitat adjoining the camp, with the exception of scattered trees in the mown parkland portion of the reserve. The swamp sclerophyll forest vegetation is the primary roosting habitat and the dry sclerophyll forest is used as a secondary roosting habitat.

Figure 7 Cocos Crescent Reserve camp

Figure 8 Cocos Crescent Reserve camp vegetation map

2.4.2 History of the camp

Flying-foxes were first recorded at Cocos Crescent Reserve in November 2018 and have occupied the reserve on a semi-permanent basis since. The camp has a strong association with the Karloo Street Reserve camp, with the establishment coinciding with reduced flying-fox usage of the Karloo Street Reserve camp. Flying-foxes have sometimes appeared to move between the two camps when disturbed.

The camp is mostly occupied by Grey-headed Flying-foxes, although infrequent occurrences of Black Flying-foxes have been recorded.

Flying-fox numbers recorded at the camp are shown in **Figure 9**. The maximum number of animals officially recorded is 2,100 individuals in February 2021, although adjacent residents have reported higher numbers. Generally there are <500 flying-foxes at the camp. The site does not satisfy the criteria as a nationally significant Grey-headed Flying-fox camp (DoE, 2013).

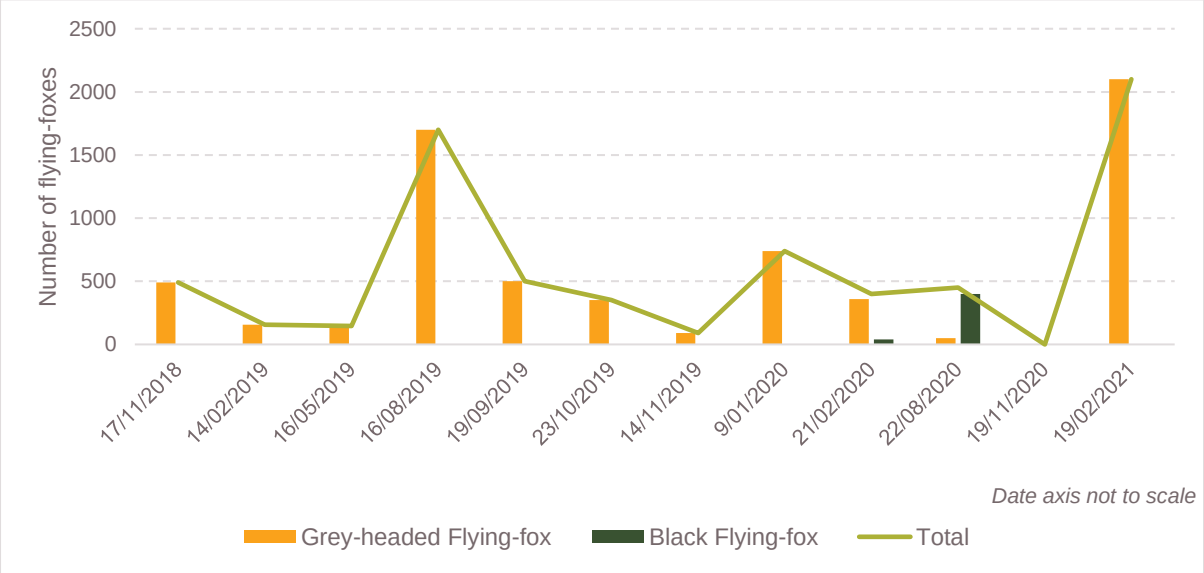


Figure 9 Flying-fox count numbers for Cocos Crescent Reserve camp

2.4.3 Land tenure and zoning

Cocos Crescent Reserve is made up of two Council managed lots that are listed in **Table 3** and displayed in **Figure 10**. It is zoned *RE1 – Public Recreation* under the *Great Lakes Local Environmental Plan 2014*. This zone has the following objectives:

- *To enable land to be used for public open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*
- *To provide for a range of educational, environmental, community and cultural uses for the benefit of the community.*
- *To enable access to activities and businesses located within adjacent waterways.*

Residential land zoned *R2 - Low Density Residential* is the primary freehold land use within 300 m of the camp. Other land within this area comprises Council reserves managed for environmental protection or recreation.

Table 3 Cocos Crescent Reserve land tenure and zoning

Lot and DP	Tenure	Zoning	Property Name
248/801790	Council	RE1 – Public Recreation	Bangalow Place Reserve
48/793497	Council	RE1 – Public Recreation	Bangalow Place Reserve

2.4.4 Sensitive receptors

Residential dwellings are the main sensitive receptors to the Cocos Crescent Reserve camp. There are approximately 319 residential lots within a 300 m radius of the camp, including:

- seven residential lots that directly adjoin the camp
- 148 residential lots that are also within 300 m of the Karloos Crescent Reserve camp.

To the immediate north-west of the camp there is also an aged care facility that is partly constructed. The site will include self-care villas, apartments and a 160 bed residential aged care facility.

No other sensitive receptors are known to occur within 300 m of the Cocos Crescent Reserve camp.

2.4.5 Council assets and activities

Cocos Crescent Reserve functions as an urban drainage reserve. Council managed infrastructure within and directly adjacent to Cocos Crescent Reserve includes Cocos Crescent, sewer and water mains and managed drains (**Figure 7**). The vegetation within the reserve forms part of Council's urban drainage management system by helping to absorb runoff from the surrounding catchment and contributing to flood management. Other Council management activities at the reserve include:

- maintaining a 15 m APZ along the western, southern and eastern boundaries of the forested section of the reserve.
- maintaining lawn/parkland areas in the northern part of the reserve.
- bush regeneration works, with a focus on weed management.

There are no formal walking tracks through the reserve, although informal access is possible around the perimeter via the APZs and mown area in the north. Other utilities adjacent to the camp include underground communications and electricity infrastructure.

Figure 10 Cocos Crescent Reserve land zoning and proximate residences

2.4.6 Community reported issues related to the camp

Council has received periodic complaints about the camp from surrounding residents since its establishment in 2018. Key reported issues include:

- odour, particularly following wet conditions
- noise as flying-foxes depart or return to the camp
- noise from the camp during the day and seasonally during the night
- faecal drop on houses and outdoor areas, roofs that have associated water tanks, cars and washing lines, and associated time spend cleaning areas adjacent to the camp
- disease concerns to residents and pets
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- lifestyle impacts as a result of reduced amenity/smell/disease concerns (e.g. house bound, inability to leave windows open
- reduced general amenity
- damage to vegetation
- impacts on other native animals, particularly birds
- pollution of waterways
- property devaluation.

Local residents report being impacted by noise and odour impacts, particularly when flying-foxes are present at this reserve (even in low numbers), due to its small size and the proximity of adjacent residents. There are some reports that the APZ management has helped some residents, although odour impacts have not significantly improved.

Other complaints were associated with stagnant water odour and drainage concerns, mosquitos and the overall condition of the site. Some residents suggested that the reserve was inadequately managed and should be managed as parkland with less trees and a mown grass understorey. Although these concerns are not directly associated with flying-foxes, the residents associated these concerns with flying-foxes and overall reduced amenity of the site.

As for the Karloo Street Reserve camp, maintenance of infrastructure and features (e.g. APZs) has been identified as an issue for managers planning and implementing works at the reserve due to flying-fox interaction, approval and welfare considerations, as well as disturbance to flying-foxes from on-ground works. This has potential to exacerbate noise impacts to residents.

2.4.7 Management response to date

Council's management responses implemented for the Cocos Street Reserve camp to date have included:

- responding to community complaints and providing information on flying-foxes, legislative considerations and Council's actions
- seasonal flying-fox monitoring four times a year as part of the national flying-fox monitoring program to increase Council's understand flying-fox use of the camp
- additional flying-fox monitoring commencing in August 2019 in response to community concerns
- weed management works, including removal of Camphor Laurel trees in 2019
- preparation of a draft flying-fox camp management plan for Karloo Street and Cocos Crescent reserves (2015-19; prepared internally)

- APZ establishment (2019) and management with the dual benefit of improved bushfire protection and providing separation between roosting flying-foxes and residences.

2.5 Pacific Palms camp

2.5.1 Location and setting

The Pacific Palms camp is located at Elizabeth Beach, north of the Pacific Palms community centre and tennis courts (**Figure 11**). The camp is located on a larger area of Council land bound by Wallis Lake to the west, The Lakes Way to the north and east, and Pacific Palms Recreation Club to the south. Booti Booti National Park occurs north of The Lakes Way and residential land that forms part of Elizabeth Beach occurs to the east. A boat ramp and managed foreshore occurs west of the Pacific Palms Recreation Club.

The flying-fox camp occurs in the north-eastern portion of the reserve. The maximum recorded extent of the camp covers an area of 0.6 ha, dominated by swamp sclerophyll forests. Vegetation mapping showing indicative DPIE BioNet PCTs at the camp are displayed in **Figure 12** and include:

- Swamp sclerophyll forests:
  - PCT 1235 Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
  - PCT 1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast
- Saline wetlands:
  - PCT 1747 Grey Mangrove low closed forest.

The mapped PCTs comprise potential flying-fox roosting habitat and the total area of contiguous potential roosting habitat at the camp is 4.4 ha.

Figure 11 Pacific Palms camp

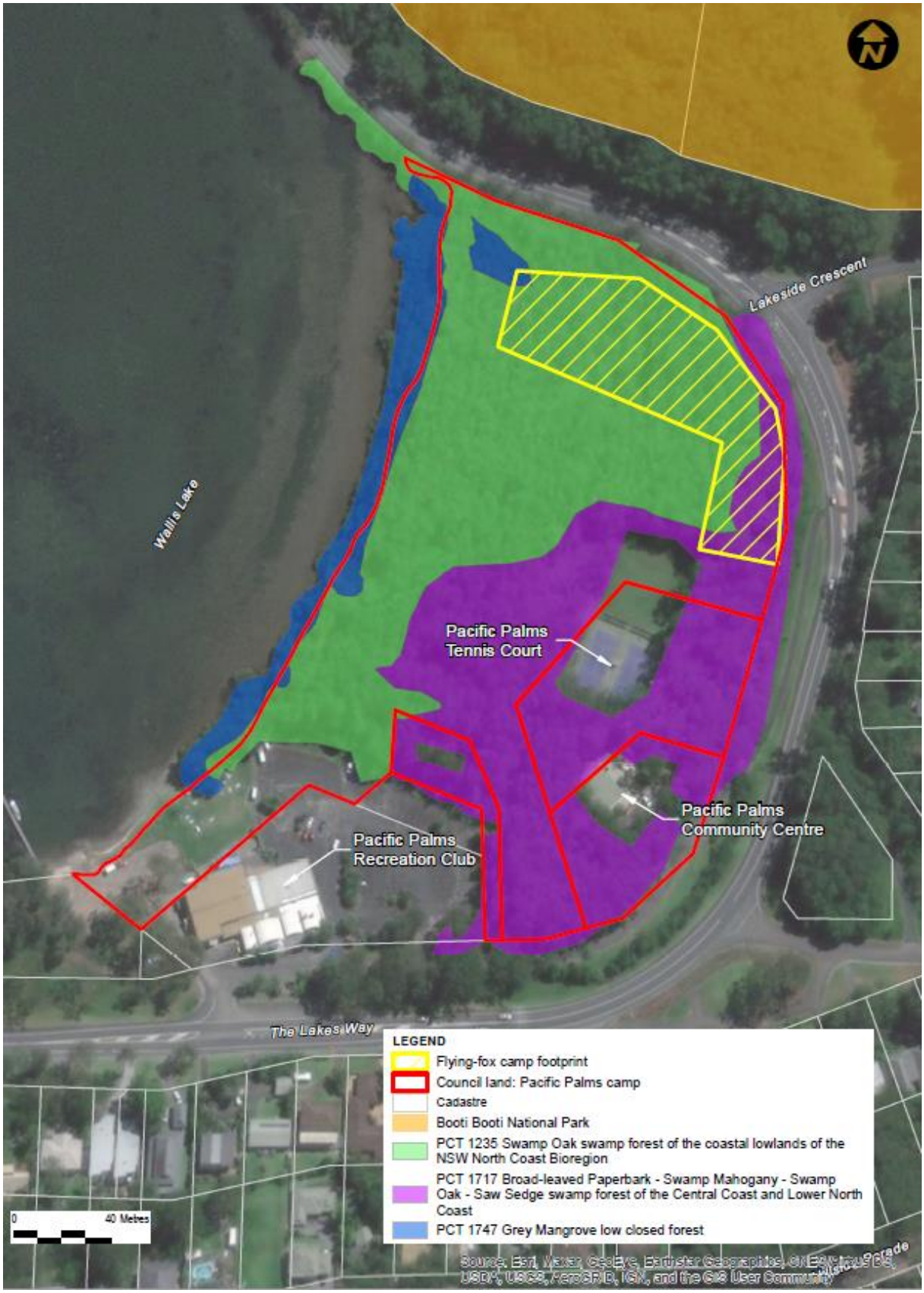


Figure 12 Pacific Palms camp vegetation map

2.5.2 History of the camp

The Pacific Palms camp reportedly established in the early 2010s, although monitoring as part of the national flying-fox monitoring program did not commence until 2018. The camp is irregularly occupied by relatively small numbers of flying-foxes (refer to **Figure 13**). The highest number of flying-foxes recorded for the camp is 2,400. The Grey-headed Flying-foxes is the only flying-fox species that has been observed roosting at this camp.

Another camp has been reported approximately 500 m west of Pacific Palms camp in Booti Booti National Park, between the residential area of Elizabeth Beach and the Elizabeth Beach shoreline. The frequency of occupation and numbers of flying-foxes at this camp are not known.

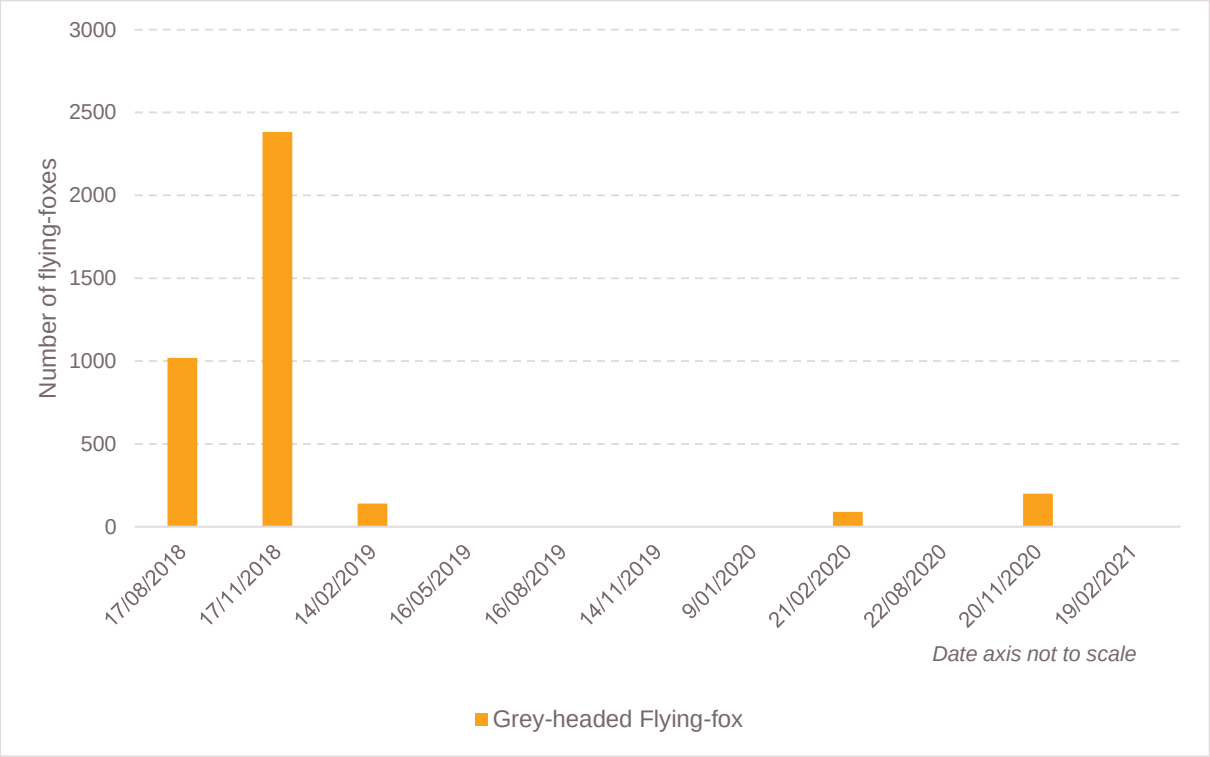


Figure 13 Flying-fox count numbers for Pacific Palms camp

2.5.3 Land tenure and zoning

Council managed land at the Pacific Palms camp is listed in **Table 4** and displayed in **Figure 14**. The camp is located on land zoned *E3 – Environmental Management* under the *Great Lakes Local Environmental Plan 2014*. The objectives of this zone have been discussed previously in **Section 2.3.3**.

The community centre and tennis court portion of the reserve are zoned RE1 - Public Recreation. The objectives of this zone have been discussed previously in **Section 2.4.3**. Other land zones in proximity to the camp include:

- *R2 - Low Density Residential* in the residential area of Elizabeth Beach
- *E1 - National Parks and Nature Reserves* at Booti Booti National Park
- *RE2 - Private Recreation* at the Pacific Palms Recreation Club.

Table 4 Pacific Palms camp land tenure and zoning

Lot and DP	Tenure	Zoning
1 DP875579	Council	E3 – Environmental Management
2 DP875579	Council	E3 – Environmental Management
432 DP753168	Council	RE1 – Public Recreation
447 DP45864	Council	RE1 – Public Recreation

2.5.4 Sensitive receptors

Residential dwellings are the primary sensitive receptors to the Pacific Palms camp. Within a 300 m radius of the camp there are approximately 102 residential lots, roughly 10 of which do not currently contain dwellings (as of March 2021). The Lakes Way provides separation between the camp and residential properties, with the closest dwelling being approximately 60 m east of the camp. There are no known other high conflict sensitive receptors within 300 m of the Pacific Palms camp.

Potential low conflict receptors include the:

- Pacific Palms Community Centre
- Pacific Palms tennis court
- Pacific Palms Recreation Club
- boat ramp and foreshore area west of the recreation club.

2.5.5 Council assets and activities

Council managed infrastructure and assets directly adjacent to the Pacific Palms camp include:

- The Lakes Way and associated pedestrian footpath
- the Pacific Palms Community Centre and tennis court, and associated facilities (driveways, parking bays, outdoor furniture, etc.)
- water mains
- sewer mains and pump station.

The location of these features are shown in **Figure 11**. Other Council management activities at the reserve undertaken in proximity to the camp include:

- maintaining APZs around the community centre and tennis courts
- general maintenance of gardens and lawn
- bush regeneration works, with a focus on weed management.

Other utilities adjacent to the camp include overhead powerlines.

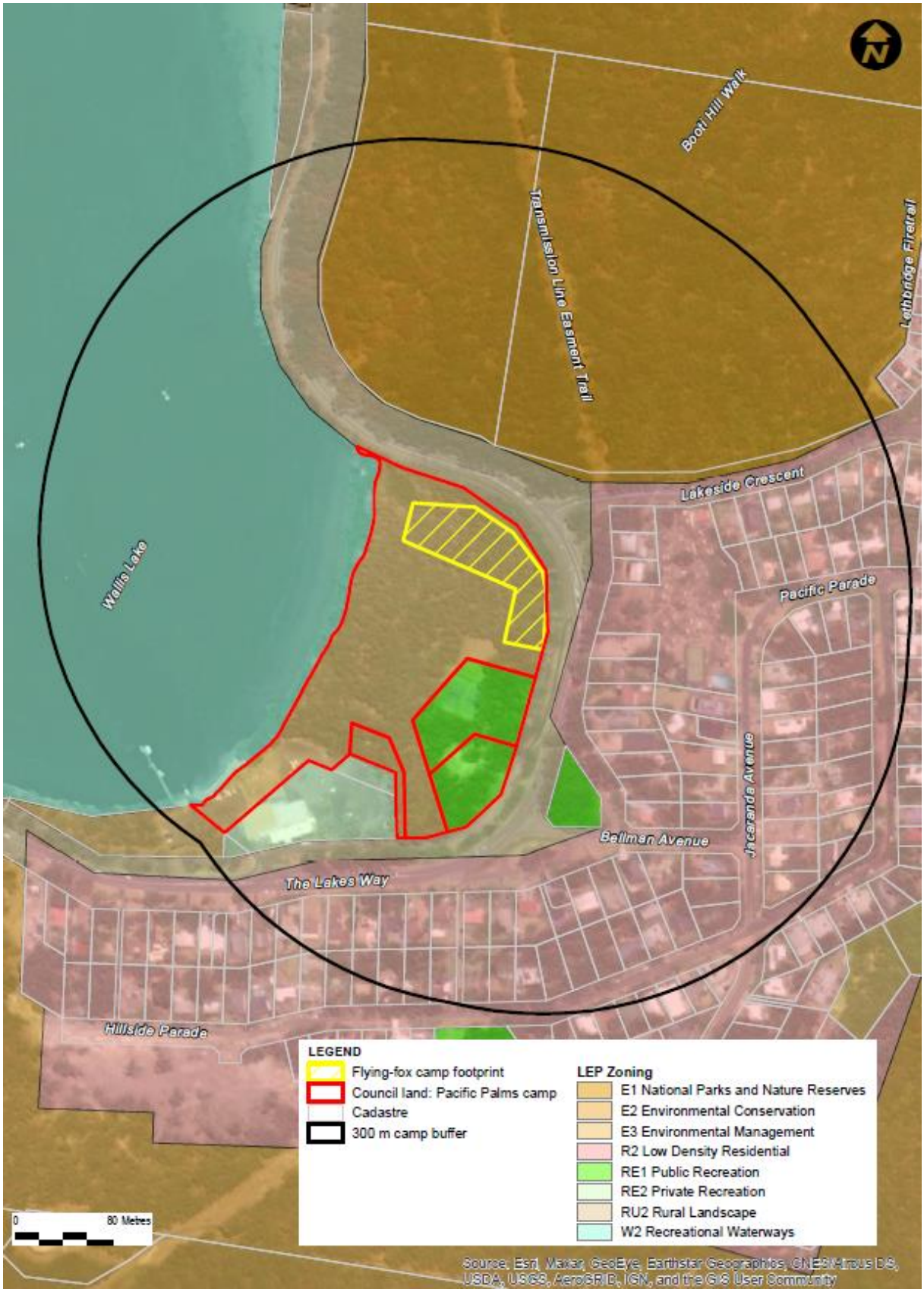


Figure 14 Pacific Palms land zoning and proximate residences

2.5.6 Community reported issues related to the camp

Council has not received any formal complaints about this camp. Issues related to the camp that have been reported by the community are significantly less than those reported at the other target camps. Tennis court users have reported droppings on the tennis courts as a nuisance as:

- they are difficult to clean off the synthetic surface
- damage tennis balls if they land in the dropping
- present a safety concern (slips and falls).

Some general reports of odour, noise and dropping issues, and disease concerns have been received, however these were in relation to flying-foxes in general and not specifically the Pacific Palms camp. The Community Centre Coordinator reported limited conflict with the centre operations as it is generally hired during the day.

2.5.7 Management response to date

Council have undertaken seasonal flying-fox monitoring four times a year at the Pacific Palms camp since Augusts 2018. No other flying-fox related management actions have been implemented as of March 2021.

2.6 Smiths Lake camp

2.6.1 Location and setting

The Smiths Lake camp is located on the Smiths Lake peninsula (**Figure 15**). The primary roost area is located along a gully south of Casson Street on both private and Council land. Residential (village) lots adjoin the camp to the east, north and west. A recently approved holiday accommodation facility (i.e. a private campground) is located to the south-east.

An occasionally occupied secondary roost is located in a separate gully north of Casson Street in a Council reserve. The reserve is surrounded by residential (village) lots.

The combined recorded camp footprint for the primary and secondary roost is 5.2 ha, with the primary roost covering 2.1 ha and the secondary roost covering 3.1 ha. The actual occupied roost area is dynamic and moves overtime within this mapped area.

Vegetation mapping showing indicative DPIE BioNet PCTs at the camp are displayed in **Figure 16** and include:

- Wet sclerophyll forests:
  - PCT 1567 Tallowwood - Brush Box - Sydney Blue Gum moist shrubby tall open forest on foothills of the lower North Coast
  - PCT 699 Blackbutt tall moist forest of the coastal ranges of the central and southern NSW North Coast Bioregion
- Rainforest:
  - PCT 1201 Soft Corkwood - Yellow Carabeen - Cryptocarya spp. subtropical rainforest of the NSW North Coast Bioregion.

The mapped PCTs comprise potential flying-fox roosting habitat and are centred around the rainforest. The total area of contiguous potential roosting habitat at the camp is 14.9 ha.

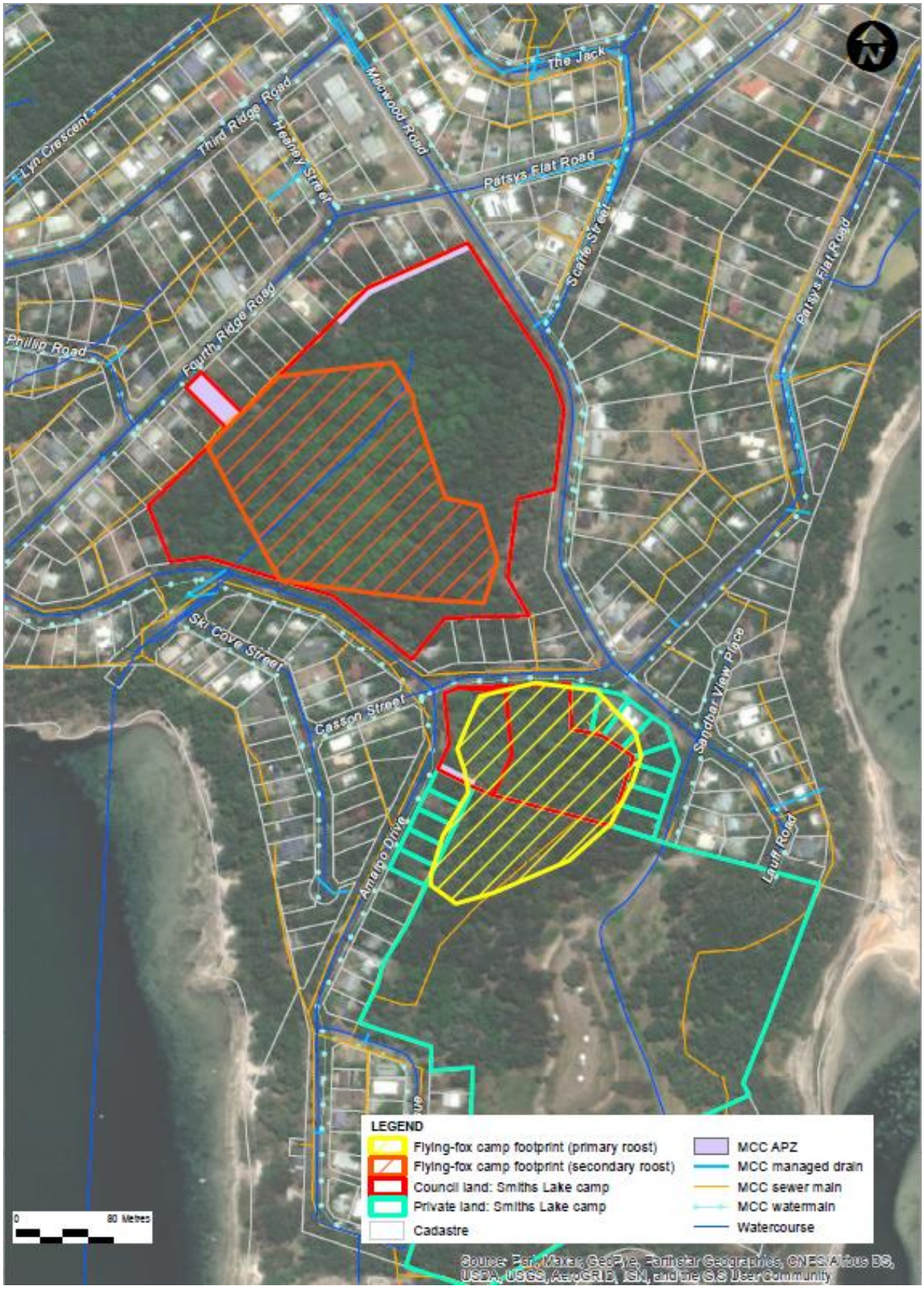


Figure 15 Smiths Lake camp

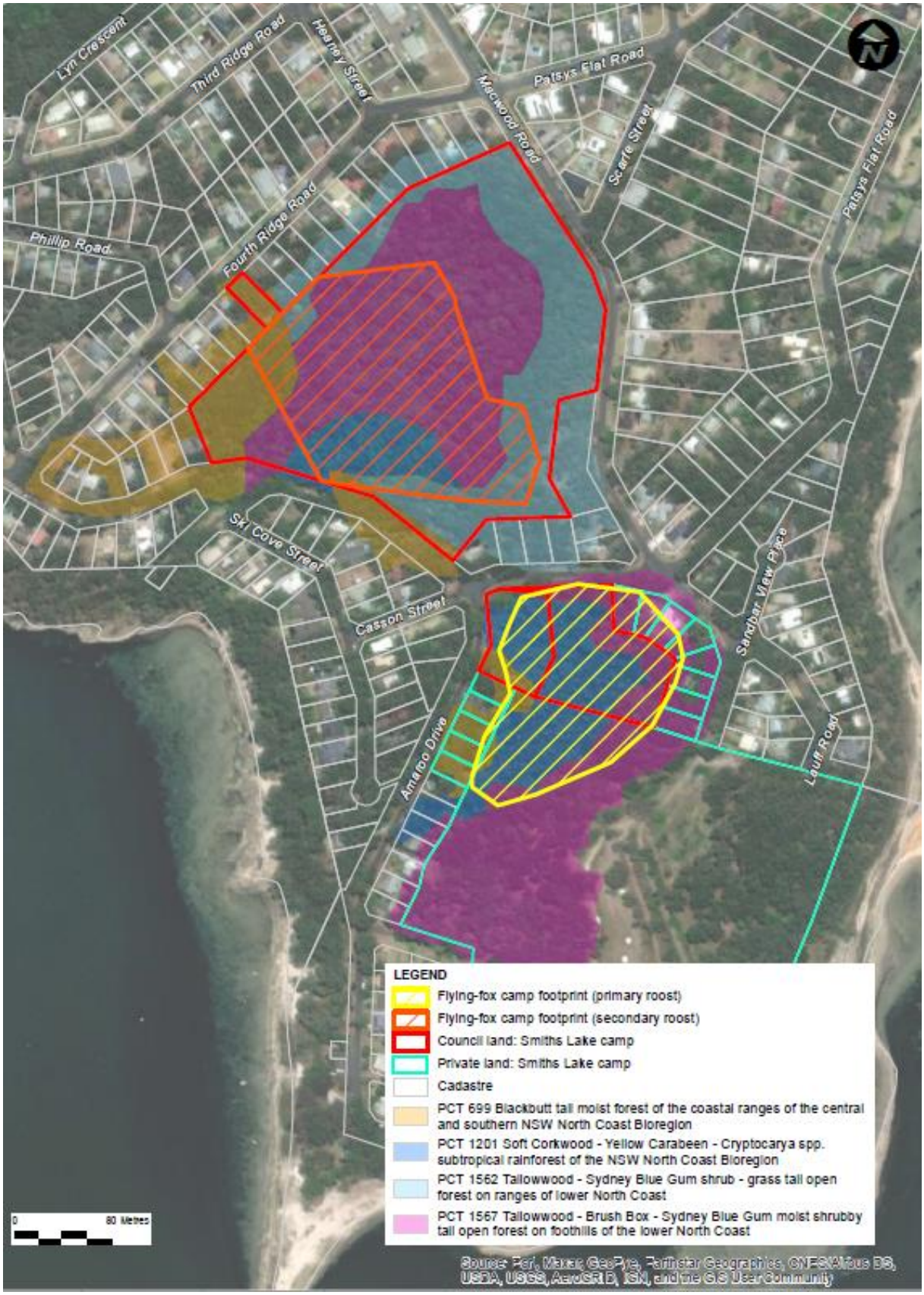


Figure 16 Smiths Lake camp vegetation map

2.6.2 History of the camp

There are conflicting community reports of when the Smiths Lake camp established. Some residents reported occasional small numbers of flying-foxes roosting at the camp in the 1990s. The camp however became more regularly occupied by moderate to large numbers of flying-foxes around 2001, which was believed to have occurred as a result of fires at a camp at Mungo Brush to the south.

The national flying-fox monitoring program results between 2011 and 2020 suggest the camp is occupied seasonally (not permanently) and that flying-fox numbers have fluctuated with up to approximately 13,000 individuals observed. The Grey-headed Flying-fox is the main species recorded at the site.

A peak in flying-fox numbers was reported in the summer of 2007/08, coinciding with a large influx of Little Red Flying-foxes. Roost areas on both sides of Casson Street were occupied during this period.

The Smiths Lake camp satisfies the criteria as a nationally significant Grey-headed Flying-fox camp (refer to **Section 4.4.1**). Periods of breeding/ maternity camp usage is likely based on the number of animals and timing of records.

The community has reported an infrequently used flying-fox camp along a gully approximately 500 m north of the Smiths Lake camp, between First Ridge Road and Second Ridge Road/Keith Crescent within the Smiths Lake village. Flying-fox numbers and the duration and frequency of flying-fox occupation at this site is not known.

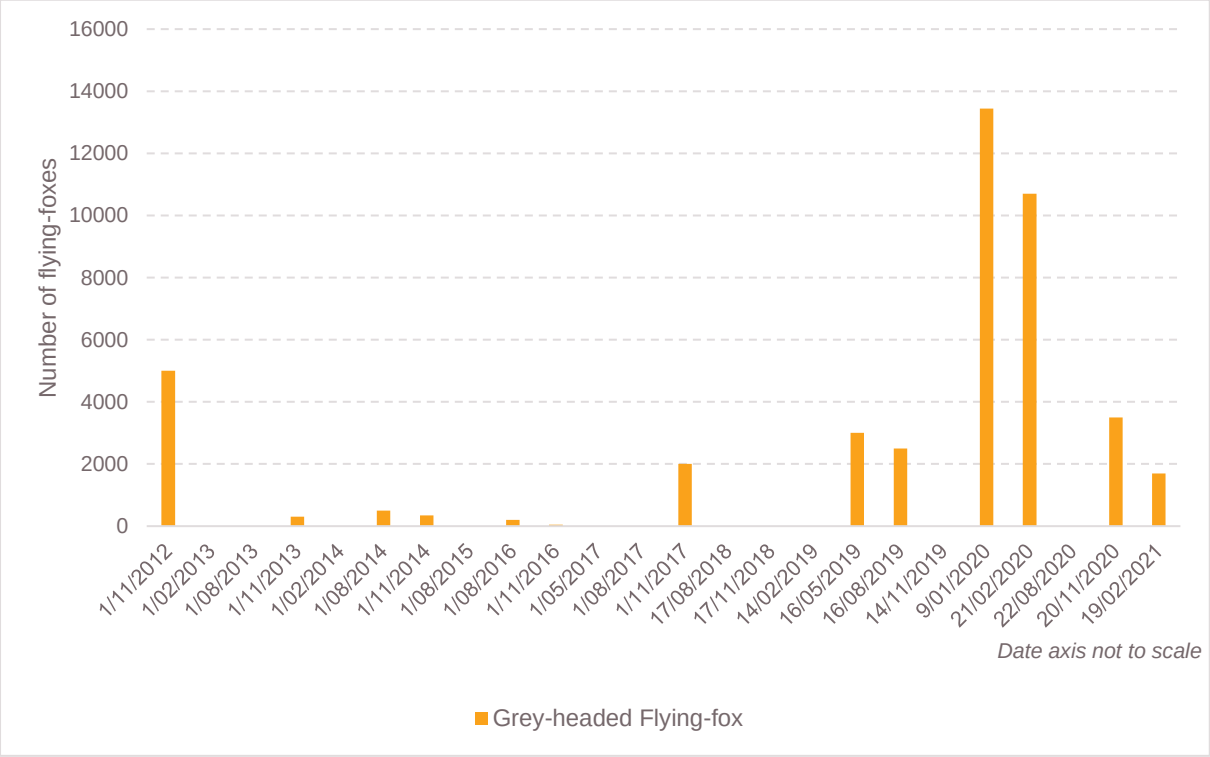


Figure 17 Flying-fox count numbers for the Smiths Lake camp

2.6.3 Land tenure and zoning

The Smiths Lake camp is located on three Council and 14 private lots that are listed in **Table 5** and displayed in **Figure 18**. The majority of the camp is located on land zoned *E2 - Environmental Conservation* or *E3 – Environmental Management* under the *Great Lakes*

Local Environmental Plan 2014. The objectives of the *E2 - Environmental Conservation* zone are:

- *To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.*
- *To prevent development that could destroy, damage or otherwise have an adverse effect on those values.*

The objectives of the *E3 – Environmental Management* zone have been discussed previously in **Section 2.3.3**. The remainder of the camp is located on land zoned *RU5 – Village*. The objectives of this zone are:

- *To provide for a range of land uses, services and facilities that are associated with a rural village.*
- *To provide for a range of land uses, services and facilities that are associated with a coastal village.*
- *To enable non-residential development that does not prejudice the established land use pattern within the village.*

These three zonings are the main zones on land within 300 m of the camp.

Table 5 Smiths Lake camp land tenure and zoning

Lot and DP	Tenure	Zoning
56 DP246466	Council	E3 – Environmental Management
126 DP30829	Council	E3 – Environmental Management
47 DP32209	Council	E3 – Environmental Management
2 DP1103357	Private	RU5 - Village, E2 - Environmental Conservation
102 DP30829	Private	RU5 – Village
101 DP30829	Private	RU5 – Village
100 DP30829	Private	RU5 – Village
99 DP30829	Private	RU5 – Village
98 DP30829	Private	RU5 – Village
32 DP32209	Private	RU5 – Village
31 DP32209	Private	RU5 – Village
29 DP32209	Private	RU5 – Village
30 DP32209	Private	RU5 – Village
26 DP32209	Private	RU5 – Village
27 DP32209	Private	RU5 – Village
28 DP32209	Private	RU5 – Village
25 DP32209	Freehold	RU5 – Village

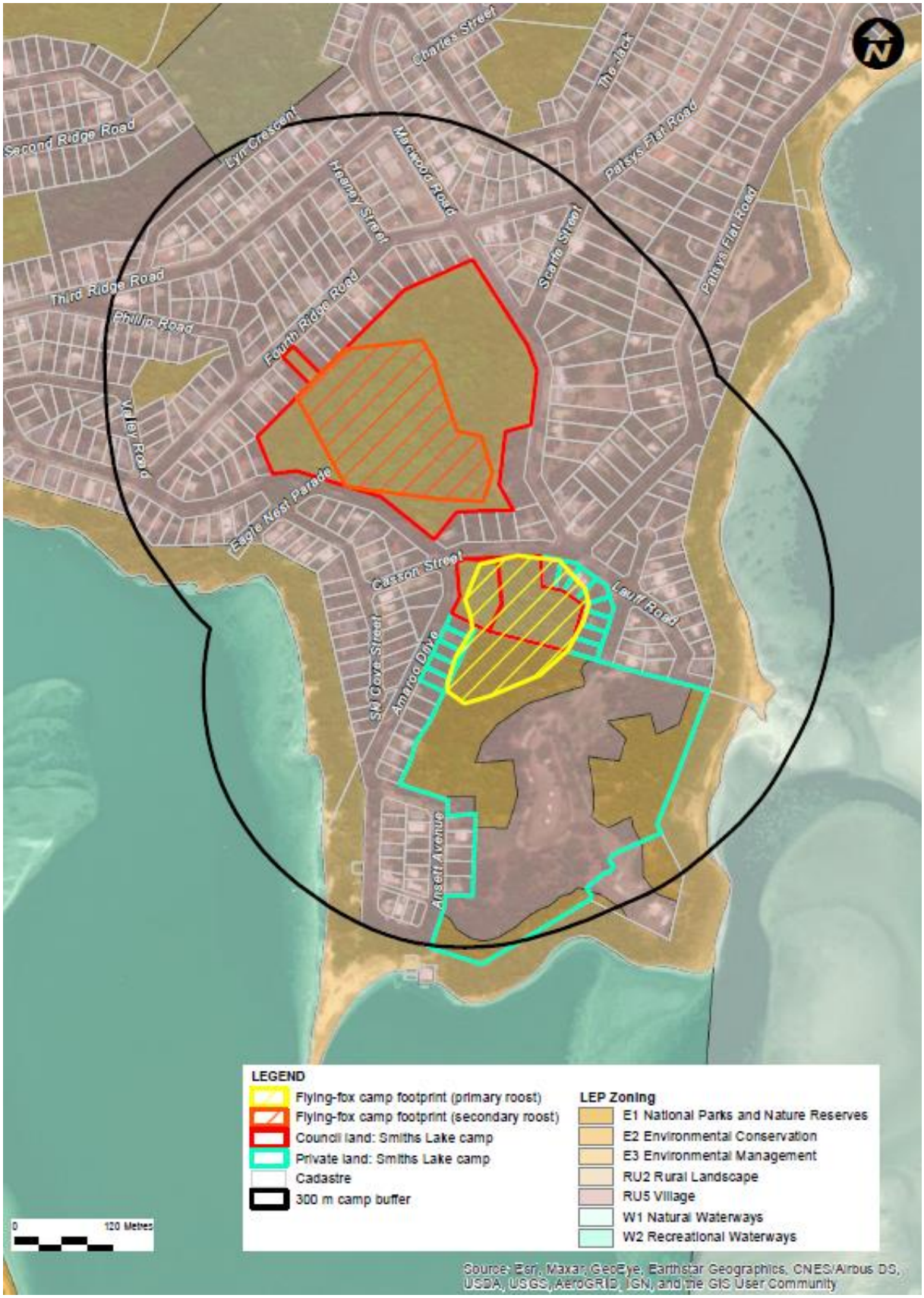


Figure 18 Smiths Lake camp land zoning and proximate residences

2.6.4 Sensitive receptors

Residential dwellings and accommodation facilities are the primary sensitive receptors at the Smiths Lake camp. Of the 14 private lots that support the camp, 10 have existing dwellings or holiday houses, and four are yet to have dwellings constructed. This include a recently approved private campground to the south-east of the camp.

There are eight other residential lots that directly adjoin the primary camp roost, four of which have dwellings and four of which have not been built on. Within a 300 m radius of the camp there are approximately 323 other residential lots; 292 of which have dwellings and 31 that had not been built on as of March 2021.

Further establishment of houses and accommodation facilities will increase the number of residences in proximity to the camp. There are no known other sensitive receptors within 300 m of the Smiths Lake camp.

2.6.5 Council assets and activities

There are no Council assets or utilities within the Council reserves at the Smiths Lake camp. Local roads, water mains and sewer mains however occur adjacent to the camp, and a section of Council managed sewer main is located on private land that intersects the camp's primary roost (refer to **Figure 15**). Council also maintains localised APZs within the Council reserves near some residential properties at the camp. There are no current bush regeneration programs undertaken at the reserves.

Other utilities adjacent to the camp include electricity (overhead and underground) and communications.

2.6.6 Community reported issues related to the camp

The following list is a collation of the issues related to the Smiths Lake camp that have been reported by the community. Key reported issues include:

- odour, particularly following wet conditions
- faecal drop on houses and outdoor areas, roofs that have associated water tanks, cars and washing lines, and associated time spend cleaning areas adjacent to the camp
- noise as flying-foxes depart or return to the camp
- noise from the camp during the day and seasonally during the night
- disease concerns to residents and pets
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- lifestyle impacts as a result of reduced amenity/smell/disease concerns (e.g. house bound, inability to leave windows open
- reduced general amenity
- damage to vegetation
- impacts on other native animals, particularly birds
- pollution of waterways
- property devaluation.

Council has received complaints about the camp from surrounding residents periodically since the early 2000's. Residents have stated that the issues are exacerbated when there are large numbers of flying-foxes.

Concerns have also been raised about new developments and houses putting pressure on the camp from impacts such as vegetation removal, noise and smoke from wood fires. Existing residents are concerned that these impacts will result in reduced flying-fox habitat and displacement of the camp closer to existing residences and increasing noise, odour and dropping impacts in particular. Future development and housing construction will result in more people living or holidaying in proximity to the camp.

Some residents have reported concerns about flying-fox conservation and welfare, including habitat loss and degradation by other landholders and visitors locally, and disturbances to the flying-foxes from these activities.

2.6.7 Management response to date

Council's management responses as of March 2021 at the Smiths Lake camp have included:

- responding to community complaints and providing information on flying-foxes, legislative considerations and Council's actions
- seasonal flying-fox monitoring four times a year as part of the national flying-fox monitoring program to increase Council's understand flying-fox use of the camp

2.7 Hawks Nest camp

2.7.1 Location and setting

The Hawks Nest camp is located on both private and Council land in Hawks Nest near the Ibis Avenue and Kingfisher Avenue intersection (refer to **Figure 19**). It is situated on the interface between a stand of vegetation associated with the Myall River estuarine zone and the residential area of Hawks Nest. The Council land is officially known as Jean Shaw Koala Reserve. Myall Lakes National Park occurs directly to the west of the reserve.

The primary flying-fox roost footprint is located on the Council land, north of Kingfisher Avenue and has an area of 0.6 ha. The secondary roost footprint has an area of 4.2 ha, extending north from the primary roost on Council land to Albatross Avenue and south onto private land between Eagle Avenue and Kingfisher Avenue. The combined recorded camp extent covers a total area of 4.8 ha, although the occupied footprint varies over time.

Vegetation mapping showing indicative DPIE BioNet PCTs at the camp are displayed in **Figure 20** and include:

- Swamp sclerophyll forests:
  - PCT 1235 Swamp Oak swamp forest of the coastal lowlands of the NSW North Coast Bioregion
  - PCT 1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast
- Dry sclerophyll forest:
  - PCT 685 Blackbutt - Needlebark Stringybark shrubby open forest on coastal sands of the NSW North Coast Bioregion
- Saline wetlands:
  - PCT 1747 Grey Mangrove low closed forest.

The total area of contiguous potential roosting habitat at the camp is 8.1 ha.

Figure 19 Hawks Nest camp

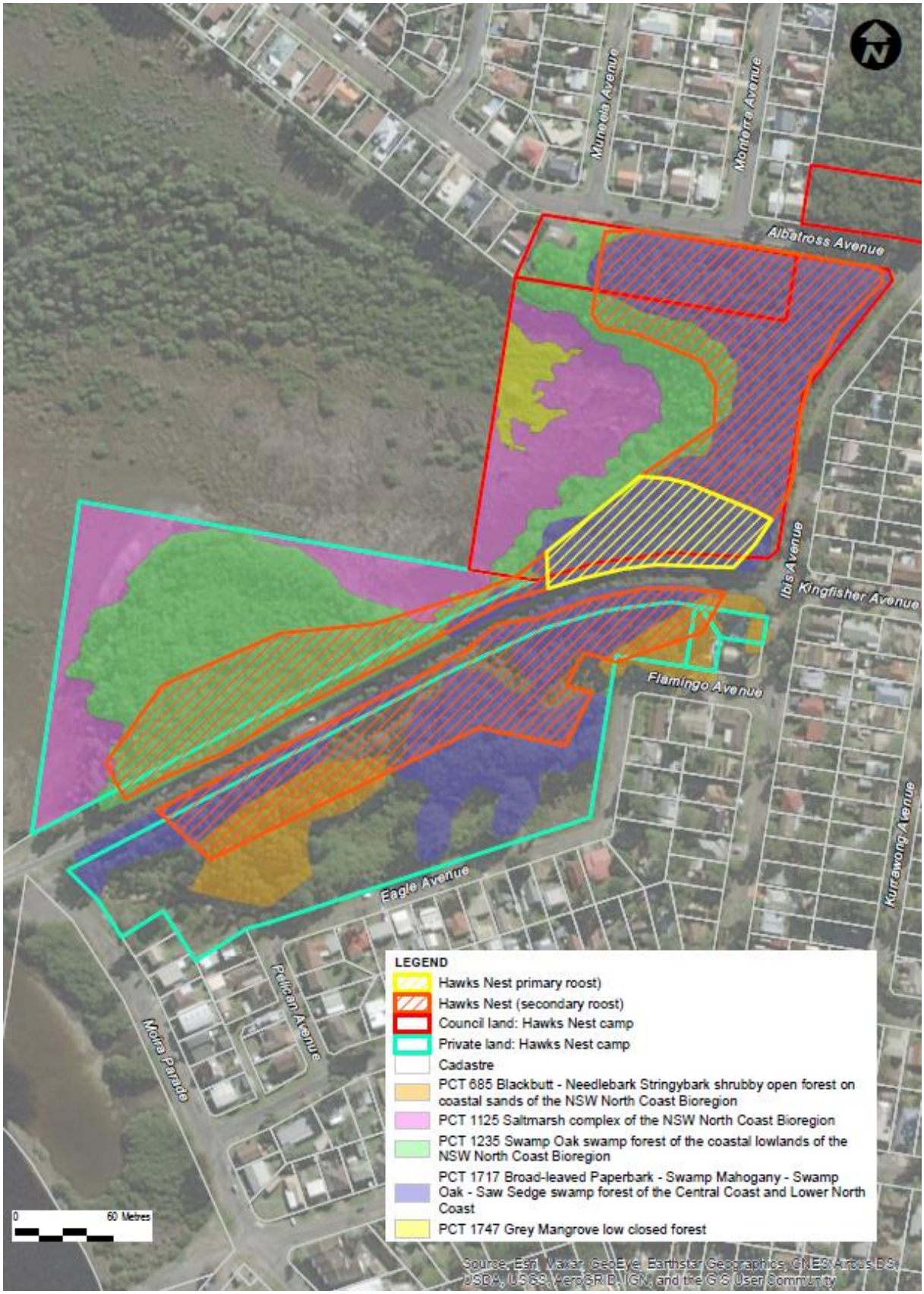


Figure 20 Hawks Nest camp vegetation map

2.7.2 History of the camp

A colony of Little Red flying-foxes at the camp in the mid-1990s is the earliest report of flying-foxes at the Hawks Nest camp. After that, flying-fox occupation was reportedly very irregular with only very small number of animals occurring occasionally until around 2015 when the camp became more permanent. There is limited information about flying-fox usage at the site before May 2019, since then the Grey-headed Flying-fox has been the main species observed. Usage has been seasonal with up to 5,500 animals recorded. Little Red Flying-foxes have also been observed at the camp in low numbers.

Community members have reported that the camp has an association with a flying-fox camp within the Port Stephens LGA at Bobs Farm, 18 km to the south-west. Flying-foxes reportedly move between the two camps.

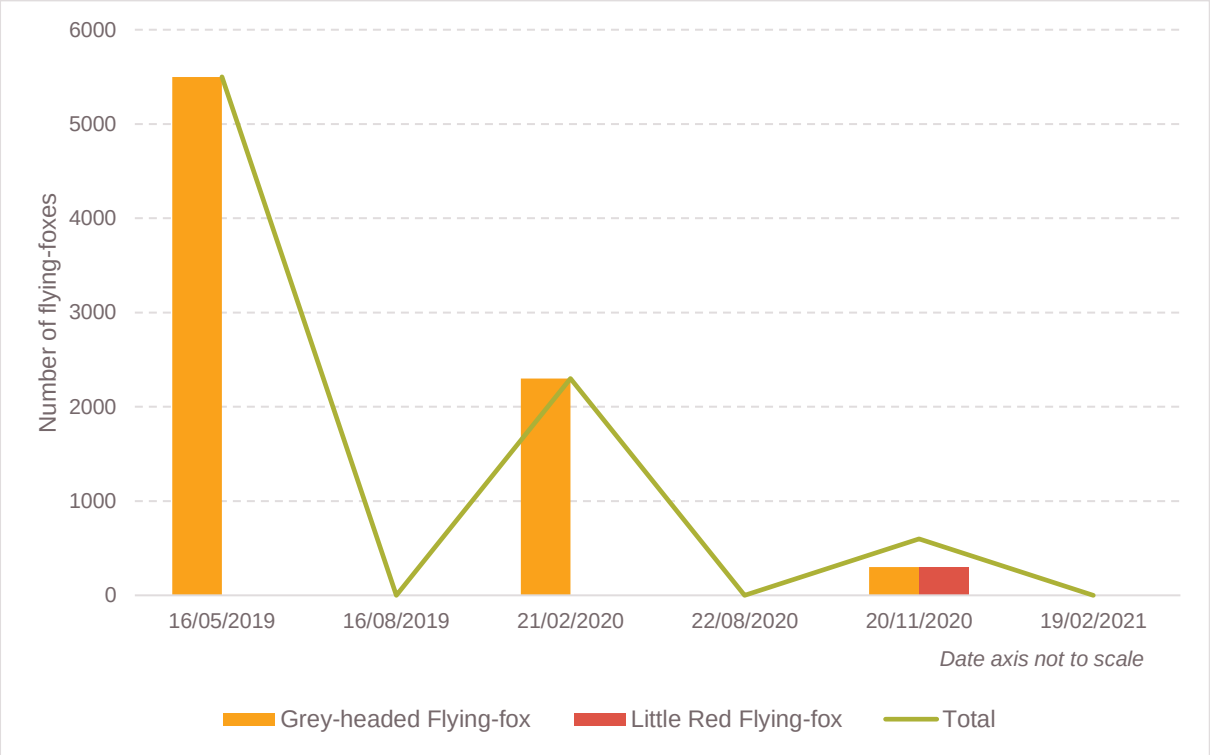


Figure 21 Flying-fox count numbers for the Hawks Nest camp

2.7.3 Land tenure and zoning

The two Council lots and three private lots that support the Hawks Nest camp are listed in **Table 6** and displayed in **Figure 22**. Most of the camp, including the primary roost, is located on land zoned *E2 – Environmental Protection* under the *Great Lakes Local Environmental Plan 2014*. The objectives of this zone have been discussed previously in **Section 2.6.3**. The remainder of the camp is located on land zoned *R2 - Low Density Residential*. The objectives of this zone are:

- *To provide for the housing needs of the community within a low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*

Other land zones within 300 m of the camp include:

- *R2 - Low Density Residential* in the residential area of Hawks Nest
- *E1 - National Parks and Nature Reserves* at Myall Lakes National Park
- *R3 - Medium Density Residential* to the south-west of the camp, including the fringes of the Hawks Nest town centre
- *RE1 – Public Recreation*.

Most of the *R3 - Medium Density Residential* zone area has not been developed to medium density and currently resembles low density residential land.

Table 6 Hawks Nest camp land tenure and zoning

Lot and DP	Tenure	Zoning
67 DP235299	Council	E2 – Environmental Conservation
296 DP30790	Council	E2 – Environmental Conservation
1 DP546852	Private	R2 – Low Density Residential, E2 – Environmental Conservation, R3 – Medium Density Residential
250 DP30790	Private	R2 – Low Density Residential
251 DP30790	Private	R2 – Low Density Residential

2.7.4 Sensitive receptors

Residential dwellings are the primary sensitive receptors to the Hawks Nest camp. There are approximately 447 residential lots within a 300 m radius of the camp, including:

- two residential lots with houses that support a small portion of the secondary roosting area at the camp.
- one lot that supports the secondary roosting area of the camp and is partly zoned for residential development.
- one residential lot with a dwelling that adjoins the secondary roosting area at the camp.

Local roads and clearings separate other dwellings from the camp. Future development of undeveloped areas and increasing urban densities in permissible areas may increase the number of residences in proximity to the camp. There are no known other sensitive receptors within 300 m of the Karloo Street Reserve camp.

2.7.5 Council assets and activities

Council managed infrastructure within and directly adjacent to Hawks Nest camp includes adjacent roads and footpaths, sewer mains and pump station and water mains. Other Council management activities at the Council reserve include:

- maintaining an APZ behind residential properties north of the camp.
- bush regeneration works, with a focus on weed management.

Other utilities adjacent to the camp include electricity (overhead) and communications.

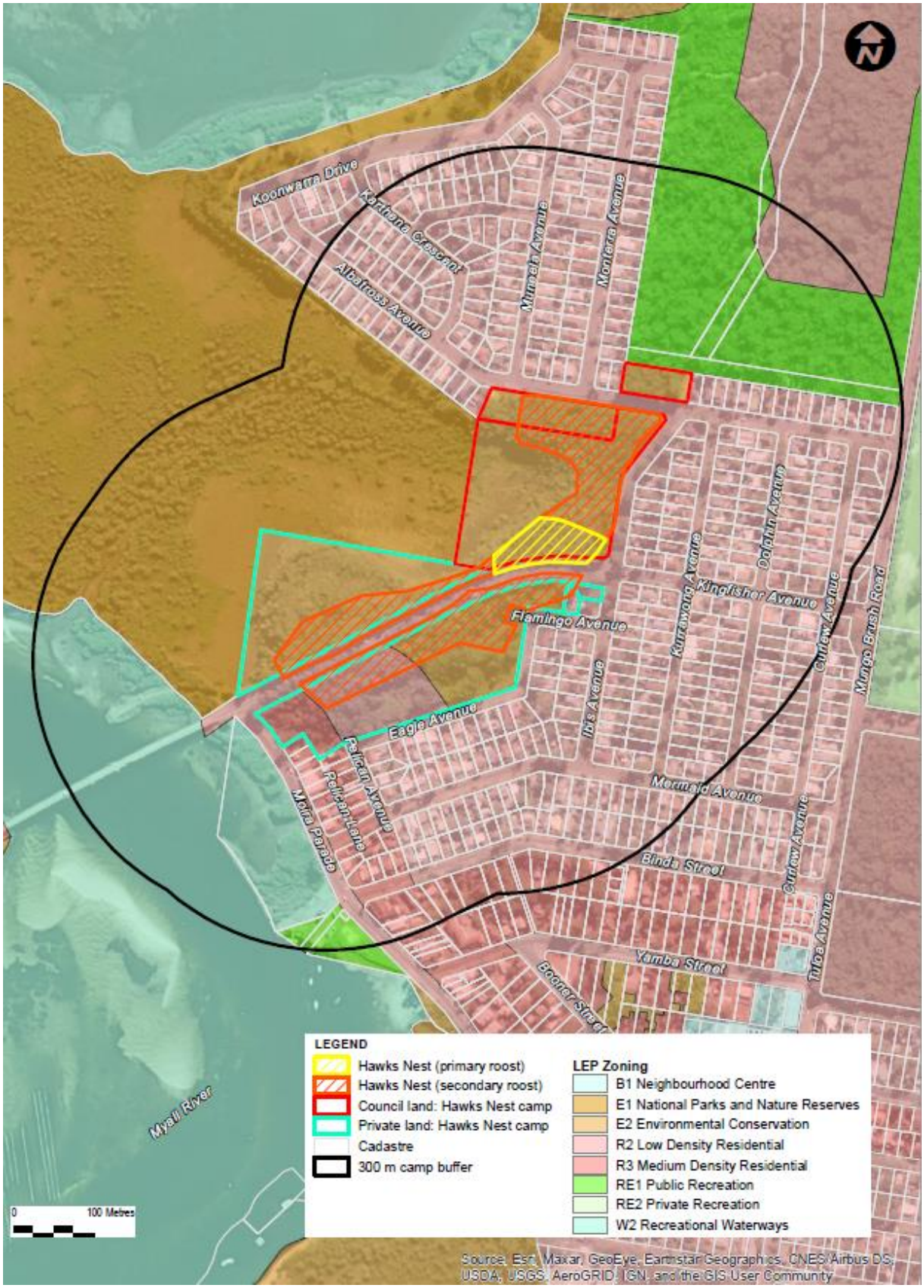


Figure 22 Hawks Nest camp land zoning and proximate residences

2.7.6 Community reported issues related to the camp

The following list is a collation of the issues related to the Hawks Nest camp that have been reported by the community. Key reported issues include:

- odour, particularly following wet conditions or when flying-fox numbers are high.
- noise as flying-foxes depart or return to the camp
- noise from the camp during the day and seasonally during the night
- noise from flying-fox foraging in gardens at residences
- faecal drop on houses and outdoor areas, roofs that have associated water tanks, cars and washing lines, and associated time spend cleaning areas adjacent to the camp
- disease concerns to residents and pets
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- lifestyle impacts as a result of reduced amenity/smell/disease concerns (e.g. house bound, inability to leave windows open
- reduced general amenity
- damage to vegetation
- impacts on other native animals, particularly birds and Koalas
- property devaluation.

Council has received only a small number of complaints about the camp, particularly in comparison the camps at Forster. Potential future residential development to the south-west of the camp poses potential emerging issues, with:

- habitat removal reducing the extent of available roosting habitat, forcing the flying-foxes to roost in proximity to other residents
- more residents living in proximity to the camp.

2.7.7 Management response to date

Council's management responses as of March 2021 at the Hawks Nest camp have included:

- responding to community complaints and providing information on flying-foxes, legislative considerations and Council's actions
- seasonal flying-fox monitoring four times a year as part of the national flying-fox monitoring program to increase Council's understand flying-fox use of the camp commencing in May 2019).
- bush regeneration works, with a focus on weed management.

2.8 Comparison of target camp issues to other NSW camps

The LGNSW *Flying-fox Habitat Restoration Program – Camp Mapping* (Ecosure 2019) project identified priority camps across NSW for flying-fox camp restoration works. The project included scoring conflicts and flying-fox habitat values of 334 known flying-fox camps in NSW to provide an overall score and ranking.

Of the subject camps, the Karloo Street Reserve camp (referred to as Forster in the report) ranked the highest at 47th in the State as a candidate camp for restoration works, followed by the Smiths Lake camp (ranked 107), the Pacific Palms camp (referred to as Elizabeth Beach which ranked 151) and the Hawks Nest camp (ranked 193). The Cocos Crescent camp was not assessed as part of the project due to its recent establishment. However, conflict scores

for the Karloo Street Reserve camp are transferable to the Cocos Crescent camp due to the proximity of these camps and their similar setting.

The Karloo Street Reserve, Smiths Lake and Hawks Nest camps all scored high for residential conflicts, while Hawks Nest only received a moderate residential conflict score. Numerous other urban camps across the state received similar residential conflict scores. All subject camps scored low for other sensitive receptors and airport conflicts.

2.9 General reported flying-fox conservation support related to the camps

At all of the subject camps, except for Cocos Crescent Reserve camp, there are local residents in the surrounding area who enjoy the camp and would prefer it be managed in-situ. Their primary concerns related to flying-fox conservation issues. Reported positive feedback stemmed from people who:

- recognise the landscape-scale benefits flying-foxes provide through seed dispersal and pollination
- acknowledge the need to conserve flying-foxes as an important native species
- enjoy watching flying-foxes at the camp and/or flying out or in
- appreciate the intrinsic value of the camp
- appreciate the natural values of the camp and habitat
- feel the camp does not negatively impact on their lifestyle
- value the opportunity the camp provides for them and their family to get close to nature
- recognise the need for people and wildlife to live together
- appreciate opportunities to learn more about flying-foxes
- feel reassured after learning the facts about flying-foxes and human health.

2.10 Regional flying-fox foraging resources

The distribution of flying-fox across the landscape at any one time is associated with the availability of food resources. LGNSW recently commissioned flying-fox foraging habitat mapping for NSW (Eby et al. 2019), updating early mapping in 2008 (Eby and Law, 2008). Final rank habitat mapping scores for the MidCoast Council LGA is provided in **Figure 23** and **Figure 24**. These scores correspond with the flying-fox foraging habitat value of vegetation in the area based on the productivity and reliability of food (blossom and fruit) resources within each vegetation community.

The mapping shows that large portions of the MidCoast Council LGA contain moderate value flying-fox foraging habitat. These resources are mostly available in summer/autumn and limited resources are available in winter/spring. This corresponds with the seasonal occurrences of flying-foxes at the subject camps.

Potential nightly foraging distances of 20 km (typical) and 50 km (maximum) around each camp are shown in **Figure 23**. This shows that when flying-foxes are roosting at the subject camps, they are mostly dependent on food resources within the MidCoast Council LGA. The exception is the Hawks Nest camp which is also within nightly foraging distance of potential foraging resources on land to the south. There is a strong overlap in the area within the typical nightly foraging distances around the Karloo Street Reserve and Cocos Crescent Reserve camps, and the Pacific Palms and Smiths Lake camps.

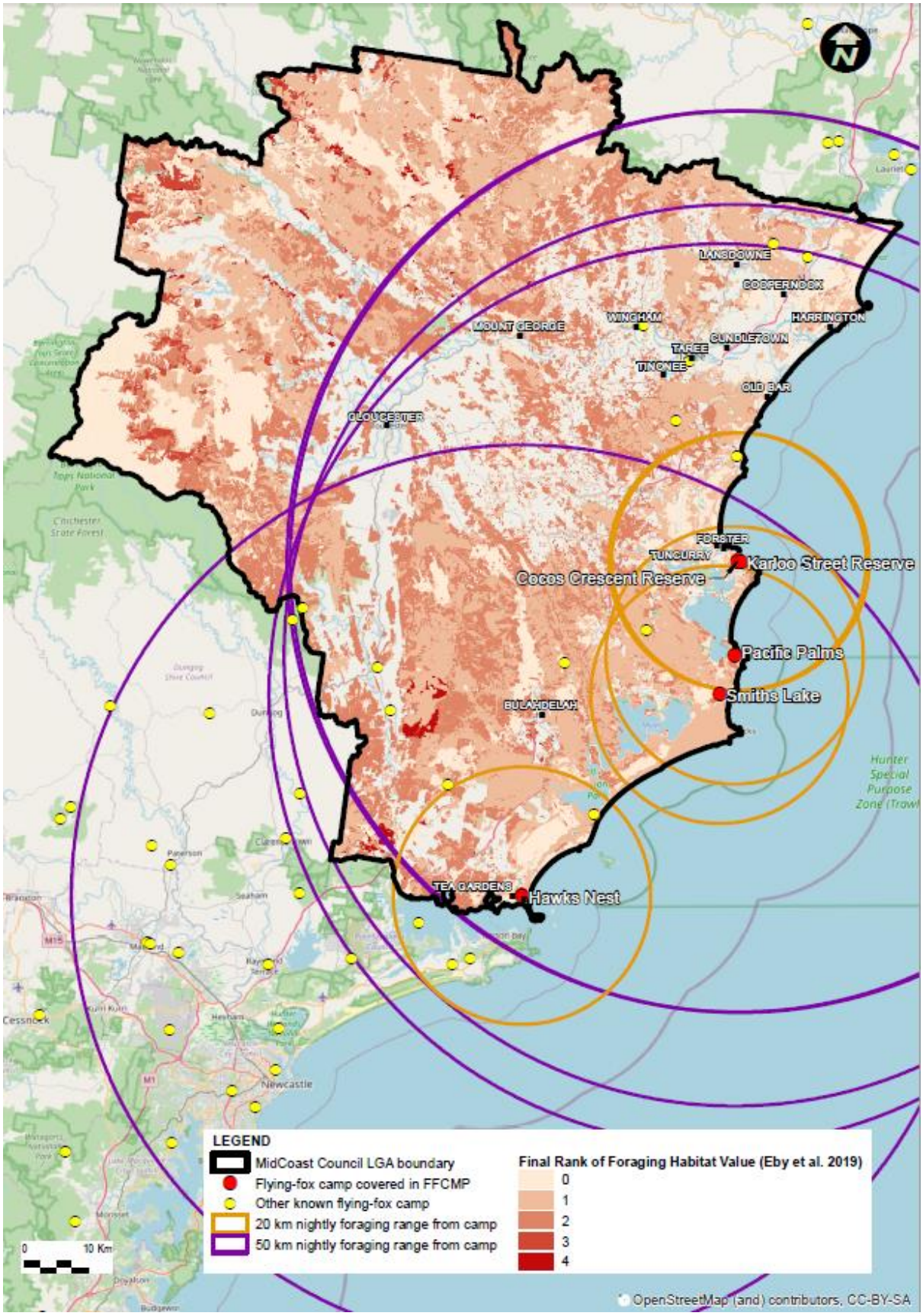


Figure 23 Total 'Final Rank' flying-fox foraging habitat scores for the MidCoast Council LGA

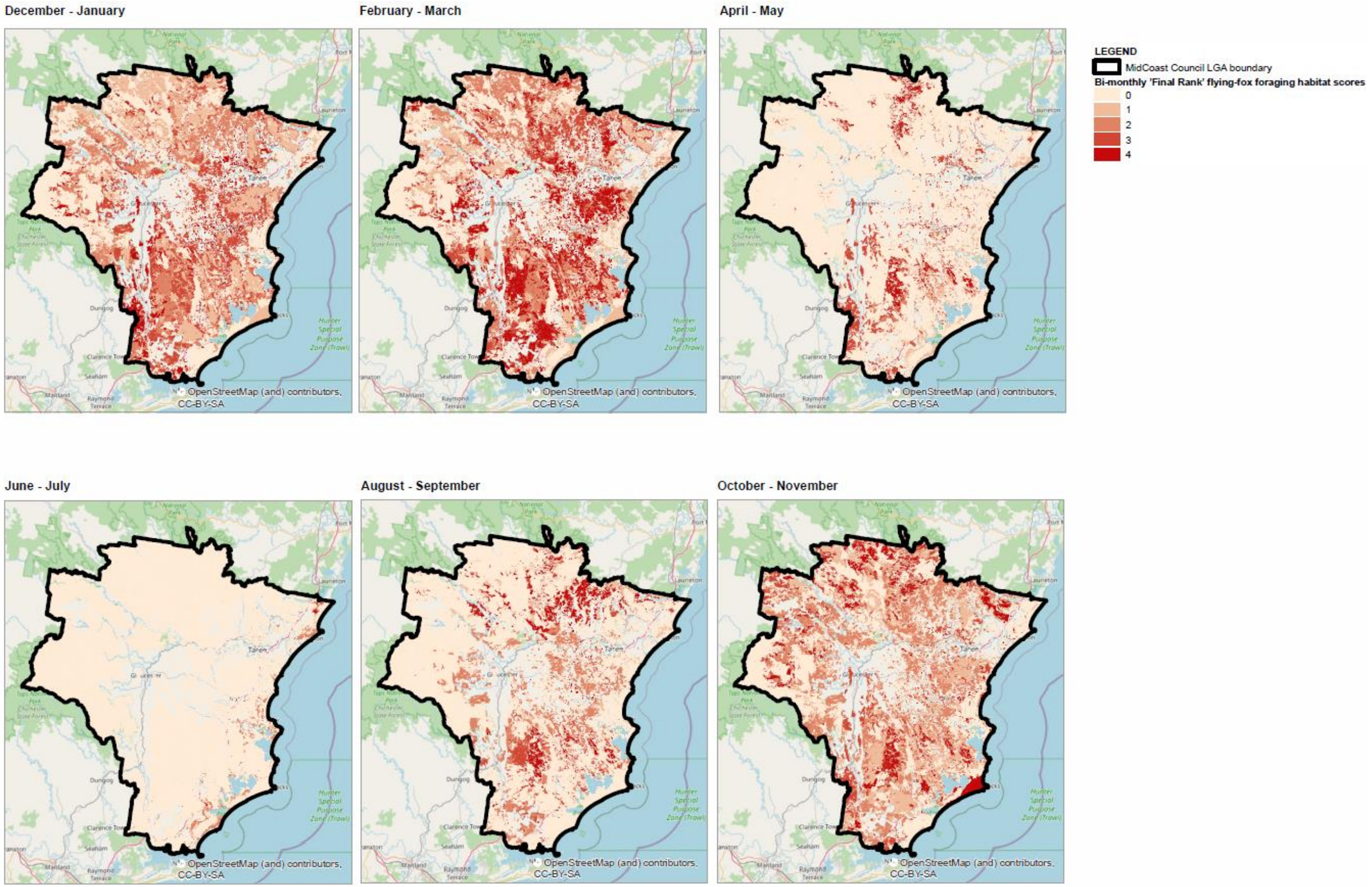


Figure 24 Bi-monthly 'Final Rank' flying-fox foraging habitat scores for the MidCoast Council LGA

3. Community engagement

3.1 Stakeholders

A range of stakeholders are directly or indirectly affected by the subject flying-fox camps or are interested in their management. Stakeholders include those shown in **Table 7**.

Table 7 Stakeholder in the subject camps and this Plan

Stakeholder	Interest/reported impacts
Residents at and within proximity to the camp	Residents at and within proximity to the camp are the primary stakeholder (refer to Section 2 for reported issues)
Residents	Residents of MidCoast Council LGA have an interest in Council activities, policies and strategies that impact the environmental and biodiversity, Council land and land use management.
Business owners within proximity to the camp	Business owners operating within proximity to the camp are a stakeholder group directly interested. They are likely mostly to include home business operators, as well as: • Owners/managers of the aged care facility north-east of the Cocos Crescent Reserve • Tourism accommodation properties (mainly holiday letting) • Business owners who use the facilities at the Pacific Palms community centre and tennis courts • The Pacific Palms Recreation Club.
Business owners	Business owners have an interest in Council activities, policies and strategies that impact the environmental and biodiversity, Council land and land use management.
Indigenous community	The local Biripi and Worimi people have an interest in land management activities on both public land and private land
Hospitals	Interested in human health issues related to flying-fox and human contact in general
Airports	Airport managers have a responsibility to reduce the risk of wildlife–aircraft strike. Forster (Wallis Island) airport is located within 20km of the Cocos Crescent Reserve camp (4.2 km), Karloo Street Reserve camp (4.5 km), Pacific Palms camp (15 km) and Smiths Lake camp (19.9 km).
Equine facilities and vets	Equine facility managers and local vets are aware of Hendra virus risk and appropriate mitigation measures. Where feasible, all horse owners within 20 km of the camp should be included in such communications. The Tuncurry-Forster Jockey Club is located approximately 7 km north-west of the Karloo Street Reserve and Cocos Crescent Reserve camps.
Orchardists and fruit growers	Fruit growers may be impacted by flying-foxes feeding in orchards.

Stakeholder	Interest/reported impacts
Civic leaders and influencers (including local, state and federal politicians)	All levels of government have legislation or policies relevant to flying-fox management or impact assessment. Local councillors have, at times, received complaints about local flying-fox camps and have been involved with management decision making (particularly the Forster camps).
Local government	Local government has responsibilities to the community and environment of the area for which it is responsible in accordance with the *Local Government Act 1993*. Council is also responsible for administering local laws, plans and policies, and appropriately managing assets (including land) for which it is responsible.
Local Government NSW (LGNSW)	LGNSW is an industry association that represents the interests of councils in New South Wales.
Department of Planning, Industry and Environment (DPIE; NSW government)	DPIE is responsible for administering legislation relating to (among other matters) the conservation and management of native plants and animals, including threatened species and ecological communities.
Australian Government Department of Agriculture, Water and the Environment (DoAWE) (relevant to camps with grey-headed flying-foxes or other matters of national environmental significance)	DoAWE is responsible for administering federal legislation relating to matters of national environmental significance, such as the grey-headed flying-fox and any other federally-listed values of the camp site.
NSW National Parks and Wildlife Service (NPWS)	NSW NPWS manage land directly adjacent to the Pacific Palms and Hawks Nest camps. They also have an interest in land and fauna management more broadly.
Wildlife carers and conservation organisations	Wildlife carers and conservation organisations have an interest in flying-fox welfare and conservation of flying-foxes and their habitat. They also have an interest in conservation based education programs. FAWNA and WINC are local wildlife care organisations that look after flying-foxes within the MidCoast Council area.
Researchers/universities/CSIRO	Researchers have an interest in flying-fox behaviour, biology and conservation.
Media	The media occasionally publish stories relating to flying-foxes, particularly during times of conflict. They have a responsibility to deliver correct information to the MidCoast Council community

3.2 Engagement methods

Extensive effort has been made to engage with the community regarding the subject flying-fox camps to:

- understand the issues, directly and indirectly, affecting the community
- raise awareness within the community about flying-foxes
- correct misinformation and allay fears
- seek ideas and feedback about possible future management options.

The types of engagement that have been undertaken include:

- promotion of contact details of responsible officer
- telephone conversations and emails to record issues and complaints
- media releases about the project (radio, print, social media)
- website pages and links
- flyers posted to landholders within 300 m of the camps (February 2021).
- webinar information session (8 February 2021)
- community information booths at all five camps (9 and 10 February 2021, attended by approximately 74 people)
- direct contact with known community groups with an interest in each camp by phone and email
- an online survey (flying-fox engage) for all the subject camps (1 February to 12 March 2021; 139 valid submissions received).

Previous community surveys relating to flying-fox camp management at the subject camps were also reviewed, including:

- a flying-fox engage survey for the Karloo Street Reserve camp in 2017. Fifty-seven valid submissions were received

- University of Melbourne 2019 surveys of residents within 300m of the Karloo Street Reserve and Smiths Lake camps. The results were presented in individual camp reports and a preliminary report titled *A large-scale survey of residents living close to flying-fox camps to guide conflict management: preliminary report* (Lentini et al. 2020). One-hundred and thirty survey responses were received from residents near the Karloo Street Reserve camp and 31 survey responses were received from residents near the Smiths Lake camp.

Further details of the community engagement process for the Plan is provided in **Appendix 3**.

3.3 Community feedback – management options

The flying-fox engage survey was the main platform for recording community feedback in relation to camp management options. A total of 139 valid survey submissions were received and the results are provided in **Appendix 4**. The responses strongly reflected comments received during other community engagement phases. Issues raised for each camp have been discussed in **Section 2**, with odour, noise, excrement and disease/health concerns being the main issues raised.

The survey found the community consider it is important that flying-fox camp management measures:

- reduce the impact of noise and odour from flying-foxes at the camp on nearby residents (67% of respondents considering this very or extremely important)
- reduce the impact of flying-fox excrement on the property of nearby by residents (68% of respondents considering this very or extremely important)
- do not move the flying-fox camp to other areas that may also be near residents or businesses (65% of respondents considering this very or extremely important)
- ensure the risk of disease transmission remains low (77% of respondents considering this very or extremely important)
- have a low financial cost to residents living near the camp (65% of respondents considering this very or extremely important)

- can be implemented quickly (61% of respondents considering this very or extremely important)
- provide a long term solution (86% of respondents considering this very or extremely important)
- do not harm flying-foxes (58% of respondents considering this very or extremely important)
- do not degrade the natural or ecological values of the site (70% of respondents considering this very or extremely important)
- do not change the visual appeal or recreational opportunities currently undertaken at the site (58% of respondents considering this very or extremely important).

The importance of the camp management measures having low financial costs to Council ratepayers and not disrupt residents and businesses during implementation was less definitive..

The survey included a ranking of recommended management options based on respondents results for the initial 'importance' or 'values' questions; re-ranked management options by respondents; and the top 5 and bottom 5 re-ranked management option preferences. The results were analysed collectively based on all survey responses. The results were also analysed for each camp by pooling the results from respondents that lived within 150 m of each camp to provide an indication of management option preferences of adjoining residents at each camp.

The cumulative order of re-ranked management options were:

1. Subsidising property modification to reduce the impacts of flying-foxes
2. Provision of flying-fox education and awareness programs
3. Guidelines for carrying out operations adjacent to camps
4. Subsidising services to reduce the impacts of flying-foxes
5. Health and safety guidelines to manage incidents related to the camp
6. Revegetate and manage land to create alternative flying-fox habitat
7. Advising about property modifications
8. Fully-funding property modification to reduce the impacts of flying-foxes
9. Routine maintenance to improve the condition of the site
10. Do Nothing- no management action required at this stage
11. Artificial roosting habitat
12. Trimming vegetation at the camp boundary to create a small buffer
13. Revegetating areas with plants that are unsuitable as roost habitat
14. Land-use planning
15. Early dispersal before a camp is established at a new location
16. Passive dispersal of a flying-fox camp through selective vegetation removal
17. Installation of noise attenuation fencing
18. Active dispersal of a flying-fox camp using disturbance
19. Removing vegetation to create a substantial buffer
20. Actively nudging the camp to a nearby location using disturbance
21. Culling flying-foxes – apply for licence from State Government.

The survey provided several opportunities for respondents to make comments in relation to camp management options. The spectrum of general comments from respondents ranged from those that considered flying-foxes pests and wanted them removed or culled, to those who reported positive experiences living near a camp. A number of respondents did not want flying-foxes harmed or the vegetation in the area removed, however wanted the flying-foxes not to roost in an urban area.

Many longer-term residents who have lived in the area pre-establishment of a respective camp commented on being disproportionately impacted in comparison to residents that had moved into the area post camp establishment. Some respondents were concerned about flying-fox conservation more broadly, including at camps and animal welfare considerations.

4. Legislation and policy

This section outlines legislation and policies that are relevant to flying-fox management at the subject camps. It should be noted that this Plan does not constitute a licence to undertake works. Any landowners seeking to undertake works on private property will need to acquire the relevant approvals via Council and/ or DPIE.

4.1 Local government

Local government is required to prepare planning schemes (including environmental planning instruments and development control plans) consistent with provisions under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Local Environmental Plans are environmental planning instruments that are legal documents and that relate to a local government area. A Development Control Plan (DCP) provides detailed planning and design guidelines to support the planning controls in a Local Environment Plan.

Planning schemes enable a local government authority to manage growth and change in their local government area (LGA) through land use and administrative definitions, zones, overlays, infrastructure planning provisions, assessment codes and other administrative provisions. A planning scheme identifies the kind of development requiring approval, as well as zoning all areas within the LGA based on the environmental values and development requirements of that land. Planning schemes could potentially include a flying-fox habitat overlay and may designate some habitat as flying-fox conservation areas.

Known plans held by Council containing a flying-fox camp are listed in **Table 8**. The are no current reserve Plans of Management that apply.

Table 8 Local Government Policy Documents and their Relevance to this Plan

Documentation	Administered by	Relevance to subject camps
Great Lakes Local Environmental Plan 2014	Council	Apply to all of the subject camps. Relevant land use zones at each camp are discussed in Section 2.
Great Lakes Development Control Plan (2014)	Council	Advice and guidance on planning for land use compatibility, avoiding land use conflict and the use of buffers. The emphasis is on identifying current and potential future land use conflicts at the outset and designing to avoid them during the development process where possible.

4.2 State

4.2.1 Flying-fox Camp Management Policy 2015

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

4.2.2 Biodiversity Conservation Act 2016

The purpose of the *Biodiversity Conservation Act 2016* (BC Act) is to conserve biodiversity at the bioregional and state scales. Under this Act, a person who harms or attempts to harm an animal of a threatened species, an animal that is part of a threatened ecological community, or a protected animal, is guilty of an offence.

The Grey-headed Flying-fox is listed as threatened under the BC Act.

A biodiversity conservation licence under Part 2 of the BC Act may be required if the proposed action is likely to result in one or more of the following:

a. harm to an animal that is a threatened species, or part of a threatened population
b. the picking of a plant that is a threatened species, or part of a threatened population or ecological community
c. damage to habitat of a threatened species, population or ecological community
d. damage to a declared area of outstanding biodiversity conservation value.

If the Department assesses a biodiversity conservation licence application and determines that a significant impact is unlikely, a biodiversity conservation licence will be granted (the appendix to the Policy lists standard conditions for flying-fox management approvals).

The Department regulates flying-fox camp management through two options provided to land managers:

- authorisation under the Flying-fox Camp Management Code of Practice for public land managers
- licensing for public and private land managers.

The Code of Practice provides a defence under the BC Act for public land managers, as long as camp management actions are carried out in accordance with the Code of Practice.

Proposed actions that would otherwise constitute an offence under the BC Act can be authorised under another law.

4.2.3 Prevention of Cruelty to Animals Act 1979

It is an offence under this Act if there is evidence of unreasonable/unnecessary torment associated with management activities. Adhering to welfare and conservation measures provided in Section 10.3 will ensure compliance with this Act.

4.2.4 Environmental Planning and Assessment Act 1979

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

The EP&A Act is administered by the DPIE.

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

Development under Part 4 of the Act does not require licensing under the BC Act.

Where public authorities such as local councils undertake development under Part 5 of the EP&A Act (known as ‘development without consent’ or ‘activity’), assessment and licensing under the BC Act may not be required; however, a full consideration of the development’s potential impacts on threatened species will be required in all cases.

Where flying-fox camps occur on private land, landowners are not eligible to apply for development under Part 5 of the EP&A Act. Private landowners should contact Council to explore management options for camps or activities that occur on private land.

4.2.5 Local Government Act 1993

The primary purpose of this Act is to provide the legal framework for the system of local government. Most relevant to flying-fox management is that it also provides encouragement for the effective participation of local communities in the affairs of local government and sets out guidance on the use and management of community land which may be applicable to land which requires management of flying-foxes.

4.3 State Environmental Planning Policies

SEPPs are environmental planning instruments that address specific planning issues within New South Wales. These SEPPs often remove power from local councils in order to control specific types of development or development in specific areas. SEPPs often transfer decision-making from councils to the Planning Minister. While there may be others, some of the SEPPs likely to apply at some flying-fox camps are outlined below.

4.3.1 SEPP (Coastal Management) 2018

The aim of this policy is to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*.

Development consent must be obtained before any clearing of native vegetation, earthworks, construction of levees, draining or environmental protection works can occur on a mapped coastal wetland or littoral rainforest.

The Council land at the Hawks Nest camp is mapped coastal wetland under this SEPP. The surrounding land, including private land that forms part of the secondary roost area, is mapped within the coastal wetland buffer area. SEPP (Coastal Management) needs to be considered for any on-ground works at the Hawks Nest camp.

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

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

Proponents will need to consider whether the State Environmental Planning Policy (Vegetation in Non-Rural Areas) applies to their proposal, and if any approvals are required under the BC Act.

4.4 Australian government

4.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

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

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

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

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

The Guideline defines a nationally important Grey-headed Flying-fox camp as one that has either:

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

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

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

Mitigation standards

- The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependent young that cannot fly on their own.
- The action must not occur during or immediately after climatic extremes (heat stress event[1], cyclone event[2]), or during a period of significant food stress[3].
- Disturbance must be carried out using non-lethal means, such as acoustic, visual and/or physical disturbance or use of smoke.

[1] 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.

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

[3] Food stress events may be apparent if large numbers of low body weight animals are being reported by wildlife carers 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 assess 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 (i.e. Karloo Street Reserve and Smiths Lake camps) is likely to be required.

5. Other ecological values of the camps

The subject camps contain high conservation value habitat for threatened species and ecological communities in additional to Grey-headed Flying-foxes. Vegetation communities and mapping at each camp has been provided previously in **Section 2**. Corresponding candidate threatened ecological communities (TECs) under the BC Act and EPBC Act, and protected vegetation under the Fisheries Management Act 1994 (FM Act) is provided in **Table 9**.

A list of threatened species known to occur within 10 kilometres of the subject camps is provided in **Appendix 3**. Those species known to occur at each camp based on DPIE BioNet Atlas records are listed in **Table 10**.

Table 9 Threatened and Protected Ecological Communities at the subject camps

TEC	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
BC Act					
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Yes (PCT 1717)	Yes (PCT 1717)	Yes (PCT 1717)	No	Yes (PCT 1717)
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Yes (PCT 1235)	No	Yes (PCT 1235)	No	Yes (PCT 1235)
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	Intergraded with Swamp Sclerophyll Forest TEC	No	Intergraded with Swamp Sclerophyll Forest TEC	No	No
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Yes (PCT 751)	No	No	Candidate (PCT 1201)	No
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	No	No	No	Yes (PCT 1201)	No
EPBC Act					
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Yes (PCT 1235)	No	Yes (PCT 1235)	No	Yes (PCT 1235)
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia Critically Endangered Community likely to occur within area Lowland Rainforest of Subtropical Australia	Yes (PCT 751) Candidate (Cabbage Palm dominated areas of PCT 1717)	Candidate (Cabbage Palm dominated areas of PCT 1717)	Candidate (Cabbage Palm dominated areas of PCT 1717)	Candidate (PCT 1201)	Candidate (Cabbage Palm dominated areas of PCT 1717)
FM Act Protected Vegetation					
Mangrove	No	No	Yes (PCT 1747)	No	Yes (PCT 1747)

Table 10 Threatened species known to occur at the subject camps based on BioNet records

Camp	Flora	Fauna
Karloo Street Reserve camp	Trailing Woodruff (*Asperula asthenes*)	Swift Parrot (*Lathamus discolor*) Squirrel Glider (*Petaurus norfolcensis*) Grey-headed Flying-fox (*Pteropus poliocephalus*)
Cocos Crescent Reserve camp	-	Grey-headed Flying-fox (*Pteropus poliocephalus*)
Pacific Palms camp	Scrub Turpentine (*Rhodamnia rubescens*)	White-bellied Sea-Eagle (*Haliaeetus leucogaster*) Grey-headed Flying-fox (*Pteropus poliocephalus*)
Smiths Lake camp	-	Koala (*Phascolarctos cinereus*) Grey-headed Flying-fox (*Pteropus poliocephalus*)
Hawks Nest camp	-	Koala (*Phascolarctos cinereus*) Koala (*Phascolarctos cinereus*): Hawks Nest and Tea Gardens population Grey-headed Flying-fox (*Pteropus poliocephalus*)

6. Camp management options and actions

6.1 Camp management options

The full range of management options available to manage and mitigate conflicts between humans and flying-foxes at camps were identified and reviewed throughout community engagement and Plan preparation. Details of these options are provided in the NSW *Flying-fox Camp Management Policy 2015* and *Camp Management Plan Template 2019*, and analysed in **Appendix 4**. The identification of alternative and innovative options was also encouraged during community engagement.

Management options are grouped into three levels, as follows:

- Level 1: *Routine camp management* which aim to manage the camp in-situ and manage issues without directly impacting the camp.
- Level 2: *In-situ camp management* which aim to retain flying-foxes at the camp, however create separation between roosting animals and adjacent sensitive receptors.
- Level 3: *Disturbance or dispersal* which aim to stop flying-foxes roosting at the site.

The DPIE NSW *Flying-fox Camp Management Policy 2015* requires a hierarchy approach to be considered based on a principle of using the lowest form of intervention required.

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

6.2 MidCoast Council management approach

MidCoast Council's approach for managing the subject flying-fox camps has taken into consideration:

- current scientific information about flying-fox behaviour and ecology
- outcomes of flying-fox management at other camps along eastern Australia
- each camp's unique situation and that camp management needs to be site specific.

The approach adopts a combination of Level 1 and Level 2 camp management actions, based on the following factors:

- Council does not want to adopt actions that have potential to exacerbate issues or create new camps where there may be similar (or worse) human/ flying-fox conflicts
- flying-fox occupation and numbers at each camp is expected to continue to fluctuate widely and seasonally depending on the availability of food resources. At camps where periods of significant flying-fox occupation have been observed, this is generally temporary and short term. Flying-foxes are typically absent or present in low numbers at the subject camps for large periods each year
- from time to time, some residents in proximity to the camps are expected to be adversely affected by the camp, particularly in relation to odour, noise and droppings. Measures to assist directly impacted residents in dealing with adverse impacts are appropriate
- the vegetation at each camp is of high amenity value for many of the surrounding residents, contributing to people's attraction to live in the local area
- most of the vegetation at each camp is of high biodiversity value, which is recognised by its retention and land use zoning

- a level of physical separation between flying-foxes and residents is important to reduce the risk of direct interactions. The ability to achieve a level of separation that completely mitigates noise and odour impacts is not achievable at the subject camps without significant vegetation removal (a Level 3 management action)
- Council will need to work closely with surrounding residents for implementation of the Plan to be effective.

MidCoast Council's approach complies with the relevant DPIE guidelines and adopts the approach of the lowest form of intervention for the issue, low risk and low cost actions, where possible. This is required to obtain DPIE endorsement of the Plan and to assist Council to apply for external funding. The more expensive actions proposed are low risk actions that do not have high environmental costs.

6.3 Consideration of Level 3 actions (dispersal)

Level 3 management actions (dispersal) have not been adopted for any of the camps. Dispersal is not feasible due to the considerations discussed above, or supported by scientific evidence or past experience, without substantial ongoing costs (refer to **Appendix 7**). For dispersal at any of the subject camps to be achieved, significant vegetation removal or significant costs would be required. A major risk with dispersal as a management action is the risk of moving the camp to other similar (potentially less desirable/ more sensitive) locations, which in turn only transfers the human/ flying-fox conflict. Such an outcome is not in line with the objectives of the Plan, which aims to reduce human/ flying-fox conflicts.

6.4 Management actions

Proposed management actions are provided in **Table 11**. They are divided into:

- General management actions that apply to all subject camps or provide regional strategy
- Camp specific management actions.

MidCoast Council is responsible for the actions outlined in the Plan.

Management controls that apply during the implementation of any action that directly impacts on the camp or flying-foxes are included in **Appendix 8**. Protocols for managing dead or injured flying-foxes are provided in **Appendix 9**.

Table 11 Management Actions

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
			General management actions				
A01	Allocate sufficient resources to enable flying-fox management plan implementation (1)	All	Sufficient resources would be allocated to enable implementation of the Plan. This is particularly important in the initial stages when a high level of organisation, facilitation and community engagement is required, as well as: • grant applications to seek external funds • prioritising on-ground works • development of procedures. A combination of internal and external resources may be used during Year 1. Existing staff resources would manage plan implementation in subsequent years.	High	Year 1	• Resources allocated to Plan implementation. • Management actions are implemented. • Community confidence in Council's ability to management flying-fox camps increased.	Year 1: $55,000 Ongoing: Existing resources
A02	Information and awareness program (1)	All	Provide information to the community regarding disease risk and management, how to minimise flying-fox impacts at your home, flying-fox management actions being undertaken by Council, flying-fox ecology and legislative status. This includes: • utilising existing flying-fox community information and awareness information published by Australasian Bat Society, DPIE, NSW Health and DoAWE • working in partnership with other organisations involved with wildlife and health related education (e.g. National Parks and Wildlife Service, FAWNA and WINC) • updating Council website with up-to-date program of works being undertaken at each camp • maps of flying-fox camp locations and 300 m potential impact zones on Council's website • regular media releases regarding works at each camp and trends of flying-foxes in the LGA • ensuring other internal Council departments are aware of the camps and associated management measures when working in the vicinity of the camp. Provide information on products and modifications that residents can undertake to reduce flying-fox impacts (e.g. first flush water tank diverters, removing washing before dusk, relocating clothes-lines from below food trees, netting fruit trees, removing undesirable trees that attract flying-fox foraging at residences and associated approval requirements/ considerations).	High	Years 1-5	• Community has greater understanding of the long-term strategy for managing flying-foxes. • Complaints to Council regarding flying-foxes are reduced.	Budget from Action A01 and existing resources
A03	Appropriate land-use planning (1)	All	• Prepare a Development Control Plan (DCP) to guide future development near flying-fox camps within the LGA, including both greenfield and infill development. The DCP would include structural requirements or guidelines on new buildings within proximity to camp to minimise the risk of future conflicts from flying-fox noise, odours and droppings. Greenfield development provisions would include appropriate urban design and landscaping provisions, and ensure that adequate distances are maintained between future dwellings/sensitive receptors and existing or historical flying-fox camps across the LGA. • Investigate the possibility of including flying-fox camps on Section 10.7 certificates for new developments. • Investigate if minor residential additions aimed at providing protection from potential nuisance from droppings, odour / noise etc from flying-foxes (e.g. car ports, sound proofing, covered outdoor areas etc) can be processed under the Exempt and Complying Provisions of Council's DCP. *Note: This action is particularly important at Karloo Street Reserve, Cocos Crescent Reserve, Smiths Lake and Hawks Nest camps.*	High	Investigate: Year 1 Implement: Years 1-5	• Conflicts are minimised through appropriate use of the site and awareness of new owners/ occupiers that a flying-fox camp is present nearby. • Only appropriate future developments are located near flying-fox camps • Human/flying-fox conflicts are not increased by future development.	Budget from Action A01 and existing resources
A04	Routine works protocol (1)	All	Develop protocols and training for Council staff and contractors when working near/ at flying-fox camps to minimise flying-fox disturbance and associated impacts (e.g. noise) for surrounding residents. Protocols may include: • undertake an acclimatisation program prior to operational works allowing time for flying-foxes to become accustomed to machinery and staff • use low noise equipment where possible (e.g. electric tools rather than motorised tools). • if flying-foxes are present and machinery such as chainsaws, whipper snippers and lawn mowers are required, monitor flying-fox behaviour during use • operational works within or adjacent to flying-fox habitat (e.g. APZ maintenance) are timed outside the species reproductive time or times when flying-fox numbers are absent or in low numbers.	High	Develop: Year 1 Implement: Years 1-5	• Protocol developed and adopted. • Training provided to relevant Council staff.	Budget from Action A01 and existing resources

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
A05	Protocols and procedures to manage incidents (1)	Disease Flying-fox conservation	A Flying-fox Incident Management Protocol would be developed to manage events that impact flying-foxes or residents, including: • new and/ or emerging camps with an influx of flying-foxes • adverse weather events e.g. bushfire threat, flood or storm, extreme heat events leading to flying-foxes changing their behaviour and/ or dying) • responses to emergency infrastructure maintenance at flying-fox camps • other environmental disruptions associated with climate change. The protocol would be developed in consultation with relevant stakeholders including DPIE, local wildlife rescue organisations (FAWNA and WINC) and NPWS, and include: • an outline of possible issues • actions to be implemented during events (including restricting public access, community notifications) • roles and responsibilities • available tools to monitor potential events (e.g. http://www.animalecologylab.org/ff-heat-stress-forecaster.html) • monitoring provisions associated with each specific event. The protocol for new camp management would include: • liaison with affected landholders • site inspection to assess species, location and sensitive receivers • determine short-term response protocol based on a risk matrix.	Medium	Develop: Year 1 Implement: Years 1-5	• Complaints to Council regarding flying-foxes are reduced. • Council is prepared for incident events. • Heat stress events are reported to http://www.animalecologylab.org/heat-stress-data-form.html	Budget from Action A01 and existing resources
A06	Service subsidies for properties in proximity to camps (1)	Odour, noise and droppings	• Investigate the feasibility of Council rate substitutes for residents living in close proximity to flying-fox camps who may have higher water and/or electricity costs as a result of living close to the camp (e.g. from cleaning, use of air-conditioning when odour levels are high). Key considerations would include proximity of residents to the camp, seasonality of flying-foxes activity and value of the potential rate subsidy. • Investigate the purchase and management of a high-pressure cleaner to be provided/ rent to affected residents to clean cars, driveways, verandas, etc affected by flying-fox droppings. • Investigate the purchase and distribution of temporary 'flying-fox resilience kits' to help residents in proximity to new or existing camps, during periods of high flying-fox influxes, including clothesline covers, pool covers, car covers and gazebos for sensitive areas (e.g. children's play areas).	High	Develop: Year 1 Implement: Years 1-5	• Complaints to Council regarding flying-foxes are reduced.	Investigation costs: Budget from Action A01 and existing resources. Implementation costs: minimum $500 for pressure cleaner. Other cost subject to securing external funding.
A07	Update mapping (1)	Improved knowledge	Update Council's internal *Intramaps* mapping to include: • flying-fox camps in the LGA, including maximum extent of camp footprints • potential flying-fox/human conflict buffers. • maps of potential flying-fox habitat across the LGA.	High	Year 1	• Council's mapping is up to date.	Budget from Action A01 and existing resources
A08	Alternative habitat creation: Wingham Brush (1)	All	Investigate regenerating Council land (Wingham Brush Recreation Reserve) adjacent to Wingham Brush camp to provide flying-fox roosting habitat away from the residential area of Wingham (refer to **Section 6.6**). This would: • complement previous vegetation regeneration works • increase the overall carrying capacity of this camp • provide roosting habitat away from residential area thereby reducing flying-fox conflicts • decrease pressure on vegetation at the existing camp footprint within Wingham Brush Nature Reserve. While Wingham Brush is not a target camp in this Plan, this regeneration work may benefit the subject camps by providing improved alternative roosting habitat that provides access to similar foraging resources in the eastern portion of the LGA (i.e. the nightly flying-fox foraging range from Wingham Brush overlaps four of the five subject camps; refer to **Figure 23**). The LGNSW *Flying-fox Habitat Restoration Program – Camp Mapping* (Ecosure 2019) project ranked the Wingham Brush camp as 2nd in the State as a candidate camp for restoration works.	Medium	Investigate: Year 1 Implement: Years 2-5 (subject to investigation and funding outcomes)	• The ability to undertake camp restoration works at Wingham Brush are investigated, including funding availability. • If viable, a Vegetation Management Plan (VMP) is prepared and on-ground works commence.	Investigation cost: Budget from Action A01 and existing resources. Implementation cost: TBC, subject to securing external funding.

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
A09	Collaborate with NPWS to develop flying-fox camp management plans for Wingham Brush and Coocumbac Island flying-fox camps (1)	All	Wingham Brush and Coocumbac Island flying-fox camps are located on NSW National Parks estate adjacent to urban townships (Wingham and Taree). The Wingham Brush camp in particular is located next to Council management land and infrastructure proposed for future upgrade works. Flying-fox camp management plans with input from relevant stakeholders would enable strategic management of these camps to achieve both conservation and community benefits. Initial stakeholder engagement is required to determine the interest by NPWS as well as other important stakeholder groups.	Coocumbac Island camp: Low Wingham Brush: High	Investigate: Year 1 Develop plans: Years 2-3 (subject to initial investigation and funding availability)	• Interest from NPWS and key stakeholder groups are identified. • Flying-fox camp management plans are prepared (subject to stakeholder interest outcomes).	Investigation cost: Budget from Action A01 and existing resources. Implementation cost: TBC, subject to securing external funding availability.
A10	Flying-fox monitoring (1)	All	Council would continue seasonal monitoring of the subject flying-fox camps and any new potential conflict camps on Council land as part of the National Flying-fox Monitoring Program. The monitoring would include: • recording flying-fox species composition and numbers per species at each camp • GPS mapping of the camp footprint. In addition to contributing to the National Flying-fox Monitoring Program, the data collector would help identify changes in flying-fox roosting behaviour; record changes in camp location; and inform future management actions during review of this Plan.	High	Ongoing	• Council continues to contribute to National Flying-fox Monitoring Program. • Trends in flying-fox usage is recorded and used to inform future site management.	Budget from Action A01 and existing
A11	Research support (1)	All	Council would support, encourage and collaborate with researchers studying flying-foxes and camp management. This would include providing access to the subject camps, encouraging community participation where relevant and information sharing.	Medium	Ongoing	• Research is supported.	Budget from Action A01 and existing
A12	Vegetation management on private land (1, 2)	All	• Inform the community of permitted vegetation removal on private land under the Great Lakes Development Control Plan 2014 (DCP), Section 12 Tree Vegetation Preservation, with the objective of: – enabling residents adjoining the camps to remove potential current/future roost trees within 5 m of dwellings – removing garden trees that are flying-fox food trees and result in disturbance to residences due to flying-fox foraging activity – encourage removal of declared weeds and undesirable species, particularly flying-fox food trees and result in disturbance to residences due to flying-fox foraging activity (e.g. Cocos Palms *Syagrus romanzoffiiana*). Council would also inform residents of BC Act licence requirements and process where tree removal impacts roosting habitat. • Investigation opportunities to assist residents undertaking the above vegetation removal, potentially including: – replacement plant offers. – green waste disposal concessions (e.g. free tip entry, up to a maximum value).	High	Inform/ investigate: Year 1 Implement: Years 2 (subject to initial investigation)	• Complaints to Council regarding flying-foxes are reduced. • Weed or undesirable trees on private land are reduced.	Inform/ Investigation cost: Budget from Action A01 and existing resources. Implementation cost: TBC, subject to outcomes of investigations.
Karloo Street Reserve and Cocos Crescent Reserve camps							
KC01	Buffers through vegetation removal (2)	Noise, droppings, health/well-being	Undertake selective vegetation trimming/ removal on Council land in close consultation with landholders where vegetation from the reserves overhang dwellings (excluding sheds and other outdoor areas). Relevant locations are shown in **Figure 25** and **Figure 26**. In combination with Action K12, this will create a minimum 5-10 m buffer from dwellings and potential flying-fox roost areas. *Note: as these locations are within managed APZs, compensatory planting on site is not proposed.*	High	Years 1	• Complaints to Council regarding flying-foxes are reduced. • The risk of flying-fox disturbance is reduced. • The risk of interactions between residents and flying-foxes are reduced.	Initial works: est. $30,000. Ongoing: existing funding associated with APZ maintenance.
KC02	Maintain existing buffers (1)	Noise, health/ well-being	Maintain existing and enhanced (Action K01) buffers around the camp, including APZs, maintained lawn area and the cleared road verges. Maintenance works would be undertaken in Routine Works Protocol (Action A04).	High	As required	• Reduced conflicts at adjacent residential dwellings. • Complaints to Council regarding flying-foxes are reduced.	Existing budget

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
KC03	Partially/ fully subsidised property modification (1)	Noise, odour, dropping, health/well-being	Support residents with existing dwellings adjacent to the camp/s with property modification options, potentially including: • air conditioning • construction of carports and other covered areas affected by droppings • construct sound barrier fencing • purchase clothes dryers • install acoustic batts • insulating bedrooms • noise reducing windows (e.g. laminate or double glaze windows). Council's role would include support complying DAs, assist with sourcing funding and informing the community. This includes liaise with funding bodies in relation to grant application options. Consideration should be given to funding models similar to noise mitigation on infrastructure projects where actions are targeted at individual residences; however the entire community benefits (e.g. through not trying to shift the problem elsewhere).	High	Initial investigations: Year 1 Building works: Years 2 and 3	• Residents interested in property modifications are identified. • Potential funding sources identified and secured for implementing on-ground works. • Reduced conflicts at adjacent residential dwellings	At a minimum, Council's costs are covered under Action A01 or existing resources. Costs would increase depending on identified funding model. Estimated at $400 for low cost features (e.g. clothes dryers, excluding electricity); bedroom acoustic treatment (insulation and window treatment); $5000; to $10,000 for more complex modifications (e.g. combined features of air conditioning unit, solar panels and battery system). Overall costs subject to external funding.
KC04	Buffers without vegetation removal (2)	Noise, smell, health/well-being	Should conflicts with adjacent residents continue after implementing the above actions, investigate installation of targeted flying-fox deterrent devices (i.e. sprinklers in vegetation canopy) at targeted locations around the primary roost area with the objective of maintaining a 15 m buffer between housing and roosting flying-foxes, without pushing the camp into close proximity with other sensitive receivers. Protocols for sprinkler establishment and operations can be sought through liaising with DPIE and other Councils that have installed deterrent sprinklers. The decision making for triggering this action is provided in **Section 8**.	Low	Initial investigations: Year 3 Installation of sprinklers: Years 4 and 5	• Reduced conflicts at adjacent residential dwellings • The risk of interactions between residents and flying-foxes are reduced.	Planning: Budget from Action A01 and existing resources. Establishment: est.$20,000 subject to securing external funding. Ongoing: Residents paying for water usage.
			Pacific Palms camp				
P01	Maintain existing buffers (1)	Noise, health/ well-being	Maintain existing buffers around the camp, including APZs, Community Centre, tennis courts, maintained lawn area, clearing adjacent to the footpath and road (refer to **Figure 27**). Maintenance works would be undertaken in accordance with the Routine Works Protocol (Action A04).	High	As required	• Buffers between camp, site facilities and residences maintained. • Complaints to Council regarding flying-foxes are reduced.	Budget from Action A01 and existing resources.
P02	Tennis court cover (1)	Droppings	Liaise with Pacific Palms tennis club regarding interest in a ground court cover (e.g. tarp), particularly when flying-fox numbers are high at the Pacific Palms camp. The need for funding support from Council would be determined in consultation with the tennis club committee.	Medium	Year 1	• Buffers between camp, site facilities and residences maintained. • Complaints to Council regarding flying-foxes are reduced.	Investigation cost: Budget from Action A01 and existing resources. Implementation cost: $1000-$4000 should Council assistance (securing external funding) be required and depending on tarp quality.
			Smiths Lake camp				
S01	Maintain existing buffers (1)	Noise, health/ well-being	Maintain existing APZs (refer to **Figure 27**) and road verges surrounding the camp. Maintenance works would be undertaken in accordance with the Routine Works Protocol (Action A04).	High	As required	• Buffers between camp, site facilities and residences maintained. • Complaints to Council regarding flying-foxes are reduced.	Existing budget

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
S02	Partially/ fully subsidised property modification (1)	Noise, odour, dropping, health/well-being	Support residents with existing dwellings adjacent to the camp with property modification options, potentially including: • air conditioning • construction of carports and other covered areas affected by droppings • construct sound barrier fencing • purchase clothes dryers • install acoustic batts • insulating bedrooms • noise reducing windows (e.g. laminate or double glaze windows). Council's role would include support complying DAs, assist with sourcing funding and informing the community. This includes liaise with funding bodies in relation to grant application options. Consideration should be given to funding models similar to noise mitigation on infrastructure projects where actions are targeted at individual residences; however the entire community benefits (e.g. through not trying to shift the problem elsewhere).	High	Initial investigations: Year 1 Building works: Years 2 and 3	• Residents interested in property modifications are identified. • Potential funding sources identified and secured for implementing on-ground works. • Reduced conflicts at adjacent residential dwellings	At a minimum, Council's costs are covered under Action A01 or existing resources. Costs would increase depending on identified funding model. Estimated at $400 for low cost features (e.g. clothes dryers, excluding electricity); bedroom acoustic treatment (insulation and window treatment); $5000; to $10,000 for more complex modifications (eg. combined features of air conditioning unit, solar panels and battery system). Overall costs subject to external funding.
S03	Buffers without vegetation removal (2)	Noise, smell, health/well-being	Investigate resident interest and support interested residents install localised exclusion devices (i.e. aerial sprinklers) around dwellings where the camp is located on private property. The objective is to create a localised buffer 5-10 m around target dwellings. Council's role may include: • investigating resident interest • identifying appropriate systems and protocols • informing residents about the BC Act licencing process • applying for grant funding (if not able to be funded by residents) • co-ordinating the installation process.	High	Initial investigations: Year 1 Installation of sprinklers: Years 2 (subject to interesting, licencing and funding)	• Reduced conflicts at adjacent residential dwellings	At a minimum, Council's costs are covered under Action A01 or existing resources. Installation: Relevant residents or external funding. Ongoing: Residents paying for water usage.
S04	Improved access for flying-fox surveys (1)	Improved knowledge	Seek written approvals from private landholders to access their property for the purpose of flying-fox surveys (A11).	Medium	Years 1	Approval from landholders obtained.	Budget from Action A01 and existing resources.
			Hawks Nest camp				
H01	Maintain existing buffers (1)	Noise, health/ well-being	Maintain existing managed areas including APZs (refer to **Figure 27**), road and footpath verges surrounding the camp. Maintenance works would be undertaken in Routine Works Protocol (Action A04).	High	As required	• Buffers between camp, site facilities and residences maintained. • Complaints to Council regarding flying-foxes are reduced.	Existing budget

Action ID	Management action (DPIE 2015 Action Level)	Target issue	Management action details	Priority	Timing	Performance indicators	Cost
H02	Partially/ fully subsidised property modification (1)	Noise, odour, dropping, health/well-being	Support residents with existing dwellings adjacent to the camp with property modification options, potentially including: • air conditioning • construction of carports and other covered areas affected by droppings • construct sound barrier fencing • purchase clothes dryers • install acoustic batts • insulating bedrooms • noise reducing windows (e.g. laminate or double glaze windows). Council's role would include support complying DAs, assist with sourcing funding and informing the community. This includes liaise with funding bodies in relation to grant application options. Consideration should be given to funding models similar to noise mitigation on infrastructure projects where actions are targeted at individual residences; however the entire community benefits (e.g. through not trying to shift the problem elsewhere).	High	Initial investigations: Year 1 Building works: Years 2 and 3	• Residents interested in property modifications are identified. • Potential funding sources identified and secured for implementing on-ground works. • Reduced conflicts at adjacent residential dwellings	At a minimum, Council's costs are covered under Action A01 or existing resources. Costs would increase depending on identified funding model. Estimated at $400 for low cost features (e.g. clothes dryers, excluding electricity); bedroom acoustic treatment (insulation and window treatment); $5000; to $10,000 for more complex modifications (eg. combined features of air conditioning unit, solar panels and battery system). Overall costs subject to external funding.
H03	Buffers without vegetation removal (2)	Noise, smell, health/well-being	Investigate resident interest and support interested residents install localised exclusion devices (i.e. aerial sprinklers) around dwellings where the camp is located on private property (i.e. on the corner of Flamingo Avenue, Ibis Avenue and Kingfisher Avenue). The objective is to create a localised buffer 5-10 m around target dwellings. Council's role may include: • investigating resident interest • identifying appropriate systems and protocols • BC Act licencing • applying for grant funding (if not able to be funded by residents) • coordinating the installation process.	Medium	Initial investigations: Year 1 Installation of sprinklers: Years 2 (subject to interesting, licencing and funding)	• Reduced conflicts at adjacent residential dwellings	At a minimum, Council's costs are covered under Action A01 or existing resources. Installation: Relevant residents or external funding. Ongoing: Residents paying for water usage.
H04	Improved access for flying-fox surveys (1)	Improved knowledge	Seek written approvals from private landholders to access their property for the purpose of flying-fox surveys (A11).	Medium	Years 1	Approval from landholders obtained.	Budget from Action A01 and existing resources.

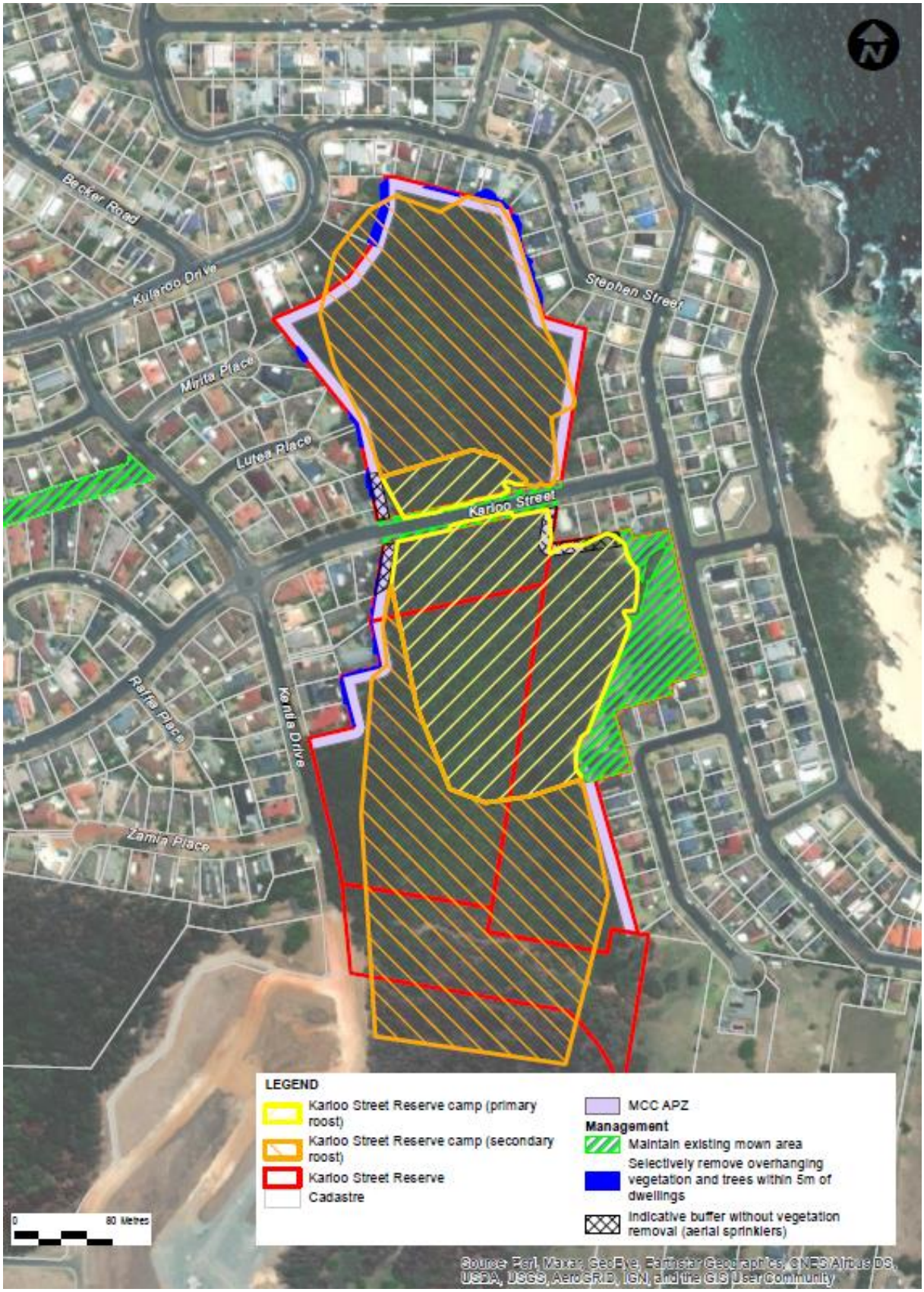


Figure 25 Karloo Street Reserve management actions

Figure 26 Cocos Crescent Reserve camp management actions

Figure 27 Pacific Palms camp management actions

Figure 28 Smiths Lake camp management actions

Figure 29 Hawks Nest camp management actions

6.5 Stop work triggers

The management program will cease and will not recommence or progress to subsequent levels without consulting the DPIE if:

- any of the animal welfare triggers occur on more than two days during the program, such as unacceptable levels of stress (see
- **Table** 12)
- there is a flying-fox injury or death
- new camp/camps appear to be establishing
- impacts are created or exacerbated at other locations
- there appears to be potential for conservation impacts (e.g. reduction in breeding success identified through independent monitoring)
- standard measures to avoid impacts (detailed in **Appendix 6**) cannot be met.

Management may also be terminated at any time if:

- unintended impacts are created for the community around the camp
- allocated resources are exhausted.

Table 12 Planned action for potential impacts during management

Welfare trigger	Signs	Action
Unacceptable levels of stress	If any individual is observed: • panting • saliva spreading • located on or within two metres of the ground.	• Works to cease for the day.
Fatigue	In-situ management • more than 30% of the camp takes flight • individuals are in flight for more than five minutes • flying-foxes appear to be leaving the camp.	• Works to cease and recommence only when flying-foxes have settled* / move to alternative locations at least 50 m from roosting animals
Injury/death	• a flying-fox appears to have been injured/killed on-site (including aborted foetuses) • loss of condition evident.	• Works to cease immediately and DPIE notified • Rescheduled • Adapted sufficiently so that significant impacts (e.g. death/injury) are highly unlikely to occur, as confirmed by an independent expert^ • Stopped indefinitely and alternative management options investigated.

Welfare trigger	Signs	Action
Reproductive condition	• females in final trimester • dependent/crèching young present	• Works to cease immediately and DPIE notified • Rescheduled • Stopped indefinitely and alternative management options investigated.

*maximum of two unsuccessful attempts to recommence work before ceasing for the day.

^a person with experience in flying-fox behaviour will monitoring for welfare triggers and direct works.

6.6 Regeneration area (Action A08): Wingham Foreshore Recreation Reserve

6.6.1 Location and setting

The Wingham Foreshore Recreation Reserve is an area consisting of three Crown Reserves located on the southern outskirts of Wingham bordering the Manning River. The Reserve is 11.46 ha in size and is bounded to the north by Farquhar Street, Wingham Brush Nature Reserve and private land holdings; to the east/south by the Manning River; and to the west by private land and the Wingham township. Land that makes up the Reserve is listed in **Table 12** and displayed in **Figure 30**.

The topography of the Reserve is generally flat to gently undulating, except for steeper gradients adjacent to the banks of the Manning River and in the north-western corner of the Reserve. Elevation ranges from 0m to 14.5m AHD (Australian Height Datum).

The Reserve is located below the 1 in 100 year average recurrence interval (ARI) flood level. The majority of the Reserve is inundated during a 5 year ARI flood event.

Most of the original native vegetation at the Reserve has been cleared in the past for agriculture. Remnant and regrowth vegetation contain attributes of the following DPIE BioNet PCTs:

- 1068 Pepperberry - Giant Stinging Tree - Fig lowland rainforest in the NSW North Coast Bioregion
- 1530 Weeping Lilly Pilly – Water Gum riparian warm temperate rainforest of the lower North Coast.
- 1106 River Oak riparian woodland of the NSW North Coast Bioregion and Northern Sydney Basin Bioregion.

PCT 1068 and 1530 are indicative of the BC Act Threatened Ecological Community (TEC): *Lowland Rainforest on Floodplain in the New South Wales North Coast Bioregion*.

The adjoining Wingham Brush Nature Reserve is a significant remnant rainforest with 10% of lowland rainforest on floodplain remaining in New South Wales.

Table 13 Planned action for potential impacts during management

Property Name	Lot	DP	Owner
Mick Tuck Riverside Reserve	7300	1120599	DPI - Crown Lands - Council Managed
Mick Tuck Riverside Reserve	7303	1149346	DPI - Crown Lands - Council Managed

Mick Tuck Riverside Reserve	7012	1118212	DPI - Crown Lands - Council Managed
Mick Tuck Riverside Reserve	26	759099	DPI - Crown Lands - Council Managed
NA	25	759099	MidCoast Council
NA	24	759099	MidCoast Council
NA	23	759099	MidCoast Council
NA	22	759099	MidCoast Council
Wingham Riverside Reserve	7304	1149521	DPI - Crown Lands - Council Managed

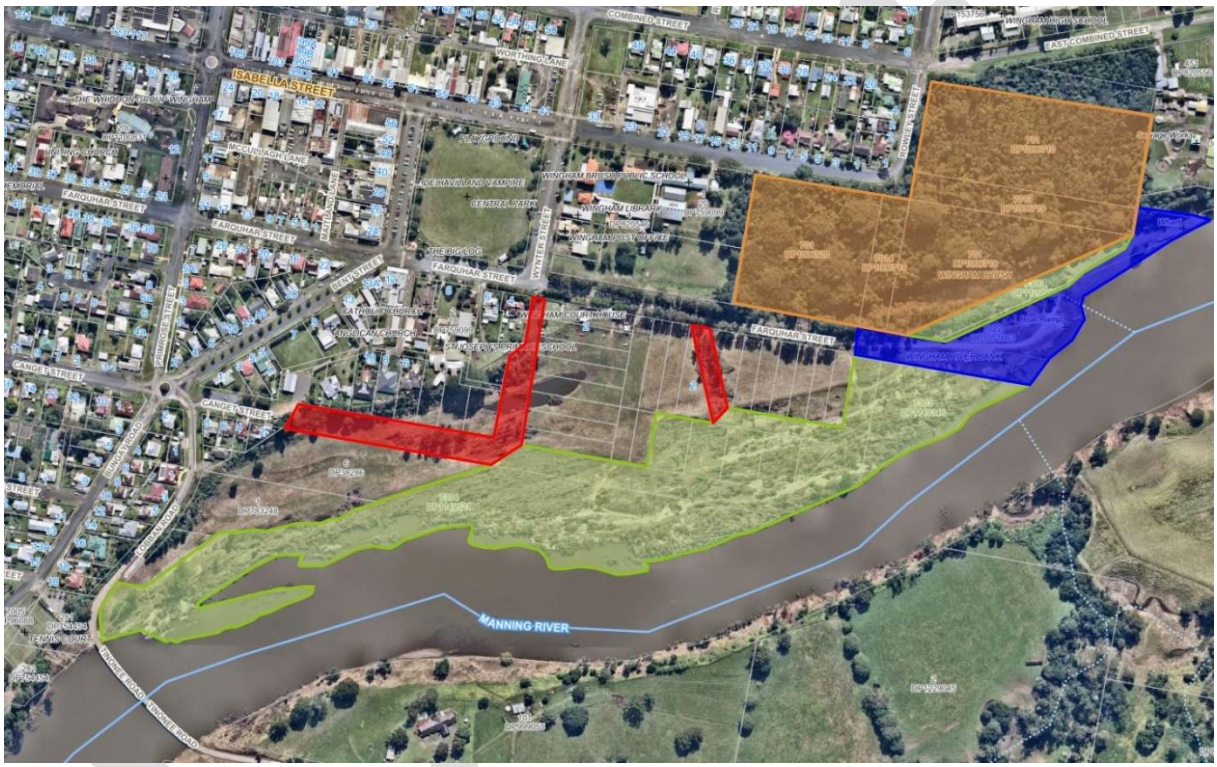


Figure 30 Wingham Foreshore Recreation Reserve

Notes:

- light green denotes area to be included in the regeneration plan
- red denotes unformed roadways
- blue denotes Council managed parkland
- orange denotes Wingham Brush Nature Reserve.

6.6.2 Flying-foxes

Wingham Brush Nature Reserve is a nationally important flying-fox camp, providing a key maternity and continuously used roost site. It is the only known continuously occupied camp for the Grey-headed Flying-fox between the Hunter Valley and Coffs Harbour. Black Flying-foxes are also known to roost at this camp.

The Wingham Foreshore Recreation Reserve has a landscape position and vegetation regeneration potential similar to that of the adjoining Wingham Brush Nature Reserve. It therefore provides an important supplementary environment to Wingham Brush.

With regeneration of the Wingham Foreshore Recreation Reserve, there is a high likelihood of Grey-headed Flying-foxes and Black Flying-foxes roosting within the Wingham Foreshore Recreation Reserve, at least as a spill-over roost. This has previously been observed in February 2021, although the roosting carrying capacity would increase with regeneration.

While Wingham Brush is not a target camp in this Plan, this regeneration work may benefit the subject camps by providing improved alternative roosting habitat that provides access to similar foraging resources in the eastern portion of the LGA (i.e. the nightly flying-fox foraging range from Wingham Brush overlaps four of the five subject camps; refer to **Figure 23**).

6.6.3 Past regeneration works

MidCoast Council began regenerating the Wingham Foreshore Recreation Reserve in 2001. In 2017 MidCoast Council received a three-year Environmental Trust Grant to regenerate lowland rainforest within the Reserve. The grant also aimed to diversify the number of plant species within the reserve to strengthen the flood tolerance of the Reserve whilst providing foraging and roosting habitat for flying-foxes.

6.6.4 Future regeneration works

The benefits of regenerating the Wingham Foreshore Recreation Reserve include:

- complementing previous vegetation regeneration works
- increasing the overall carrying capacity of the Wingham Brush camp
- providing roosting habitat away from residential areas thereby reducing conflicts between humans and flying-foxes
- reducing impacts on vegetation within Wingham Brush Nature Reserve from ongoing flying-fox roosting by providing additional roosting habitat
- regenerating lowland rainforest TEC
- increasing riverbank stability
- other riparian vegetation benefits.

Key steps to be implemented and considered as part of Action A08 prior to undertaking on-ground works include:

- investigate and secure external grant funding to complement Council contributions
- prepare a Vegetation Management Plan to guide onground works and takes into consideration current and future land uses to avoid future conflicts.

7. Assessment of impacts

7.1 Flying-fox habitat to be affected

Implementation of the management actions detailed in **Section 7** of the Plan would have the following impacts on flying-foxes or their habitat:

- Removal of known/ potential flying-fox roosting habitat on the edges of the camps at Karloo Street Reserve (Action A12 and KC01), Cocos Crescent Reserve (Action KC01), Smith Lake (Action A12) and Hawks Nest (Action A12) camps. Estimated quantities of vegetation to potentially be removed from Council land are provided in **Table 14** and **Table 15** and overlap existing approved APZs. These estimates do not include potential roosting habitat removal on private land detailed in Action A12 and permitted under the Great Lakes Development Control Plan 2014 (DCP) as the area of potential impact will be depend on resident interest and subject to DPIE BC Act licence approval.
- Loss of available roosting opportunities through roost deterrent (aerial sprinklers) at Karloo Street Reserve (Action KC04), Cocos Crescent Reserve (Action KC04), Smith Lake (Action S03) and Hawks Nest (Action H03) camps. Estimated impacted areas on Council land are provided in **Table 14**. These estimates do not include potential deterrent devices on private land for Smith Lake and Hawks Nest camps as the area impacted will be depend on resident interest and DPIE BC Act licence approval.
- Disturbance during on-ground works (mitigated through implementation of management measures provided in **Appendix 8**).

The Plan includes actions that aim to reduce long-term disturbance to roosting flying-foxes through protocols and increasing separation between flying-foxes and residents. This is considered a positive impact. Camp habitat creation (Action A08 and **Section 6.6**) is also proposed with the objective of creating flying-fox roosting habitat in a low conflict area.

Table 14 Flying-fox habitat loss/deterrent on Council land

	Karloo Street Reserve	Cocos Crescent Reserve	Total*
Available roosting habitat	18.10 ha	0.90 ha	19 ha
Habitat removal (Action KC01: Remove overhanging vegetation and trees within 5m of dwellings)	0.19 ha (1%)	0.04 ha (4%)	0.23 (1%)
Flying-fox deterrent (Action KC04: Buffer without vegetation removal (aerial sprinklers))	0.15 ha (1%)	0.20 ha (22%)	0.35 ha (2%)
Total habitat removed/deterred (Action KC01 and KC04)	0.34 ha (0.2%)	0.24 ha (0.27%)	0.58 ha (0.3%)
Remaining available habitat (post Action KC01 and KC04)	17.76 (98%)	0.66 ha (73%)	18.42 ha (0.97%)

** The total column is of particular relevance as the camps are interrelated with flying-foxes known to move between both camps.*

Table 15 Vegetation removal on Council land

PCT	TEC	Karloo Street Reserve	Cocos Crescent Reserve
751 Brush Box - Tuckeroo littoral rainforest on coastal headlands of the NSW North Coast Bioregion	Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) Littoral Rainforest and Coastal Vine Thickets of Eastern Australia Critically Endangered Community likely to occur within area Lowland Rainforest of Subtropical Australia (EPBC Act)	0.11 ha	-
1562 Tallowwood - Sydney Blue Gum shrub - grass tall open forest on ranges of lower North Coast	-	0.08 ha	-
1602 Spotted Gum - Narrow-leaved Ironbark shrub - grass open forest of the central and lower Hunter habitat	-	-	0.02 ha
1717 Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act)	-	0.02 ha
Total	-	0.19 ha	0.04 ha

7.2 Assessment of impacts to other threatened species or communities

The known or potential occurrence of other threatened species and TECs at each subject camp is discussed in **Section 5**Error! Reference source not found. and **Appendix 5**. TECs o ccur at all the subject camps and threatened flora are known at Karloo Street Reserve and Pacific Palms camps. All camps support potential habitat for a range of threatened fauna species (refer to **Appendix 5**).

The main potential impacts of the proposal on other threatened species and communities include:

- Habitat loss/ modification at all camps (except Pacific Palms). This includes removal of approximately 0.23 ha of available habitat at the Karloo Street and Cocos Crescent Reserves (refer to **Table 14**) which is within existing managed APZs.
- Potential loss/ modification of TECs at Karloo Street and Cocos Crescent Reserves (refer to **Table 15**).

- Potential direct or indirect impacts to threatened flora (e.g. trimming or removal – safeguards have been provided to minimise the risk of such impacts).
- Indirect impacts through increased edge effects and on-ground work activities (noise, human presence, etc.). Safeguards have been provided to minimise the risk and magnitude of such impacts.

The Plan includes standard safeguards for on-ground works to reduce the impacts to threatened species and TECs. It is not expected that the proposed management actions at any of the subject flying-fox camps would affect other threatened species or ecological communities such that a viable population would be placed at risk of extinction.

7.2.1 Offsets

No formal offsets are proposed as part of the implementation of the Plan. Vegetation removal on Council land is restricted to Karloo Street Reserve and Cocos Crescent Reserve within existing approved and managed APZs. Potential vegetation removal of private land is permitted under the Great Lakes Development Control Plan 2014 (DCP) (subject to DPIE BC Act licence approval).

Council has an existing bush regeneration program and schedule that applies to Council reserves and is ongoing. Camp habitat creation is proposed with the objective of creating flying-fox roosting habitat in a low conflict area adjacent to the Wingham Brush camp (Action A08; refer to **Section 6.6**). The feasibility of this would be determined as part of Plan implementation and subject to external funding.

8. Plan administration

8.1 Funding and approvals

The following key steps would be undertaken to instigate implementation of the Plan:

- Obtain MidCoast Council endorsement
- Obtain DPIE endorsement prior to undertaking any Level 2 actions
- Obtain funding through available grants
- Review council budgets and funding allocation options
- Obtain statutory approval or BC Act licence for activities:
  - On private land that are not covered by the *Flying-fox Camp Management Code of Practice 2018*.
  - On Council land that impact threatened species, ecological communities or their habitat (in addition to flying-foxes).

BC Act licence application information is provided in **Appendix 10**.

Cost estimates have been included with the management actions in **Section 6.4**. Cost structuring and sharing for the various actions would form a key component of the early phase of Plan implementation and include budget allocations over the Plan's five year life.

MidCoast Council has a responsibility to ensure appropriate funding is available to undertake management actions included in this Plan. The Plan will operate from 2021 – 2026 and therefore should ensure ongoing funding, and forward planning for management actions are included in their annual budget development.

Council will be seeking a commitment by landholders to maintain private property and assets. Applying for and securing external funding will be important to enable Plan implementation.

8.2 Evaluation and review

The Plan will have a scheduled review annually, which will include evaluation of management actions against measures shown in **Section 6**.

The following will trigger additional reviews of the Plan:

- completion of a management activity
- progression to a higher level of management (refer to **Figure 31**)
- changes to relevant policy/legislation
- new management techniques becoming available
- outcomes of research that may influence the Plan
- incidents associated with the camp.

These reviews will allow for adaptive management during Plan implementation. Results of each review will be included in reports to the DPIE (refer to **Section 8.4**).

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 resubmitted to DPIE.

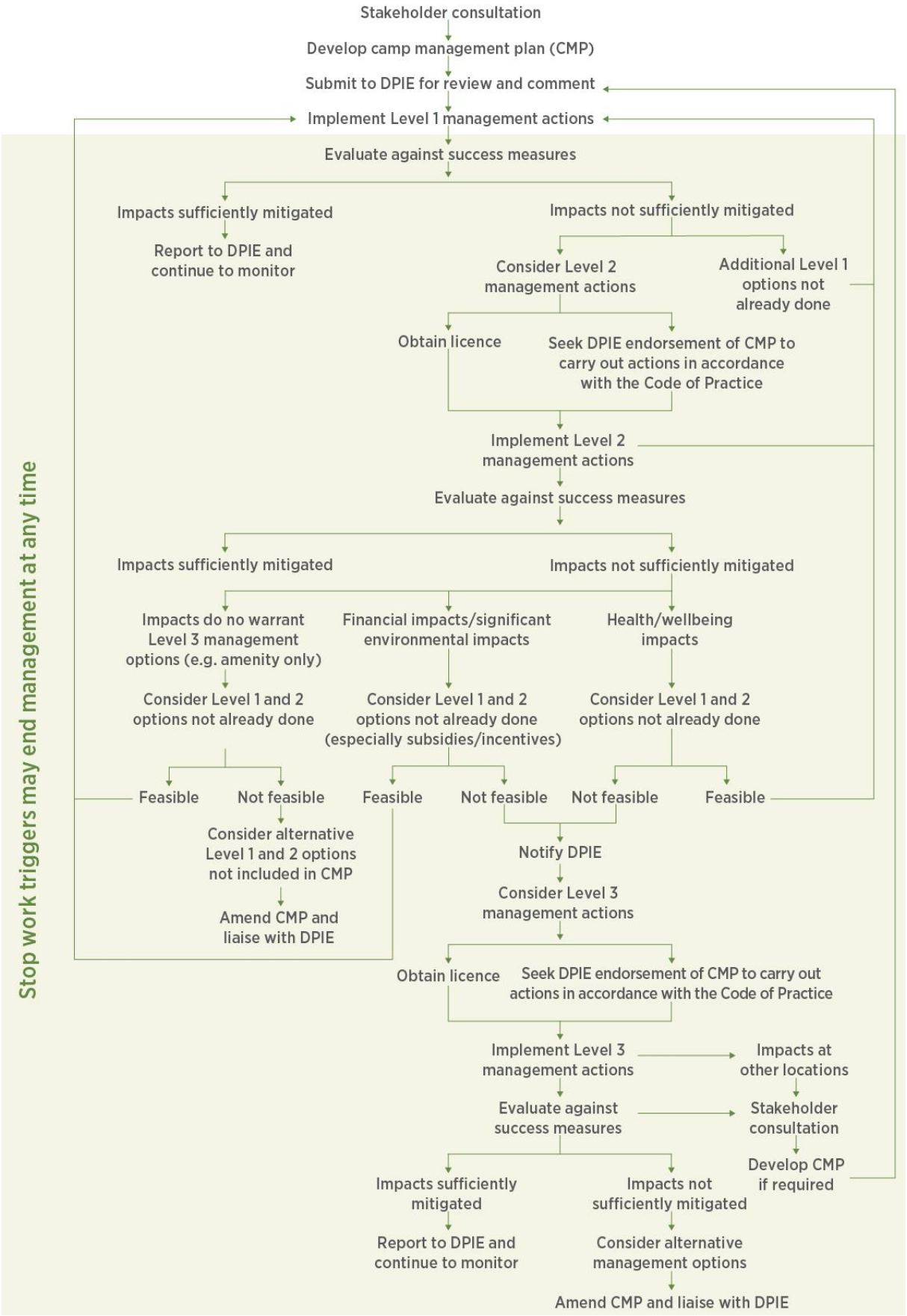


Figure 31 Process for management decision-making

8.3 Monitoring

Monitoring of each of the five subject flying-fox camps will continue to be undertaken by Council on a quarterly basis in line with the National Flying-fox Monitoring Program. New camps on Council land would also be monitored in potential conflict areas. Monitoring will continue for the life of the Plan and will include:

- area and size of the flying-fox camp
- detailed flying-fox counts including species and number present, presence of pregnant females or females with young
- maintaining detailed records of the management activities and their outcomes
- recording details of timing, costs and staff resources utilised
- keeping a register of community complaints
- surveying affected neighbours and the local community after implementation of proposed management actions in Year 5.

Monitoring at the Smiths Lake camp would include the primary and secondary roost areas and the infrequently used flying-fox camp along a gully approximately 500 m north of the Smiths Lake camp, between First Ridge Road and Second Ridge Road/Keith Crescent within the Smiths Lake village.

8.4 Reporting

Reporting would be required periodically throughout the life of the Plan including:

- Annual Council update reports, including annual reviews (refer to **Section 8.2**)
- Reporting obligations under the *Flying-fox Camp Management Code of Practice 2018*
- Reporting obligations under BC Act licence conditions
- An evaluation review at the end of 5 Year (refer to **Section 8.2**).

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Appendix 1: Flying-fox ecology and behaviour

Ecological role

Flying-foxes make a substantial contribution to ecosystem health through their ability to move seeds and pollen over long distances (Southerton et al. 2004). This directly assists gene movement in native plants, improving the reproduction, regeneration and viability of forest ecosystems (DEE 2019a). 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 kilometres in a single night with a foraging radius of up to 50 kilometres from their camp (McConkey et al. 2012) and have been recorded travelling over 500 kilometres in two days between camps (Roberts et al. 2012). In comparison bees, another important pollinator, move much shorter foraging distances of generally less than one kilometre (Zurbuchen et al. 2010).

Long-distance seed dispersal and pollination make flying-foxes critical to the long-term persistence of many plant communities (Westcott et al. 2008; McConkey et al. 2012), including eucalypt forests, rainforests, woodlands and wetlands (Roberts et al. 2006). Seeds that are able to germinate away from their parent plant have a greater chance of growing into a mature plant (DES 2018). 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 (Roxburgh et al. 2006), provide habitat for other animals and plants, stabilise river systems and catchments, add value to production of hardwood timber, honey and fruit (e.g. bananas and mangoes; Fujita 1991), and provide recreational and tourism opportunities worth millions of dollars each year (DES 2018).

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 at non-urban roosts or culling at orchards
- urban effects on local climate
- refuge from predation
- movement advantages, e.g. ease of manoeuvring in flight due to the open nature of the habitat or ease of navigation due to landmarks and lighting.

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 *Threatened Species Conservation Act 1995* (now BC 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 the national population had declined by up to 30%. It was also estimated 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, culling and other threats.

The main threat to grey-headed flying-foxes in New South Wales is clearing or modification of native vegetation. This 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, which is continuing.

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.)
- exposure to extreme natural events such as cyclones, drought and heatwaves.

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

Camp characteristics

All flying-foxes are nocturnal, typically roosting during the day in communal camps. These camps may range in number from a few to hundreds of thousands, with individual animals frequently moving between camps within their range. Typically, the abundance of resources within a 20 to 50-kilometre radius of a camp site will be a key determinant of the size of a camp (SEQ Catchments 2012). Many flying-fox camps are temporary and seasonal, tightly tied to the flowering of their preferred food trees; however, understanding the availability of feeding resources is difficult because flowering and fruiting are not reliable every year, and can vary between localities (SEQ Catchments 2012). These are important aspects of camp preference and movement between camps and have implications for long-term management strategies.

Little is known about flying-fox camp preferences; however, research indicates that apart from being in close proximity to food sources, flying-foxes choose to roost in vegetation with at least some of the following general characteristics (SEQ Catchments 2012; Eco Logical Australia 2018):

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

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

Species profiles

Black flying-fox (*Pteropus alecto*)

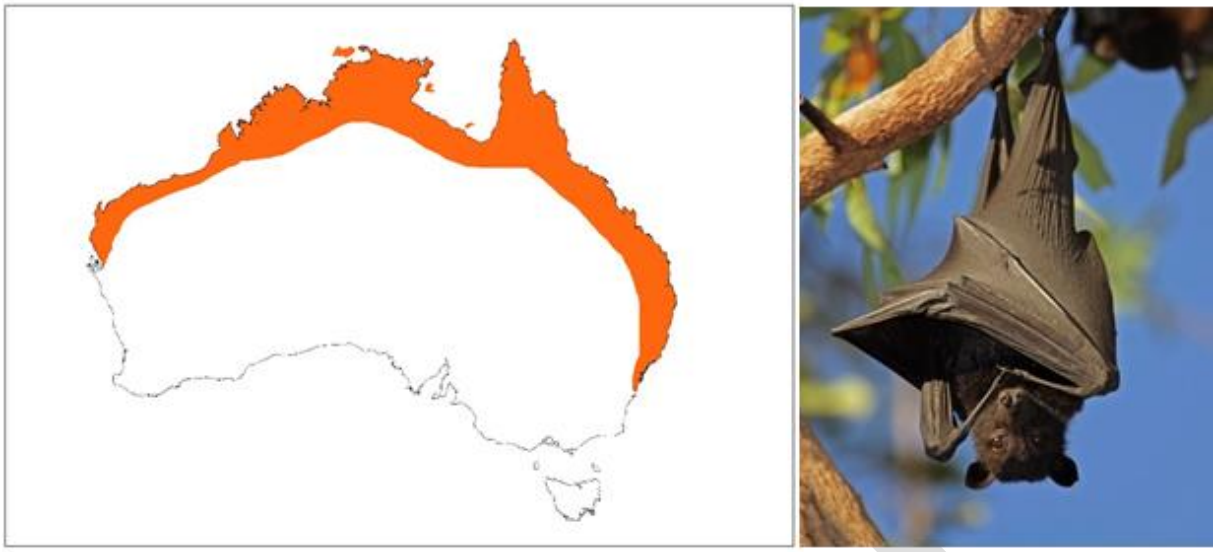

Figure 1a Black flying-fox indicative species distribution (adapted from DPIE 2019a)

The black flying-fox (BFF) (Figure 1a) has traditionally occurred throughout coastal areas from Shark Bay in Western Australia, across northern Australia, down through Queensland and into New South Wales (Churchill 2008; DPIE 2019a). Since it was first described there has been a substantial southerly shift by the BFF (Webb & Tidemann 1995).

They forage on the fruit and blossoms of native and introduced plants (Churchill 2008; DPIE 2019a), including orchard species at times.

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

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

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

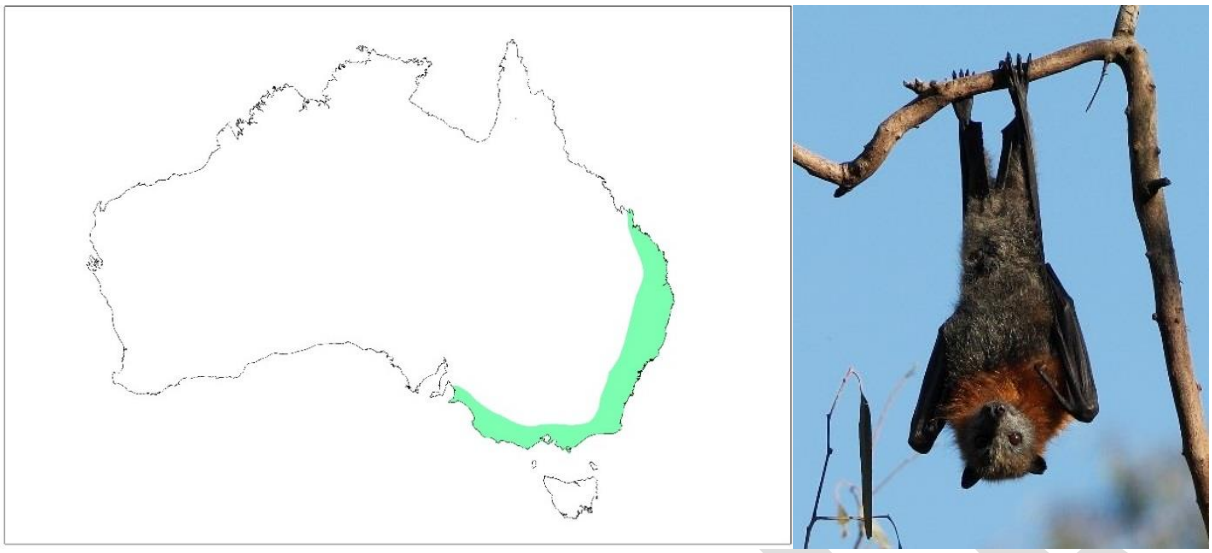

Figure 1b **Grey-headed flying-fox indicative species distribution (adapted from DPIE 2019a)**

The grey-headed flying-fox (GHFF) (Figure 1b) is found throughout eastern Australia, generally within 200 kilometres of the coast, from Finch Hatton in Queensland to Melbourne, Victoria (DPIE 2019c). This species now ranges into South Australia and individual flying-foxes have been reported on the Bass Islands and mainland Tasmania (Driessen et al. 2011). 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 feed in orchards at times, especially when other food is scarce (DPIE 2019a).

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

The GHFF population has a generally annual southerly movement in spring and summer, with their return to the coastal forests of north-east NSW and south-east Queensland in winter (Ratcliffe 1932; Eby 1991; Parry-Jones & Augee 1992; Roberts et al. 2012). This results in large fluctuations in the number of GHFF in New South Wales, 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 New South Wales (DECCW 2009).

There is evidence the GHFF population declined by up to 30% between 1989 and 2000 (Birt 2000; Richards 2000 cited in DPIE 2019a). There is a wide range of ongoing threats to the survival of the GHFF, including habitat loss and degradation, culling in orchards, conflict with humans, infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, and power line electrocution) 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).

Little red flying-fox (*Pteropus scapulatus*)

Figure 1c Little red flying-fox indicative species distribution (adapted from DPIE 2019a)

The little red flying-fox (LRFF) (**Figure 1c**) is widely distributed throughout northern and eastern Australia, with populations occurring across northern Australia and down the east coast into Victoria.

The LRFF forages almost exclusively on nectar and pollen, although it will eat fruit at times and occasionally feeds in orchards (Australian Museum 2010). LRFF often move very long distances in search of sporadic food supplies. The LRFF is the most nomadic species of flying-fox in New South Wales. They are strongly influenced by the availability of food resources, predominantly the flowering of eucalypt species (Churchill 2008). This means the duration of their stay in any one place is generally very short.

Habitat preferences of this species are quite diverse and range from semi-arid areas to tropical and temperate areas, and can include sclerophyll woodland, melaleuca swamplands, bamboo, mangroves and occasionally orchards (Eby & Roberts 2016). LRFF frequently roost with other flying-fox species. In some colonies, LRFF individuals can number many hundreds of thousands and they are unique among *Pteropus* species in their habit of clustering in dense bunches on a single branch. As a result, the weight of roosting individuals can break large branches and cause significant structural damage to roost trees, in addition to elevating soil nutrient levels through faecal material (SEQ Catchments 2012).

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

Reproduction

Black and grey-headed flying-foxes

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

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

As such, the critical reproductive period for GHFF and BFF is generally from August (when females are in their final trimester) to the end of peak conception around April. Dependent pups are usually present from September to March (see Figure 4).

Little red flying-fox

The LRFF breeds approximately six months out of phase with the other flying-foxes. Peak conception occurs around October to November, with young born between March and June (McGuckin & Blackshaw 1991; Churchill 2008) (Figure 4). Young are carried by their mother for approximately one month then left at the camp while she forages (Churchill 2008). Suckling occurs for several months while young are learning how to forage. LRFF generally birth and rear young in temperate areas (rarely in New South Wales).

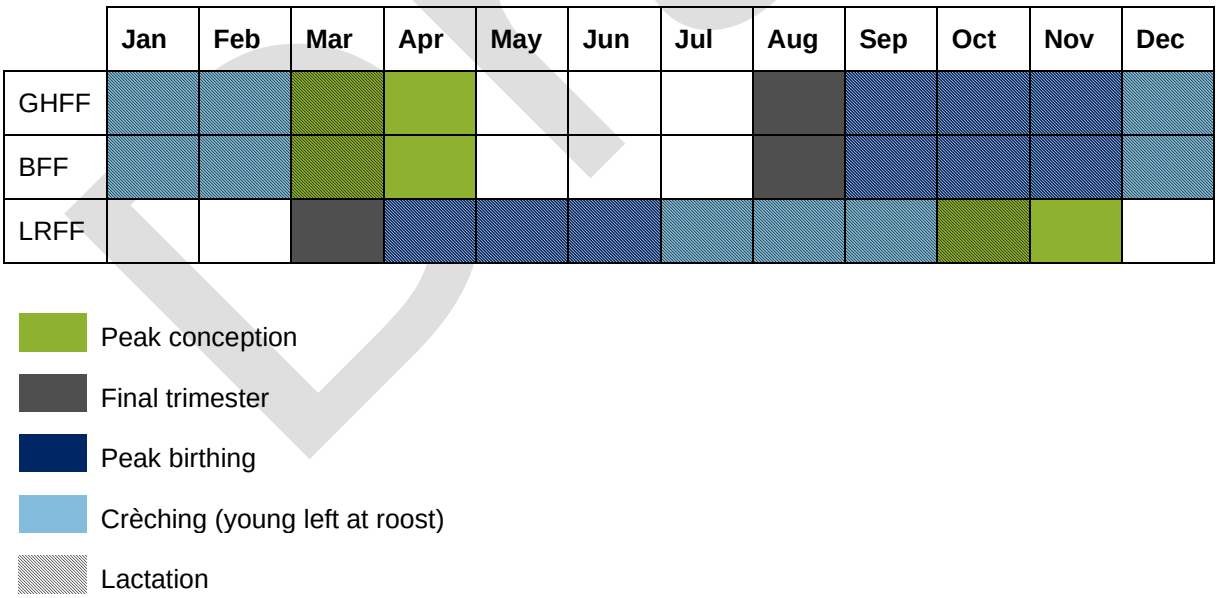

Figure 1d Indicative flying-fox reproductive cycle

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

Appendix 2: Flying-fox related health considerations

Human and animal health

Flying-foxes, like all animals, carry pathogens that may pose human health risks. Many of these are viruses that cause only minor infections with no clinical signs 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 and Menangle virus.

Flying-fox camps in public places can raise concerns for community members about possible health risks. Human infections with viruses borne by flying-foxes are very rare. There is no risk of being infected with these viruses as long as people do not come into physical contact with flying-foxes.

Outside of an occupational cohort, including wildlife carers and vets, human exposure to these viruses is extremely rare and similarly, transmission rates and incidence of human infection are very low. In addition, Hendra virus 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).

Australian bat lyssavirus

Australian Bat Lyssavirus (ABLV) is a rabies-like virus that may be found in all flying-fox species on mainland Australia. It has also been found in an insectivorous microbat and it is assumed it may be carried by any bat species. The probability of human infection with ABLV is very low with less than 1% of the flying-fox population being affected (DPI 2017) and transmission requiring direct contact with an infected animal that is secreting the virus. In Australia, three people have died from ABLV infection since the virus was identified in 1996 (NSW Health 2015).

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

Transmission of the virus from bats to humans is through a bite or scratch but may have potential to be transferred if bat saliva directly contacts the eyes, nose, mouth or broken skin. ABLV is unlikely to survive in the environment for more than a few hours, especially in dry environments that are exposed to sunlight (NSW Health 2015).

Transmission of closely related viruses suggests that contact or exposure to bat faeces, urine or blood does not pose a risk of exposure to ABLV, nor does living, playing or walking near bat roosting areas (NSW Health 2015).

The incubation period in humans is assumed similar to rabies and variable between two weeks and several years. Similarly, the disease in humans presents essentially the same clinical picture as classic rabies.

Once clinical signs have developed the infection is invariably fatal; however, infection can easily be prevented by avoiding direct contact with bats (i.e. handling).

Pre-exposure vaccination provides reliable protection from the disease for people who are likely to have direct contact with bats, and it is generally a mandatory workplace health and safety requirement that all persons working with bats receive pre-exposure vaccination and have their level of protection regularly assessed. Like classic rabies, ABLV infection in

humans also appears to be effectively treated using post-exposure vaccination and so any person who suspects they have been exposed should seek immediate medical treatment. Post-exposure vaccination is usually ineffective once clinical manifestations of the disease have commenced.

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

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

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

Hendra virus

Flying-foxes are the natural host for Hendra virus, which can be transmitted from flying-foxes to horses. Infected horses sometimes amplify the virus and can then transmit it to other horses, humans and on two occasions, dogs (DPI 2018). There is no evidence that the virus can be passed directly from flying-foxes to humans or to dogs (Halim et al. 2015). Clinical studies have shown cats, pigs, ferrets and guinea pigs can carry the infection (DPI 2018).

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

Humans may contract the disease after close contact with an infected horse. Hendra virus infection in humans presents as a serious and often fatal respiratory and/or neurological disease and there is currently no effective post-exposure treatment or vaccine available for people. The mortality rate in horses is greater than 70% (DPI 2018). Since 1994, more than 100 horses have died (Degeling et al. 2018) and four of the seven infections in humans were fatal (Goldspink et al. 2015).

Previous studies have shown that infections of horses have been associated with foraging flying-foxes rather than camp locations. Therefore, risks are considered similar at any location within the range of flying-fox species and all horse owners should be vigilant. Vaccination of horses can protect horses and subsequently humans from infection (DPI 2018), as can appropriate horse husbandry (e.g. covering food and water troughs, fencing flying-fox foraging trees in paddocks, etc.).

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

Menangle virus

Menangle virus (also known as bat paramyxovirus no. 2) was first isolated from stillborn piglets from a NSW piggery in 1997. Little is known about the epidemiology of this virus, except that it has been recorded in flying-foxes, pigs and humans (Field 2002; Kirkland 2017). The virus caused reproductive failure in pigs and severe febrile (flu-like) illness in two piggery workers employed at the same Menangle piggery where the virus (Field 2002). The virus is thought to have been transmitted to the pigs from flying-foxes via an oral–faecal matter route (Kirkland 2017). Flying-foxes had been recorded flying over the pig yards prior to the occurrence of disease symptoms. The two infected piggery workers made a full recovery, and this has been the only case of Menangle virus recorded in Australia.

Other general health considerations

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 diseases.

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.

Disease and flying-fox management

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

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

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

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

The potential to increase disease risk should be carefully considered as part of a full risk assessment when determining the appropriate level of management and the associated mitigation measures required.

Appendix 3: Community engagement

Table 1a Community engagement timeline during development of this Plan

Date	Engagement Type	Comment
1-5/02/2021	• Promotion of contact details of responsible officer • Media releases about the project (radio, print, social media) • Website pages and links • Flyers posted to landholders within 300 m of the camps.	• Approximately 1400 flyers sent to landholders within 300 m of the camps (based on known camp footprint at the time and Council records of mailing addresses). • Radio promotion/interview broadcast on ABC Mid-north Coast on 5/02/2021.
1-5/02/2021	• Telephone conversations and emails to record issues and complaints.	Targeted community groups included: • FAWNA • WINC • NSW NPWS • Pacific Palms Community Centre coordinator.
8/02/2021	• Webinar information sessions with presentations from GeoLINK and NSW Health	• There were 18 community attendees to the webinar.
9-10/02/2021	• Community information booths for 2 hours at each of the five focus camps	Approximately 74 community members attended the information booth sessions, comprising: • 20 attendees at the Cocos Crescent Reserve camp session • 25 attendees at the Karloo Street Reserve camp session • 10 attendees at the Pacific Palms camp session (approximately half were interested in the Pacific Palms camp and half were interested in the Smiths Lake camp • Seven attendees at the Smiths Lake Palms camp session • 12 attendees at the Hawks Nest camp session.
1-28 February 2021	• Flying-fox engage online survey	139 valid submissions were received, 97 (70%) of which lived within 150 m of the subject flying-fox camps as follows: • 39 at Karloo Street Reserve camp • 29 at Cocos Crescent Reserve camp • 3 at Hawks Nest camp • 12 at Smiths Lake camp • 14 at Hawks Nest camp Two respondents lived within 150 m of a non-target flying-fox camp and 43 respondents (30% of all valid respondents) did not live within 150 m of a flying-fox camp. The full survey results are provided in **Appendix 4**.

Appendix 4: Flying-fox engage survey results

Flyingfoxengage

2021

MidCoast Council Flyingfoxengage Online Community Consultation Report

Document Control

Project Title	MidCoast Council Flyingfoxengage Online Community Consultation Report
Synopsis	This report summarises community submissions collected through Flyingfoxengage- an online engagement decision support system for the MidCoast Council flying-fox camp management plan. This document does not summarise nor represent submissions submitted to MidCoast Council through other formats i.e: written letters.
Prepared for	MidCoast Council
Prepared by	Raymond Laine Director, Ozengage Pty Ltd  5 April 2021

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1. Overview

Flyingfoxengage- an engagement decision support system was utilised by MidCoast Council as an innovative consultation method for the Council wide flying-fox camp management plan. The online Flyingfoxengage consultation tool was launched on the 1st of February 2021 with the website www.flyingfoxengage.com/midcoast remaining open for submissions until March 12th 2021. During this consultation period, the Flyingfoxengage website received 139 valid submissions. Based on these submissions, subsidising property modification to reduce flying-fox impacts was cumulatively ranked by users as their most preferred management option followed by flying-fox education and awareness programs.

2. Introduction

The premise behind Flyingfoxengage is to provide a mechanism for stakeholders (community members, councillors, developers, planners, engineers etc.) to learn about, rank and make informed decisions about management options for the flying-fox camp across Byron. Flyingfoxengage is a 4 step web-based decision support system that operates by:

1) The experts in the field produce a list of options that may be suitable for the flying fox camp across MidCoast Council (Figure 1).

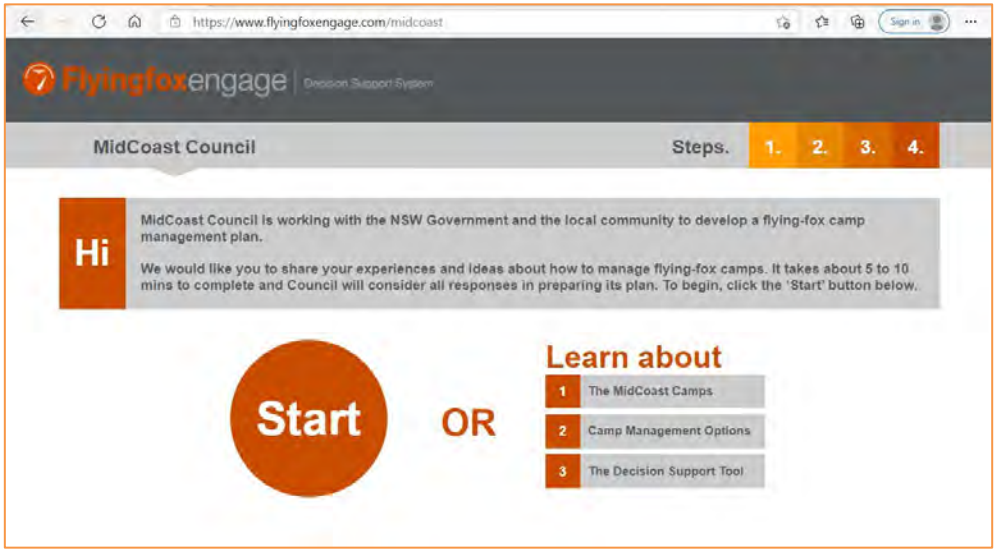


Fig 1: Flyingfoxengage welcome screen and management option information portal.

2) The NSW Department of Planning, Industry and Environment with input from local experts, Council and consultants assign justifiable and consistent scores to the flying-fox management options for social, health, effectiveness/efficiency, environmental/ecological, and economic criterion and enters it into a matrix.

3) The stakeholder assigns an importance weighting from 'not important at all' to 'extremely important' for each of the 12 criterion asked (Step 1)(Figure 2).

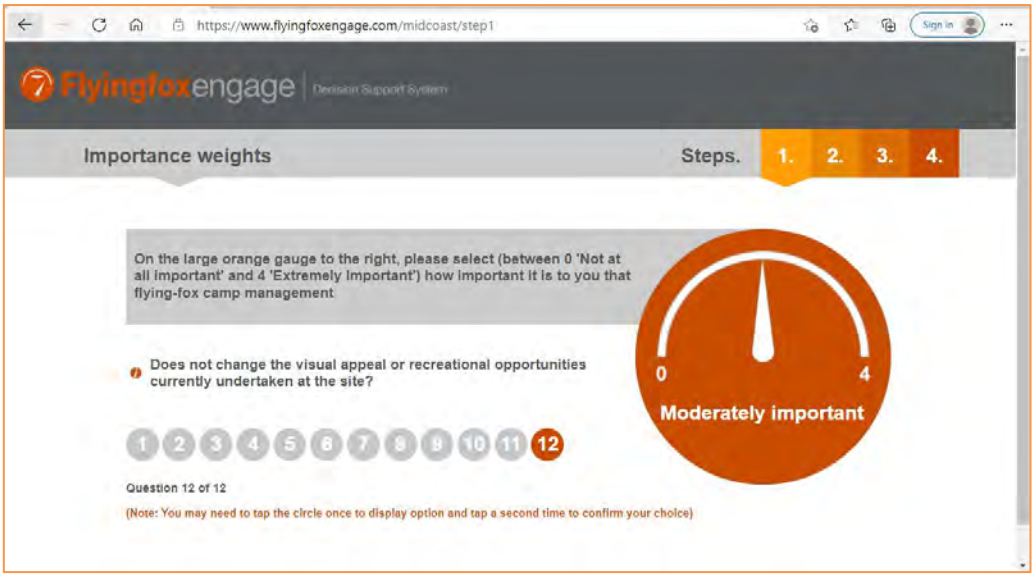


Fig 2: Flyingfoxengage step 1- stakeholder importance weighting for criterion.

4) This stakeholder data is then aggregated and inputted, combining the weights and scores for each option in the matrix to derive equitably ranked preferences. (Step 2)(Figure 3). It is hoped that the stakeholder investigates why certain options are preferenced and learns about the management options specific advantages/ disadvantages, the governing process and the constraints.

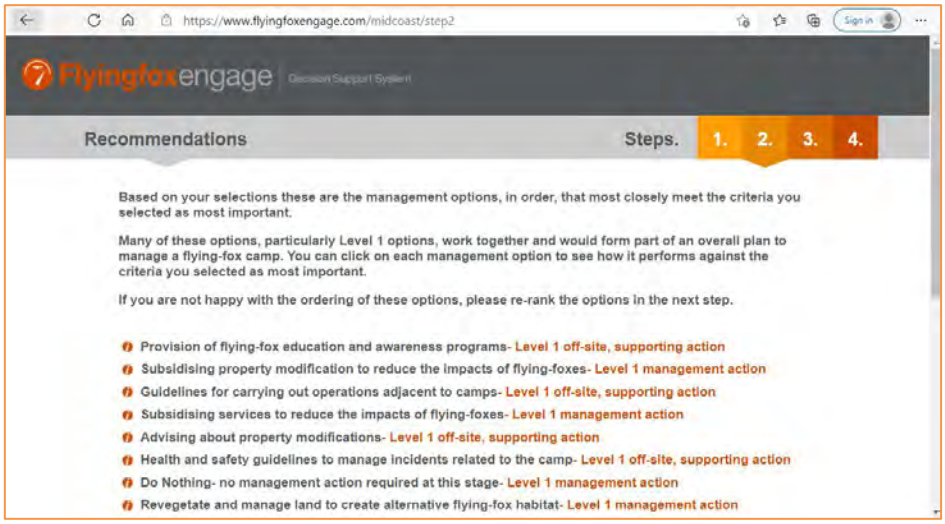


Fig 3: Flyingfoxengage step 2- Flying-fox camp management option recommendations.

5) The stakeholder can then re-rank the options (hopefully informed about the options advantages and disadvantages) in Step 3 (figure 4).

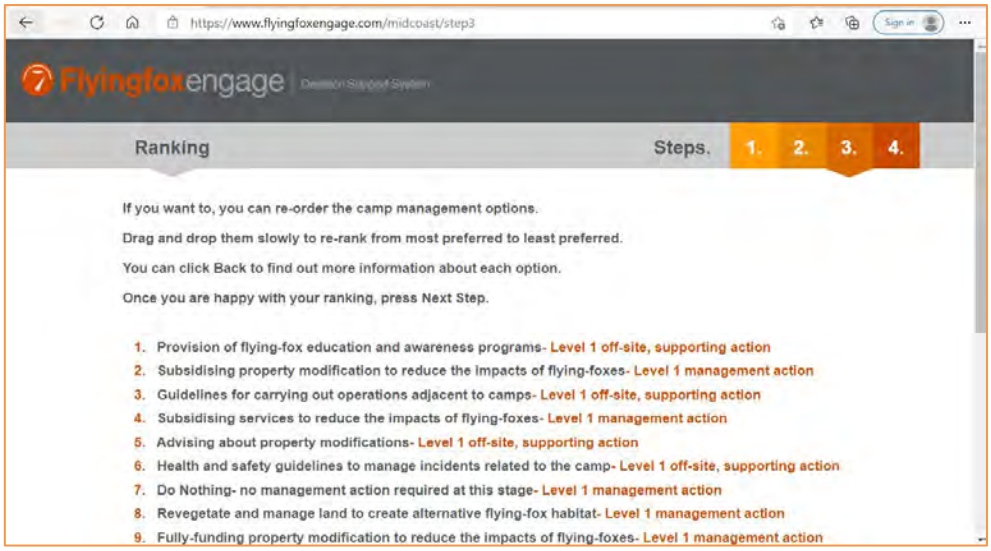


Fig 4: Flyingfoxengage step 3- option re-ranking opportunity.

6) The stakeholder is then given the opportunity to provide feedback or list other options that might have been missed, provide survey answers and press submit (figure 5).

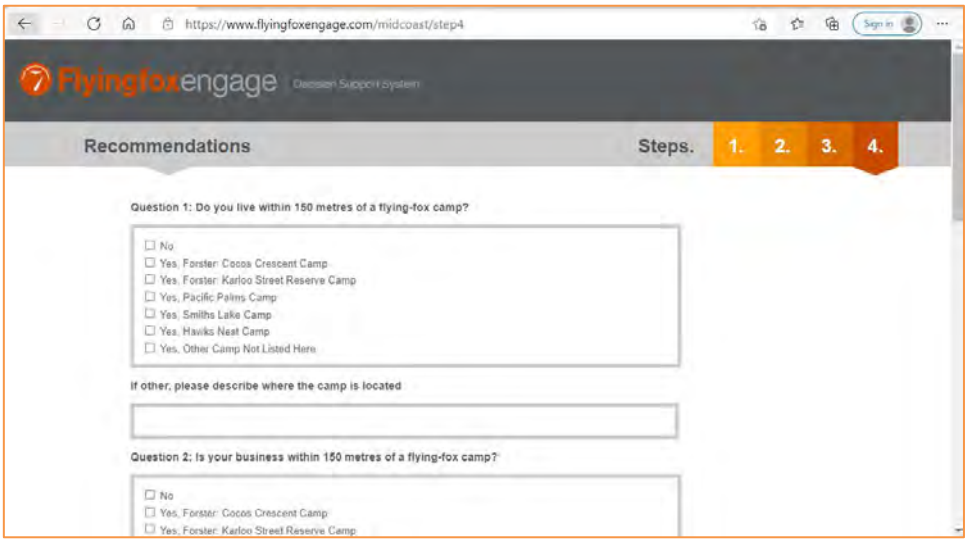


Fig 5: Flyingfoxengage step 4- feedback and comments page.

3. Media Release and Launch

MidCoast Council undertook consultation promotion of the Flyingfoxengage platform through a variety of means including print, online media coverage (figure 6), radio (ABC Radio 5/2/2021 with Cameron Marshall – Flying-foxes and how to get involved), community consultation sessions (online zoom meeting 8/2/2021 and pop-up sessions on-site at each camp) and advertisement on the Councils website (figure 7). The Flyingfoxengage platform for MidCoast Council was launched on the 1st of February 2021 with access available to users via www.flyingfoxengage.com/midcoast.

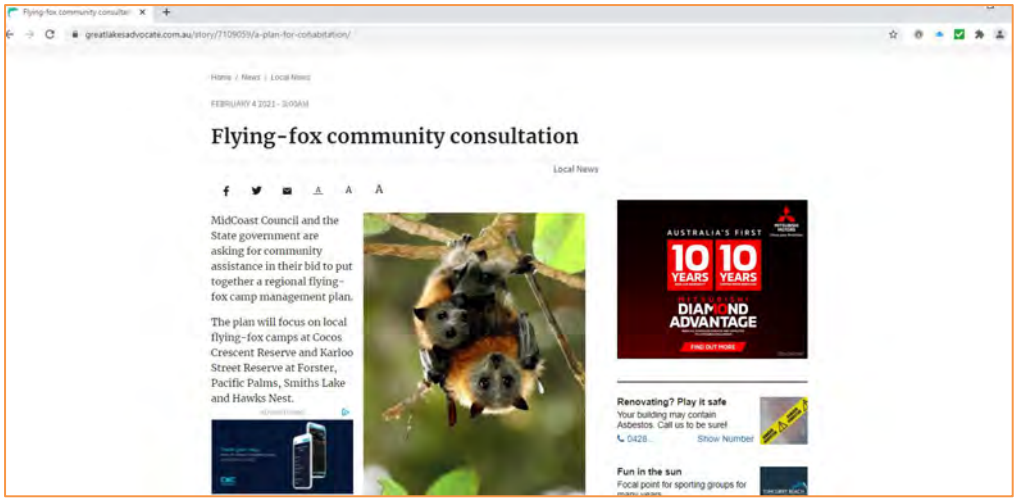


Fig 6: Online media coverage example- Great Lakes Advocate 2.2.2021

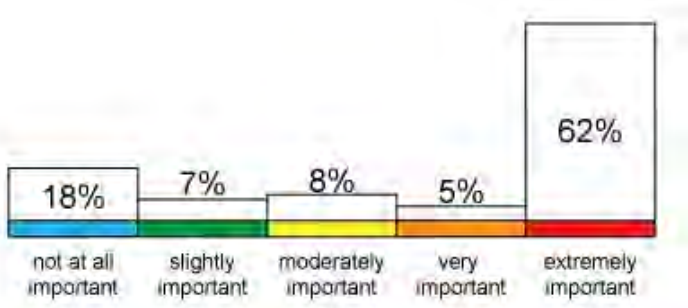
Fig 7: MidCoast Council website

4. Submission Summary

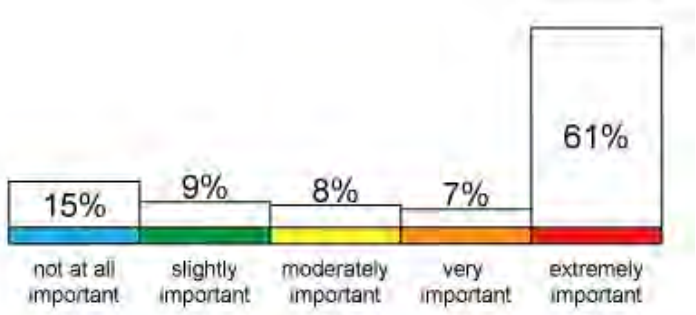
The results of the online Flyingfoxengage submissions received are as follows:

Step 1: Respondents importance weights for the 12 criterion.

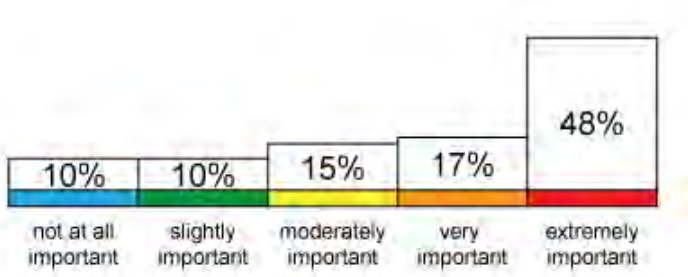
Question 1- How important is it to you that the flying-fox camp management option reduces the impact of noise and odour from flying-foxes roosting at the camp on nearby residents?: 62% of respondents believed it was extremely important that flying-fox camp management options reduce the noise and odour impacting nearby residents. 18% believed it was not important at all with the remaining responses documented below.



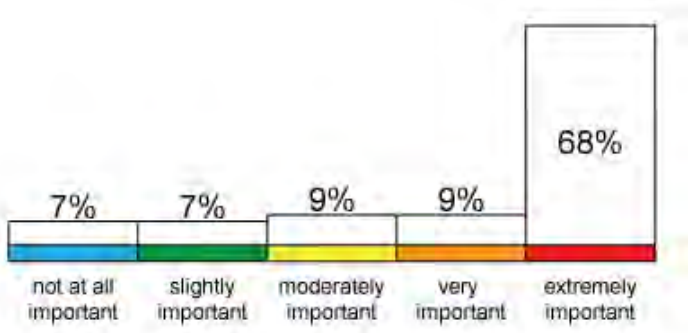
Question 2- How important is it to you that the flying-fox camp management option reduces the impact of the flying-fox excrement on the property of nearby residents?: 61% of respondents believed it was extremely important that flying-fox camp management options reduce the impact of the excrement on the property of nearby residents from flying-foxes leaving and returning to the camp, with the remaining responses documented below.



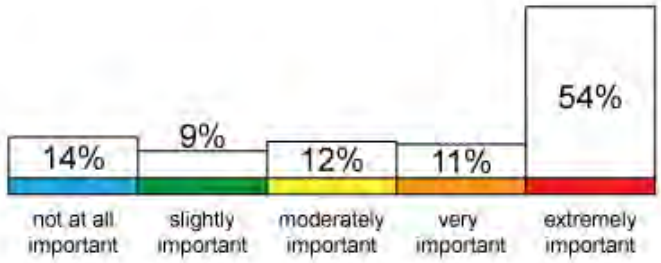
Question 3- How important is it to you that the flying-fox camp management option does not move the flying-fox camp to other areas that may also be near residents or businesses?: 48% of respondents believed it was extremely important that flying-fox camp management options do not move the flying-fox camp to sites near other residents or businesses. 17% believed it was very important with the remaining responses documented below.



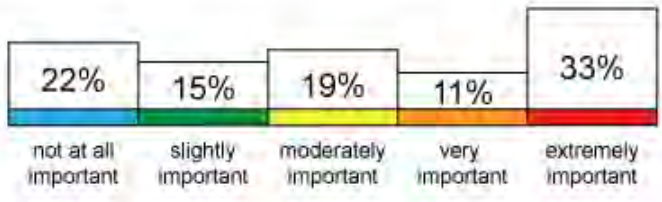
Question 4- How important is it to you that the flying-fox camp management option ensures the risk of disease transmission remains low?: 68% of respondents believed it was extremely important that flying-fox camp management options ensure the risk of transmission of diseases associated with flying-foxes stays low, with the remaining responses documented below.



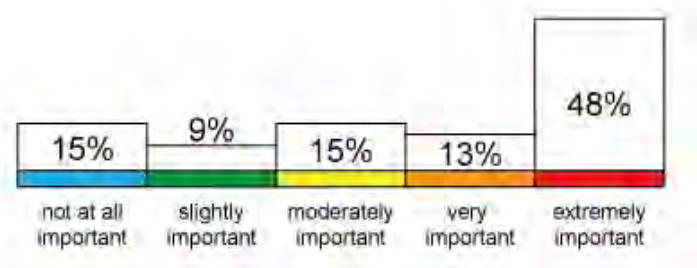
Question 5- How important is it to you that the flying-fox camp management option has a low financial cost to residents living near the flying-fox camp?: 54% of respondents believed it was extremely important that flying-fox camp management options have a low financial cost to residents living near the flying-fox camp. 14% believed it was not at all important with the remaining responses documented below.



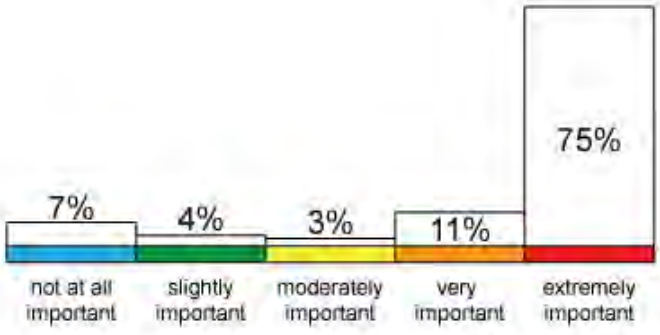
Question 6- How important is it to you that the flying-fox camp management option has a low financial cost to Council ratepayers?: 33% of respondents believed it was extremely important that flying-fox camp management options have a low financial cost to Council ratepayers, with the remaining responses documented below.



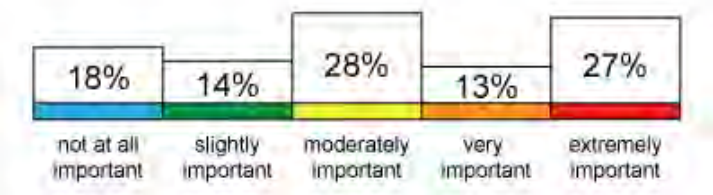
Question 7- How important is it to you that the flying-fox camp management option can be implemented quickly?: 48% of respondents believed it was extremely important that flying-fox camp management options can be implemented quickly, with the remaining responses documented below.



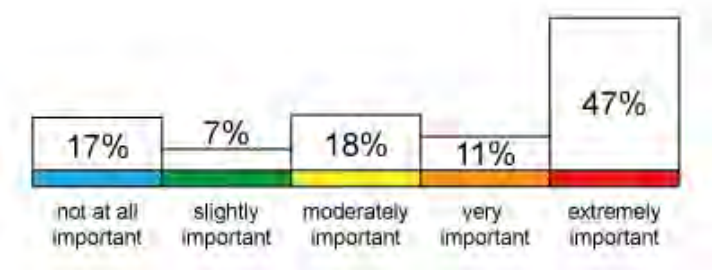
Question 8- How important is it to you that the flying-fox camp management option provides a long term solution?: 75% of respondents believed it was extremely important that flying-fox camp management options provide a long term solution. 11% believed it was very important with the remaining responses documented below.



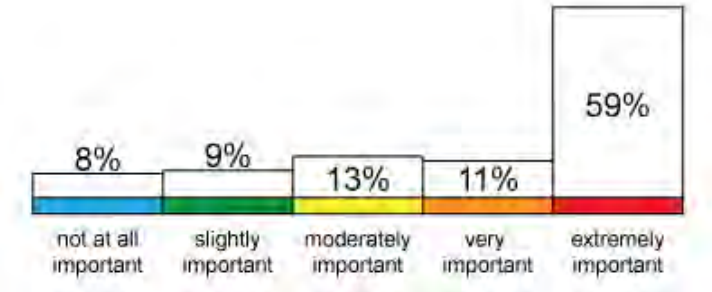
Question 9- How important is it to you that the flying-fox camp management option does not disrupt residents and businesses during implementation?: 28% of respondents believed it was moderately important that flying-fox camp management options do not disrupt residents and businesses during implementation. 27% believed it was extremely important with the remaining responses documented below.



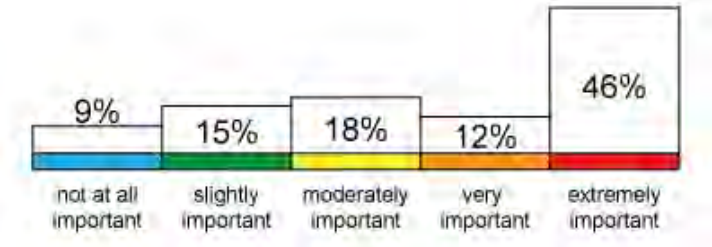
Question 10- How important is it to you that the flying-fox camp management option does not harm the flying-foxes?: 47% of respondents believed it was extremely important that flying-fox camp management options do not harm the flying-foxes, with the remaining responses documented below.



Question 11- How important is it to you that the flying-fox camp management option does not degrade the natural or ecological values of the site?: 59% of respondents believed it was extremely important that flying-fox camp management options do not degrade the natural or ecological values of the site, with the remaining responses documented below.



Question 12- 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?: 46% of respondents believed it was extremely important that flying-fox camp management options do not have a negative impact on how the site looks or the recreational opportunities at the site, with the remaining responses documented below.



Step 2: Recommended options.

As a result of the aggregated respondents importance weights and expert assigned option scores, the flying-fox camp management options for MidCoast camps subsequently ranked:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Guidelines for carrying out operations adjacent to camps
4. Advising about property modifications
5. Subsidising services to reduce the impacts of flying-foxes
6. Health and safety guidelines to manage incidents related to the camp
7. Do Nothing- no management action required at this stage
8. Revegetate and manage land to create alternative flying-fox habitat
9. Fully-funding property modification to reduce the impacts of flying-foxes
10. Routine maintenance to improve the condition of the site
11. Artificial roosting habitat
12. Trimming vegetation at the camp boundary to create a small buffer
13. Land-use planning
14. Revegetating areas with plants that are unsuitable as roost habitat
15. Installation of noise attenuation fencing
16. Early dispersal before a camp is established at a new location
17. Passive dispersal of a flying-fox camp through selective vegetation removal
18. Active dispersal of a flying-fox camp using disturbance
19. Removing vegetation to create a substantial buffer
20. Actively nudging the camp to a nearby location using disturbance
21. Culling flying-foxes– apply for licence from State Government

Step 3: Re-ranking

Respondents were given the opportunity to re-rank the flying-fox camp management options. The results of these cumulative rankings in order were:

1. Subsidising property modification to reduce the impacts of flying-foxes
2. Provision of flying-fox education and awareness programs
3. Guidelines for carrying out operations adjacent to camps
4. Subsidising services to reduce the impacts of flying-foxes
5. Health and safety guidelines to manage incidents related to the camp
6. Revegetate and manage land to create alternative flying-fox habitat
7. Advising about property modifications
8. Fully-funding property modification to reduce the impacts of flying-foxes
9. Routine maintenance to improve the condition of the site
10. Do Nothing- no management action required at this stage
11. Artificial roosting habitat
12. Trimming vegetation at the camp boundary to create a small buffer
13. Revegetating areas with plants that are unsuitable as roost habitat
14. Land-use planning
15. Early dispersal before a camp is established at a new location
16. Passive dispersal of a flying-fox camp through selective vegetation removal
17. Installation of noise attenuation fencing

18. Active dispersal of a flying-fox camp using disturbance
19. Removing vegetation to create a substantial buffer
20. Actively nudging the camp to a nearby location using disturbance
21. Culling flying-foxes– apply for licence from State Government

Re-ranking based on the top 5 preferences

To provide a more narrow insight into the preferences of respondents compared to step 3 above, a cumulative ranking was completed based on how respondents ranked their top 5 options. This entailed summing the total number of times a respondent placed X camp management option as X preference (from 1 to 5). This total was then multiplied by the preference score (5 to 1) and aggregated. For example in practice, to find the top 5 preferred options, the most preferred option is given 5 points, which is then multiplied by the number of users ranking it as their first option, followed by the second preferred option which is given 4 points multiplied by the number of users ranking it as their second option etc….This total is then summed together and the following ranking list created.

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Culling flying-foxes– apply for licence from State Government
4. Active dispersal of a flying-fox camp using disturbance
5. Do Nothing- no management action required at this stage

These rankings broken down per number of respondents are:

Provision of flying-fox education and awareness programs was the most preferred flying-fox camp management measure with 72 respondents (52%) ranking it as their 1st preference. Subsidising property modification to reduce the impacts of flying-foxes performed respondents 2nd most preferred option with 43 respondents (31%).

Please note: As a result of calculating the data in this narrow way, some management options such as ‘Culling flying-foxes’ for example appear in the Top 5 preferences when compared to the Step 3 list which is based on the cumulative totals of all 21 options. This occurs as 13 respondents ranked ‘Culling flying-foxes’ as their most preferred option. However, the majority of respondents 101 or 73% placed it as their least preferred option which is not considered in the above rankings, hence the difference in ordering.

Re-ranking based on the bottom 5 preferences

Similar to the above, a more narrow insight was conducted based solely on the bottom 5 preferences of users. This process entailed summing the total number of times a respondent placed X camp management option as X preference (from 21 to 17). This total was then multiplied by the preference score (5 to 1) and aggregated. For example in practice, to find the bottom 5 preferred options, the least preferred option is given 5 points, which is then multiplied by the number of users ranking it as their last (21st) option, followed by the second least preferred option which is given 4 points multiplied by the number of users ranking it as their 20th option etc….This total is then summed together and the following rank list created:

1. Culling flying-foxes– apply for licence from State Government
2. Actively nudging the camp to a nearby location using disturbance

3. Do Nothing- no management action required at this stage
4. Active dispersal of a flying-fox camp using disturbance
5. Removing vegetation to create a substantial buffer

These rankings broken down per number of respondents are:

Culling flying-foxes to reduce numbers was the least preferred flying-fox camp management measure with 101 respondents (73%) ranking it as their last (21st) preference. 68 respondents (49%) also ranked Actively nudging the camp to a nearby location using disturbance as their last (20th) preference.

As can be seen, options such as 'Culling flying-foxes' and 'Do Nothing- no management action required at this stage' were polarising as these options appear in both the Top 5 and Bottom 5 lists using the above methodology. This occurs as detailed previously for example, 'Culling' ranks within the top 5 preferred management options for 13 respondents but also ranks in their bottom 5 preferences for the vast majority. This also occurs with 'Do Nothing- no management action required at this stage' management options although to a lesser extent than the 'Culling' management option.

Step 4: Feedback and Comments Page

Answers provided to Question 1: Do you live within 150 metres of a flying-fox camp?

No	43 respondents
Yes, Forster: Karloo Street Reserve Camp	39 respondents
Yes, Forster: Cocos Crescent Camp	29 respondents
Yes, Hawks Nest Camp	14 respondents
Yes, Smiths Lake Camp	12 respondents
Yes, Pacific Palms Camp	3 respondents
Yes, Other Camp Not Listed Here	2 respondents

If other, please describe where the camp is located

- Sometimes Stephen St Reserve.
- Myall st
- A bit further from the hawks nest camp I think 300m

Answers provided to Question 2: Is your business within 150 metres of a flying-fox camp?

No	116 respondents
Yes, Forster: Karloo Street Reserve Camp	5 respondents
Yes, Forster: Cocos Crescent Camp	5 respondents
Yes, Hawks Nest Camp	3 respondents
Yes, Smiths Lake Camp	4 respondents
Yes, Pacific Palms Camp	1 respondents
Yes, Other Camp Not Listed Here	2 respondents

If other, please describe where the camp is located

- Wingham brush and Coocumbac Island
- Tocal

Answers provided to Question 3: What experiences have you had from a flying fox camp?

Flying foxes from the camp roost in trees that are next to or overhang my home	38 respondents
My home is very close to the camp	69 respondents
Flying foxes leaving and returning to the camp fly over my home or business	111 respondents
Flying foxes stop me from using the area, or surrounding services	38 respondents
I enjoy visiting the flying foxes	28 respondents
The flying foxes are not causing me any issues	35 respondents

Answers provided to What camp was this experience at? do you any further experience comments (positive or negative) are:

Residents that live within 150 metres of the Karloo Street Reserve flying-fox camp:

- Besides the fact that I enjoy the flying foxes, this is important habitat for them. If you choose to live next to a sanctuary you need to take on the positive and negative consequences. They should not be moved.
- We cannot have dinner outside as the bats fly over our house and drop their matter everywhere. We had a water tank put in years ago but the bats drop their matter all over the roof so the water can only be used on the plants now.
- I constantly have to hose the back verandah on a daily basis to clear up their mess.
- We cannot have the bedroom door open to let in a breeze at night due to the smell.
- When it rains (which is a lot lately) the stench is overpowering."
- Sometimes the smell is overpowering.
- We were told by a council rep 2 years ago something would be done, even if only trimming back large branches to discourage them hanging over homes, rooftop etc. Still nothing and the stench when it rains is terrible.
- Odour from the camp is noticeable most days during summer and autumn and noise can also be heard early morning as they return to roost.
- Bats are full of diseases and should not be living in close proximity to our homes
- The camps have been around my house for the last 8 years. This is unacceptable. I cannot sleep. I cannot sit ouside because of the noise and smell. I cannot walk around my neighbourhood in the morning or evening because of the shit that these creatures drop. This council has let this problem go on for far too long. There are now hundreds of thousands of these flying rats around the area. Look up at dusk over Forster and Tuncurry (if you can without being shat on) and the sky is black with these pests.
- The strong odour of the flying foxes and the faecal dropped onto my property.
- Negative, very noisy
- Adjacent to the back of my property which is in Burrawan Street.
- Karloo St. Other issues smell particularly after rain, noise particularly early morning around 2-3am, excrement, dead bats, around edge of bush area
- Karloo Street Reserve. We constantly have to clean faeces from paths, decks, solar panels roof and driveway. We cannot leave washing out overnight or any equipment eg chairs etc. The smell is horrendous particularly after rain. We worry about the camp as a health hazard. House prices are compromised in this area known as "Bat Alley"
- I love watching them fly at sunset
- These mammals are the pests of the sky. Know they are necessary for pollination but when the roosts have increased many folds due to housing developments in the areas where they used to roost, this is not acceptable

Residents that live within 150 metres of the Cocos Crescent flying-fox camp:

- Clean reserve and water way
- Smell is atrocious , noise is loud , excrement, had a bat on my patio early hours of the morning

- My quality of life has been severely diminished. Constant noise day and night has an almost intolerable impact. There are some days when I would just love to go outside and screech back at the flying foxes, the noise is just so annoying and frustrating. I have difficulty sleeping, I am woken by incessant screeching at 4.30 or 5.00 am every morning. I have tried closing windows and using ear plugs, neither are pleasant, particularly closing windows. I don't particularly like air conditioning, nor would I like to pay the cost of running one. I have lived in this house for almost 30 years, it was always a lovely pleasant quiet street until about 3 years ago. I can assure you I have considered selling and relocating. I don't wish the flying foxes any harm, I just wish they were somewhere else. Surely there are plenty of other locations away from residential areas that would be suitable for them.
- Flying fox was found nesting in a bag hanging up under pergola, I put my hand in the bag not knowing the flying fox was there and I accidentally touched the flying fox and it scratched me. Can't leave washing out due to flying fox faeces. Can't go walking out of the house when the foxes are flying around. The smell from the bats can get so bad we have to close windows and doors.
- Their flight path varies, however when they do fly over our home the mess on the pavers, driveway and metal roof is extremely messy, hard to clean off and damages paint work on the roof and vehicles.
- The smell is atrocious and the noise deafening at times.
- Terrible smells especially when it rains. Too loud at times to keep windows open. Dropping of excrement on their flight path. Concern over health for children (through carrying of Lyssavirus - according to NSW Health). Excessive noise which must exceed EPA noise requirements at times. Odours which mean windows and doors to be shut. Concern over potential virus spread - unless Midcoast Council would like to guarantee in writing that there are zero chance of virus exposure in the future?) The droppings from them are all over our back yard and therefore my kids play equipment. We've had a dead bat in our yard and we were worried about our dogs interest in it. The smell has made us go inside a lot and close the windows, the rain makes it worse, it's unbearable. Loud noise which may be damaging to children's ears. Foul odours which make it impossible for outdoor play some days. Droppings in children's play equipment. Fear of spread of disease including viruses (have you heard of bats starting a global pandemic anytime lately!) Too loud. Too smelly. Have lived here for over a decade and no camp was here. Now they are here it has to have an effect on home and land valuations in the market. Move them away from residential areas or cull them. Unrelenting smell in wet weather. Loud noises at times. Concern about chance of infection from excrement landing in our property and from visiting fruit trees. I don't see why the habitats can't be created in National Parks and away from urban areas if they are so important for the ecosystem. We have lived here for over a decade and there were no flying fox camps at our location until the last 2 years. They need to be dispersed to non-residential area such as National Parks, or next to Councillor's houses (as I'm sure they would appreciate the loud noises, pungent odours and droppings over their houses). Not every patch of reserve in a town environment is suitable for every animal. Why not invite in some cane toads and dung beetles while you're promoting ecological diversity? The flying foxes are vile creatures that seriously need addressing in a permanent manner or removal. We

have bat droppings all over our yard and the smell is disgraceful. I can even smell them inside my house with all the doors and windows closed when it's been raining.

- Noise and odour are excessive and persistent. This has an impact on residents standard of living and comfort. It also has the potential to have a negative effect on house saleability and resale price.
- Loud noises and filthy smell causing me to have to close up windows in my home - These foxes do not migrate at night like others
- Cocos crescent, since the camp started in 2018 after undergrowth in the Karloo camp was carried out we have had issues with noise, bad smell especially after rain and droppings on our property and in our pool. This cannot be healthy. I also worry about pets in this area and have seen a few dead bats on the ground which I have had to put in the bin as dogs or cats may eat them. We have lived in this street for 30 years and our children played in this reserve but I would be scared to see kids in there now. The reserve has never been well maintained the council has always relied on residents but my husband was asked to stop moving as it disturbed the bats.

Residents that live within 150 metres of the Cocos Crescent and Karloo Street flying-fox camps:

- As they fly over home their droppings fall over our house and surrounding areas.
- They love living in the areas of Karloo street and Coco Cres. I live in between both reserves and the Bats don’t worry me at all. Someone shooting at them concerns more than anything. It is dangerous and disturbs the bats environment and sleeping patterns as they are nocturnal and they are flying around stressed when this person is shooting at them in daylight. I don’t want these Bats harmed at all or moved from my area.
- Noisy and shit everywhere. I’m worried about all the diseases they carry
- Urination, defecation and noise are ongoing problems as the bats stopover in trees on our property on their way back to camp.
- Our direct walking path to Burgess Beach takes us through the Karloo St camp or ‘bat alley’! When the vegetation is too close or overhanging the grass sidewalk and road, we are forced to walk in the centre of the road to avoid being urinated or defecated on by the bats. And the smell is horrific!

Residents that live within 150 metres of the Smiths Lake flying-fox camp:

- I used to enjoy the rainforest the destruction of the natural habitat is my concern collapse canopy
- Located directly behind my home.
- Right outside our kitchen window, never an issue. Loved them.

Residents that live within 150 metres of the Hawks Nest flying-fox camp:

- Next door neighbour Lilly pilly tree bringing them in, cars have to garaged, solar panels on caravan needs cleaning, disturbed sleep, smell at night is unbearable at night,
- Hawks Nest reserve near the Singing Bridge and going over to Albatross and Monterra Avenue. Smell makes our family feel
- Bat poo over our bbq and bbq area at house.

- Despite the smell (and noise which I quite like) there is no problem for me - I am happy for the flying foxes to use our gum trees as a food source; i also realise that the existence of the camp is only a temporary situation whereby the bats move on as gums finish flowering - this year 2021 there were far fewer flying foxes than in 2020 and they stayed for a much shorter period; I feel that there should be much more education and networking with the local community so that flying foxes are welcomed into the area each year
- There are days when we are unable to sit in our back room as the smell is so strong it makes our eyes water. On some occasions the smell is evident even inside closed doors. Our cars are covered in excrement daily.
- Every morning they are here I need to wash down our driveway and all outdoor areas before use

Residents that live within 150 metres of the Pacific Palms flying-fox camp:

- These experiences have happened at all of the listed camps. Flying foxes have only had a positive impact on my life.

All other responses:

- Forster. Every time I get visitors I take them sight seeing, and the Flying Fox camp is the most popular.
- WINGHAM
- My camp is hawks nest. The flying foxes go over my house. I hear them in the night in my trees eating bananas or Lilly pilly, or blue berry ash etc etc. I love them. We take joy in watching them fly over, we love hearing their chatter at night. I walk, run , drive and cycle past the camp. I feel closer to nature when they are in residence.
- Have visited several of the camps. It is just amazing to see so many mammals so close together. They are amazing animals and play a huge role in seed dispersal and pollination,
- Tuncurry. We have had flying foxes enter our home.
- No washing or outdoor furniture can be left out at night & often we have to close windows to be able to sleep
- Smiths Lake Camp, Myall Lakes Camp, Wingham Brush camp, Sydney Domain. All positive experiences. fascinating animals.
- Wingham Brush
- The Smiths Lake colony- They have so little habitat left, they need to stay here where they are safe
- Karol st. I can smell them strongly & hear them.
- Hawks Nest - I am about 1.5km from the camp
- I live near the Smiths Lake camp. Flying-foxes are not only beautiful, charismatic animals, they are also very important pollinators of our Eucalypt forests and seed dispersers of rainforest trees. They share our planet and people need to appreciate what their ecological role in promoting diversity of Australian forests. People need to learn to live along side of flying-foxes. Moving them again and again is stressful for these animals and they can easily return to their original roost. Being unkind to them by disturbing them with loud noise and banging pots etc. should not be condoned. They are already vulnerable to extinction. We need to appreciate them as a valuable

keystone species spreading pollen and rainforest seeds ensuring the diversity of our forests.

- Foxes stop in our tree on the way over. Not a big issue for us.
- Cocus, Karloo, Hawks Nest, Coocumbac island and Wingham brush all excellent experiences
- Bangalow Place Reserve, Cocos Crescent Forster They fly over our home in Chusan Place and do droppings.
- Wingham Brush - It's obvious that the native bats are roosting in the remaining pocket of rainforest habit. Nepean River- Penrith had a massive colony squeezed into one small remaining habitat due to the extensive urban/industrial sprawl in the Sydney basin. These flew directly over our last house each dusk & dawn. You live with the sound of them eating from the neighbours fruit trees or excreting on your washing if you leave it out overnight. You learn to modify your own behaviour and practices having understood that the bats are the one's who are under stress.
- Our trees are full of flower and pollen so attracting the flying foxes. Climate change has destroyed so many trees plus cutting down trees for redevelopment. We all need these wonderful creatures for pollination of our forests.
- Tocal Homestead. Their camp is right near the entrance to the property which is not attractive to wedding guests arriving.
- Hawks Nest and Raymond Terrace
- Can't leave washing out overnight. Have to wash cars as bat faeces very acidic and damage paint. Need to keep windows shut all night due to noise and smell especially when it’s raining. Wet bats really stink.
- I am aware of the importance of flying foxes for our eco-systems and forestry, and further that they are becoming increasingly vulnerable as a species.

Answers provided to Question 4: Do you know of any other places within the MidCoast Council LGA where flying-foxes have formed camps in the past or may be forming a camp? If yes provide details are:

- No just karloo
- Wingham brush
- No
- Wingham, Raymond terrace,
- Yes. All well known.
- Cape Hawke, wingham brush
- Wingham brush
- No
- no
- All of the above places Listed
- No
- Remant Rainforest near Lethbridge Street Elizabeth Beach Booti Booti NP
- Yes near Burraneer Drive
- I have smelt them riding up Mungo brush road, not sure of exact location. I think they may have tried roosting in trees in the bush just near my home, mostly because I have heard scare gun noises near us when the bats are active

- Wingham brush.
- Wingham
- Cocos Crescent
- Karloo Street Reserve
- Cocos crescent Forster
- No
- no
- Comboyne Road - Cedar Party
- Wingham Brush
- no
- No
- Yes Karloo St, FORSTER
- No
- No
- No
- no
- No
- No
- Wingham
- Apart from Kingfisher Rd koala reserve in Hawks Nest I assume another large colony was formed in 2020 far west of the reserve because at dusk huge clouds of flying foxes were observed at dusk flying eastwards and over the Singing Bridge linking Tea Gardens and Hawks Nest
- no
- Coocumbac Island
- No
- no
- No
- behind Stephen St.
- Burrawan st
- Cocos Ave.
- Keith Crescent/First Ridge Road
- no
- Karloo Street
- no
- No
- Hawks Nest and Raymond Terrace
- No
- Cocas crescent
- Raymond Terrace opposite the McDonalds - not sure if they are still there, they may have moved in the 2019/20 drought
- Wingham Brush
- Raymond Terrace opposite Maccas
- Believe the Karloo Street Camp was added to by a roost from Cape Hawke which moved when expansion of land development occurred many years back

Answers provided to Question 5: If you want to, you can comment on the flying-fox camp management options we have explored or you can suggest other solutions are:

Residents that live within 150 metres of the Karloo Street Reserve flying-fox camp:

- Move flying foxes to an area of bush not in residential areas we can not open our bedroom windows at night for fresh air as it smells so dreadful we can't sleep for the smell we were not told about the flying foxes when we bought the house they fly over our house in the evenings dropping their droppings it's not good and make a screeching noise also this problem is getting worse as there are more flying foxes each year
- If the flying-fox camp is to remain can the camp be culled to a limited number per year?
- The flying foxes need to be culled moved on to a area with a non urban area Council needs to be more active of street maintenance keeping foot paths mown overhang trees removed in foot path areas.
- Educate the value of flying foxes in pollination
- We have been over this many many times with the same result. Nothing happens except a little bit of tree trimming. They need to be removed from this area altogether. When we purchased our property in 1991 they were not there. They did not come until somewhere between 2002-2007 and have been a pest since. When the camp got to over 100,000 all of the wildlife disappeared. It took quite some time for them to come back and it is really nice to hear the birds singing again.
- Please look at the Uni of Melb survery done of 8000 residents in camp areas. 1600 responses shld tell something. 120 were in direct response to the Karloo camp. I have a copy of the prelim report. This wld have been sent to MCC.
- this has been going on for years and nothing has been done
- Options really - how many years are you going to ask the same friggin question. Just do SOMETHING.
- The camps should be encouraged away from residential zones.
- Council needs to take about 20metres off the edge of the bush simply to create a wider buffer. This would not get rid of the bats noise or smell but at least they would be further away from my property.
- Seem to do questionnaires and community consultations every year but not outcomes at all, just another survey to tick a box. I have never seen any plan after every survey has been done. We want an outcome and action put into place.
- I am hoping that at long last something is going to be done about this problem. It has been happening for some years now and we have complained and nothing has happened. The stench in our house from the flying foxes is disgusting. We are unable to have our windows open at night because of the foul smell that permeates our home.
- I believe there should be action taken by Midcoast Council to move the flying fox colonies away from suburban areas. Noise, light, physical activity. In wet weather the smell can be quite toxic. They defficate on roofs and walls and the noise when returning to roost is quite intolerable.
- Flying Foxes should be encouraged to base in ISOLATION - away from well established Forster areas.

- The management plan is heavily dependent on grants distributed to many councils along the east coast. I fear that the amount of the grant to Midcoast Council cannot really make a significant impact on this nuisance.
- I am aware flying fox camps move according to weather and food availability. I would not like to see any current or potential camp sites disturbed. The flying foxes are a major part of the local ecology and natural environment and should stay that way. There is way too much land being over developed for greed and it is disappointing to see the environment being decimated to such an extent.

Residents that live within 150 metres of the Cocos Crescent flying-fox camp:

- Remove them could use noice
- The flying foxes at this reserve came from Karloo Street Reserve about 3 years ago and have since relocated back to the back end on the southern side of that Reserve except for a small number that have remained in the Cocos Crescent Reserve.
- GET RID OF THEM
- NO
- The flying foxes need to be encouraged to move habitat to less populated areas.
- Active strategies to remove the camps from residential areas and promote new habitats in national parks
- Disperse them to national parks. Plenty of non-residential land there.
- Encourage them to go to national parks.
- Flying fox camps are not compatible with urban environments. Especially when they are relatively new camps and residents are powerless to do anything about them. They must have an obvious effect on reduction in land values and need to be removed from residential area in whatever manner is necessary.
- Doing nothing is not really an option. Education programs will not change the situation, even if it's Council's intention to encourage residents to learn to live with flying fox camps encroaching on their properties and having an impact on their standard of living. A suitable relocation/removal program is likely the only satisfactory solution.
- No action to manage this camp by Council and it appears they a breeding more and more and causing disturbance for many local residents
- Undergrowth clearing displaces the bats, I think if the reserves were better maintained at regular intervals it would prevent the large numbers from congregating. While this may not completely move them on smaller numbers would make for more pleasant living conditions for the rate payers.

Residents that live within 150 metres of the Cocos Crescent and Karloo Street flying-fox camps:

- What about management options pertaining to residents health due to the smells, excrement and noise. What about the effect management options have on house prices of properties near the camps? What about the damage the bats do to the vegetation?
- Firstly it is most important to remove vegetation and create a substantial buffer around the camps with ongoing and regular maintenance

- For such an abundant species they should not be protected. Management should be towards separating people from disease ridden wild life. Carcasses contaminate the water & soil as well as domestic pets wandering into the camps.

Residents that live within 150 metres of the Smiths Lake flying-fox camp:

- They are destroying the rainforest habitat in the reserve. They drop excrements When flying to and from the camp. We use rainwater for drinking so this is not possible while they are in the reserve. Rate reduction, Help with pay on double glazing, I can't sell my property, Bats can be in my backyard vegetation thinning to help
- Not at all
- Try and remove the current camp to a non residental area. this will reduce the impact on local residents, spread of disease, smell and noise created by the bats
- They are very valuable to the Eco System and apart from a little noise from their chatter and a bit smelly after first rain, I don't see them as a problem. They stay in the camp and don't bother us at all. In fact, we love watching them, so do our visitors. They are also a food source for local sea eagles that frequent the camp daily for food.
- Residents need to be educated on how to live with the bats, after all the bats where there first and everyone living next to them knowingly bought/rented the house fully aware of the habitat. Removing or culling are unacceptable options.

Residents that live within 150 metres of the Hawks Nest flying-fox camp:

- I don't how to manage a camp, it's complicated- local tree neighbour Lilly pilly loads up with fruit. Reserve is good for other animals.
- Odour is the main issue
- They need to be culled. So bad a few years ago they ate every tree in reserve and people were employed to replant and the same thing has happened again. So smelly after rain you cannot put your windows open.
- Flying foxes are vulnerable native animals and are our second most important pollinator after bees. Many native trees and other plants rely on FF for pollination and without them, we would see entire infrastructures diminished or destroyed. Because they are not cuddly natives, can be noisy in their social structures, defecate inconveniently, and carry a small risk of disease, they have few friends. It is your responsibility to protect these amazing animals and educate the ignorant. Any suggestion of culling will be met by strong protest and even having culling as a survey option is obscene. From my observations, the Hawks Nest camp is made up of more than one type of FF and I suspect that one of them may be more highly listed than vulnerable. Protect them, educate locals, support them to live together and show leadership.
- I don't see a need to disturb or move any colony that forms in the koala reserve at Hawks Nest - they will disperse to another area once the blossums finish flowering
- Given we have the Myall River so close it would be great to see the colony moved to a site away from human habitation.
- remove them

- There has been no mention of the Koalas in the area at Hawks Nest. They were often seen in this area but since the flying foxes have taken over we never see them because they eat all the food and destroy the Koalas habitat Live within 150 metres of the Pacific Palms flying-fox camp:

Residents that live within 150 metres of the Pacific Palms flying-fox camp:

- Provide more viable habitat for flying foxes so that they have a larger area to move around and roost in. This would increase local biodiversity, decrease risk zoonotic disease transmission and could become a beneficial economic venture when such areas are restored with plants that have a use. Moreover, such a management plan would decrease the probability of flying foxes congregating in a single site for an extremely extended period of time. Decreasing the amount of long term disturbance to residential areas and local buissness. All of the listed sites are renouned for having flying foxes, people who have any property within flying fox area sites knew the consequences of being near flying foxes. Without flying foxes occupying such areas, the mid north coast would not nearly be as special as it is now.

All other responses:

- Putting a board walk through would make it a popular tourist destination, like Wingham Brush.
- get rid of them
- Do nothing. Wherever man has attempted to "improve" the environment there has been bigger problems created.
- I like the level 1&2 options.
- I think having people meet bats (rescue babies etc) helps. Also very dynamic info about the bats environmental duties, like their role in propagating and keeping forests healthy etc. and spread the word that the smell is not poop. Everyone feels better if it’s love potion. Mitigation issues are fine for near nearby residents (the washing must stinko) people who just don’t like bat not in 150m radius, need an I LIKE BATS STICKER
- Flying foxes do not affect me greatly. I used to find the smell horrible but can cope with it after many years. The flying foxes visit when our trees are in flower but are of interest rather than concern. I would like to think we can live with them but I feel for the people who are very close to their camp.
- I see no need to manage the camps. Rather education as to the value of flying foxes is important. We have had friends who lived next to major camps and the more they learned about the flying foxes the more they enjoyed them. Your survey is very much a push poll implying that flying foxes need to be managed. While your attached information does mention that the grey headed flying fox is listed as vulnerable to extinction, there is no mention of this in the survey. You could ask questions in a different way e.g. do you believe that a threatened species should be moved on even if it can’t find suitable habitats elsewhere?
- Flying foxes are not compatible in urban areas. They are well known to carry disease.
- To prevent conflict Council must not allow urban development to encroach on camps. I do not understand that even though this has been the consistent advice of

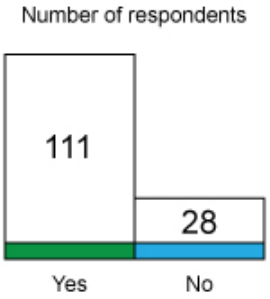
environmental scientists for decades Council continues to allow development eg new subdivisions for houses at Smiths Lake. Before purchasing land buyers should do a 'flying fox camp' search just as they would search for future road development across the block so that they can never say they did not know.

- The importance of flying foxes as primary pollinators needs to be given a higher value, especially given the collapse of populations of other primary pollinators.
- Suggest a parallel approach - bats are strong disease vectors and should not be removed near homes - homes should not be built in designated bat colonies.
- Leave them!!
- It seems they come and go according to flowering and fruiting at Hawks Nest. How can you manage that? Although the Blackbutts are flowering the FF have left the camp 3/2/21. Their importance as pollinators and seed dispersers is critical. This survey as not alerted people to this.
- We need more protection of our special Bat species, their habitat and better management of the people, businesses near Bat colonies. They play a very important role in the pollination of our hardwood forests, which in turn provides habitat for many other species. Also why are we calling them flying foxes?
- Nearby residents can install double glazing to soften the noise from flying-fox chatter. Nearby residents can cover hard surfaces and washing lines with covers to protect their footpaths and washing. Planting more trees away from residents' homes to provide the flying-foxes with more roosting options. Learn to enjoy their flyout in search of food and their return at dawn to feed their young.
- The most important aspect is the foxes well being.
- The options come across as anti Flying fox camps. Residents have moved to live near the camps so must put up with the smell and noise, otherwise sell up. To much vegetation destruction is already happening in the MCC due to development of urban areas.
- The options are good and manageable.
- Firstly, leave them alone as they are camping in the last remaining pockets of suitable habitat. There has been vast hectares of eucalypt forest clear felled for development in the Great lakes region leaving few places for them to range and roost. Hectares of forest were recently cleared on the western side of The Lakes Way for cheap housing development. Secondly, a community education scheme is required to make an aged demographic aware of the bats ecological importance and enable them to modify their homes to live alongside nature. Education in schools and a variety of other cultural settings e.g. various clubs, will also also reach a broader population and enable them to deal with arising issues when future housing developments squeeze the remaining populations of more native species into smaller fragmented habitats.
- Leave them alone as they will move on to other trees in flower
- We monitor
- Move the flying foxes on from urban areas to the scrub where they belong, and take their stink, filth disease and destruction with them .Unfortunately that leaves we who try to produce fruit to contend with their destruction. In recent decades they have greatly increased in number, destroying and damaging with their filth most of what we try to grow. Horses have died with Hendra virus contracted from flying foxes in the Hunter Valley. That's a lot further than 50km from the coast line. Further, it is

disputable that they are necessary for pollination of native flora as most flora is self pollinating.

- Limited removal of specific trees where they are CLOSE to residences may be necessary. In the case of the pathway to the Tea Gardens bridge - this could be "out of bounds" whilst the foxes are in residence - there is an alternative route along the riverfront near the Hawks Nest wharf which joins the bridge and the shops.
- It seems obvious that flying foxes camps are becoming problematic due to increasing development of human housing near their existing habitat. Flying fox camps and food sources need to be considered before approving further developments. If suitable habitat can be set aside or recreated than this may lessen the difficulties.

Answers provided to Question 6: Did this survey help you to better understand the choices available for flying-fox camp management? are:



Answers provided to Question 7: If you want to, please provide feedback about this survey, Flyingfoxengage are:

- Quite complicated for a simple survey. May have put a lot of residents off doing it.
- Consider paper version for broader community
- Have filled in surveys before about this to no avail so I hope this time something is done so we can live here and enjoy our retirement years with fresh air peoples health and well being must come first
- Covered large area and took into consideration of the animals.
- Good luck!
- The real problem is to act and provide relief to residents sooner not later Their may be health issues involved with the flying foxes and may need to be addressed
- Thanks for the chance to have an input
- I hope this survey is not just going to sit somewhere for future reference. I hope it will now have someone in control who has an understanding of what we have to put up with and will take appropriate action.
- The only way this survey will do any good at all and not be a waste of money is if some action is taken.. The whole area around the boundaries of the camps needs to be cleared back 20 metres for the flying fox and bushfire concerns.
- Survey is good but need to read all the relevant information first. As a standalone survey it doesn't work.
- Please see answer to Q 5 above. I would add that you are most interested in the views of those living near the camps. You don’t ask if they purchased their property

before or after the camp was established. Some of these camps have been there forever. If people buy a house knowing about the neighbours and then complain and complain until they are moved then that is hardly fair.

- Some one has to be accountable for the POOR grammar in some of the questions
- Love that we have a camp around our house and don't see why they would need to be interrupted. I bought my house specifically of its location in nature and would hat to see the camp moved.
- Hopefully we are kept informed with results of survey and community feedback
- I was so glad I could attend the Zoom meeting offered as it allowed me to understand the problems associated with the bat camps and also bust some myths about impacts the bats have on our health. I also attended the drop in session at Cocos Cres. This session did not go well as none of the residents attending had been enlighten about the plight of the bats like I had on the Zoom meeting. Therefore they were angry and frustrated, especially since there was no one in attendance from Council who could answer specific questions. The poor man holding the session was fighting a losing battle, trying to educate these people. The residents just wanted answers and action from council. As this session was organised through council, it seemed strange that council did not attend!
- the bats are a massive issue, the survey results will confirm that. what is important is the health risks associated and council ensuring local residents are safe. results are yet to be seen.
- Stop wasting money on surveys and get on with relocating the bats
- Waste of time again, irrelevant carefully worded or poorly worded so that there is really no information obtained and all very passive management options. No outcomes again and no actions. No more surveys please, we need action and not just education. Lots of other councils have actually been proactive and effective in the moving on of these colonies with no harm to the bats. Out council does nothing but survey.
- Biased towards level 1 answers - which is the opposite of my initial answers. Poor research paradigm; Poorly designed survey with 'importance weighting' not correlating with the 'list of management options' - aimed to mislead people into selecting level 1 interventions; Biased towards level 1 management options so "everyone looks happy with the current situation" - get out in the real world and actually make local residents aware of the survey/meetings (local residents have not received any mail documentation - I only received mine through another address in Tuncurry, which is nowhere near the camps) - can't wait for the next ICAC investigation into this council.
- Am concerned about some of the management 3 options
- First part rather hard to complete
- I hope that through this survey something will happen to improve this situation for people who live in residential areas that have been taken over by flying foxes. I HOPE IT GETS STARTED SOON.
- Mentioning the option of culling these native animals is obscene.
- I understand that some residents would like the flying fox colony to be managed and commend you for providing a survey and information sessions
- Survey, very one sided.

- No info on why the flying foxes are so vulnerable and need protection. This survey comes across as a very biased one against the bats...especially for residence who do not understand the importance for maintaining current camps.
- MCC should be holding "walks and talks" through the flying fox camps to educate rate payers on the life of as Flying Fox and to include FAWNA bat carers in this process to explain how the bats interact with people and each other....they are not just a feral animal.
- Very poor survey including the method of answering questions.
- Please leave them in their natural environments. They don’t bother anyone unless someone is shooting at them.
- Many of the local residents that are affected do not have a computer due to age demographics to complete this survey and Council should provide a paper copy to each household to complete
- Clearly human/flying fox conflicts need to be reduced and managed but hopefully not at the expense of these very important species.
- If a council in Sydney can move the flying foxes on then why can't Mid Coast Council.
- Anything to address the problem is positive
- I completed a similar survey a few years ago and no change has occurred so feel this is probably just a waste of time and money. Nobody really cares about the affects it has on our property value and day to day living
- Feedback is all very good as long as action is taken within a reasonable time frame. After all his problem has been with us for the last 30 years and little has been done to mitigate the problem
- Very confusing question and answers! Everytime I press the wrong button defaults back and have had to re-do repeatedly . Very frustrating - just want to get it over with! Why didn't you talk to Pia Lentini University of Melbourne. Typoical of Mid Coast Council that they now know nothing about that at the Meeting at Blueys. Outrageous. Insulting.
- Council should rely on the scientists and their research data relevant to bat activity in the local area and their place within the broader Australian ecosystem and not react to the personal opinion of individuals who are operating under the NIMBY principle.
- Definitely engage locals in the process but as a means to educate, empower and enable them to progress towards positive outcomes that are broader than their own desire to simply ""get rid of the bats"".
- Seems the outcomes have been pre-determined
- Since the Melbourne University survey, council has ambiguously stepped up its management of this nuisance pest, which will inevitably cost the rate payer much more over time. This council has already had many years of rate increases above & beyond inflation, with this just adding further up ward pressure on the rates to residents.
- I am pleased something is been done about these dirty, smelly, noisy things! They spoil a beautiful area.
- Survey is not the easiest to understand. Go check the questions at the beginning 2nd or 3rd ?
- Limited in scope. There are obviously many other camps. Flying foxes need to be controlled, not protected. Some years ago there was a report that a producer lost

$5000 worth of lycees in one night. It's not always possible or economical to net an orchard.

- "Management" needs clarification - it will mean different things to different people - unfortunately it could be categorised with the "wild dog eradication programme"
- This survey was not easy to locate on the first page of the link, was it hidden for a reason. It must be the most confusingly designed survey from the users viewpoint. Difficult to use and to understand the information on the page. Hope council didn't waste money paying someone to develop this rubbish that could have easily be designed by someone with keyboard skills using Survey Monkey.

5. Preferences of the residents living close to a camp

Additional analysis was undertaken of the submissions provided by respondents identifying as living close to respective camps. The results for step 3, cumulative re-ranking and cumulative re-ranking for the top and bottom 5 management options are provided below for each identified camp.

As detailed on page 10, displaying the cumulative ranking of the respondents top 5 and bottom 5 rankings was undertaken to provide a more narrow insight into the preferences of these residents compared to displaying the cumulative ranking of all 21 options. As a result some options can display in the top 5 and bottom 5 lists, as one respondent ranks option X within their top 5 preferred management options, but other respondents rank the same option in their bottom 5 preferences.

Forster: Cocos Crescent Camp

The results for 29 respondents living within a 150m of the Forster: Cocos Crescent Camp are as follows:

Based on the respondents cumulative re-rankings the most preferred options in order were:

1. Subsidising property modification to reduce the impacts of flying-foxes
2. Revegetate and manage land to create alternative flying-fox habitat
3. Guidelines for carrying out operations adjacent to camps
4. Provision of flying-fox education and awareness programs
5. Subsidising services to reduce the impacts of flying-foxes
6. Health and safety guidelines to manage incidents related to the camp
7. Advising about property modifications
8. Routine maintenance to improve the condition of the site
9. Passive dispersal of a flying-fox camp through selective vegetation removal
10. Fully-funding property modification to reduce the impacts of flying-foxes
11. Revegetating areas with plants that are unsuitable as roost habitat
12. Early dispersal before a camp is established at a new location
13. Trimming vegetation at the camp boundary to create a small buffer
14. Artificial roosting habitat
15. Active dispersal of a flying-fox camp using disturbance
16. Actively nudging the camp to a nearby location using disturbance

17. Do Nothing- no management action required at this stage
18. Removing vegetation to create a substantial buffer
19. Land-use planning
20. Installation of noise attenuation fencing
21. Culling flying-foxes– apply for licence from State Government

Based on the respondents top five cumulative rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Culling flying-foxes– apply for licence from State Government
4. Actively nudging the camp to a nearby location using disturbance
5. Active dispersal of a flying-fox camp using disturbance

As can be seen based on the top five cumulative rankings, 'Provision of flying-fox education and awareness programs' was the most preferred flying-fox camp management measure with 9 respondents ranking it as their 1st preference. 5 respondents also ranked highly 'Subsidising property modification to reduce the impacts of flying-foxes' as their first preference, in addition to 5 respondents placing 'Culling flying-foxes– apply for licence from State Government' as their first preference.

Based on the respondents bottom five cumulative rankings the least preferred options in order were:

1. Culling flying-foxes– apply for licence from State Government
2. Do Nothing- no management action required at this stage
3. Actively nudging the camp to a nearby location using disturbance
4. Provision of flying-fox education and awareness programs
5. Removing vegetation to create a substantial buffer

Based on the bottom five cumulative rankings, 'Culling flying-foxes' to reduce numbers was the least preferred flying-fox camp management measure with 16 respondents ranking it as their last (21st) preference.

Forster: Karloo Street Reserve Camp

The results for 39 respondents living within a 150m of the Forster: Karloo Street Camp are as follows:

Based on the respondents cumulative re-rankings the most preferred options in order were:

1. Subsidising property modification to reduce the impacts of flying-foxes
2. Provision of flying-fox education and awareness programs
3. Subsidising services to reduce the impacts of flying-foxes
4. Revegetate and manage land to create alternative flying-fox habitat
5. Guidelines for carrying out operations adjacent to camps
6. Fully-funding property modification to reduce the impacts of flying-foxes
7. Advising about property modifications

8. Health and safety guidelines to manage incidents related to the camp
9. Trimming vegetation at the camp boundary to create a small buffer
10. Revegetating areas with plants that are unsuitable as roost habitat
11. Routine maintenance to improve the condition of the site
12. Early dispersal before a camp is established at a new location
13. Artificial roosting habitat
14. Passive dispersal of a flying-fox camp through selective vegetation removal
15. Active dispersal of a flying-fox camp using disturbance
16. Removing vegetation to create a substantial buffer
17. Actively nudging the camp to a nearby location using disturbance
18. Do Nothing- no management action required at this stage
19. Installation of noise attenuation fencing
20. Land-use planning
21. Culling flying-foxes– apply for licence from State Government

Based on the respondents top five cumulative rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Culling flying-foxes– apply for licence from State Government
4. Active dispersal of a flying-fox camp using disturbance
5. Actively nudging the camp to a nearby location using disturbance

As can be seen based on the top five cumulative rankings, 'Provision of flying-fox education and awareness programs' was the most preferred flying-fox camp management measure with 12 respondents ranking it as their 1st preference. 7 respondents also ranked highly 'Subsidising property modification to reduce the impacts of flying-foxes' as their first preference, in addition to 6 respondents placing 'Culling flying-foxes– apply for licence from State Government' as their first preference.

Based on the respondents bottom five cumulative rankings the least preferred options in order were:

1. Culling flying-foxes– apply for licence from State Government
2. Do Nothing- no management action required at this stage
3. Actively nudging the camp to a nearby location using disturbance
4. Provision of flying-fox education and awareness programs
5. Routine maintenance to improve the condition of the site

Based on the bottom five cumulative rankings, 'Culling flying-foxes' to reduce numbers was the least preferred flying-fox camp management measure with 22 respondents ranking it as their last (21st) preference.

Hawks Nest Camp

The results for 14 respondents living within a 150m of the Hawks Nest camp are as follows:

Based on the respondents cumulative re-rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Subsidising services to reduce the impacts of flying-foxes
4. Health and safety guidelines to manage incidents related to the camp
5. Revegetate and manage land to create alternative flying-fox habitat
6. Guidelines for carrying out operations adjacent to camps
7. Advising about property modifications
8. Routine maintenance to improve the condition of the site
9. Fully-funding property modification to reduce the impacts of flying-foxes
10. Artificial roosting habitat
11. Do Nothing- no management action required at this stage
12. Trimming vegetation at the camp boundary to create a small buffer
13. Revegetating areas with plants that are unsuitable as roost habitat
14. Active dispersal of a flying-fox camp using disturbance
15. Early dispersal before a camp is established at a new location
16. Land-use planning
17. Passive dispersal of a flying-fox camp through selective vegetation removal
18. Installation of noise attenuation fencing
19. Removing vegetation to create a substantial buffer
20. Actively nudging the camp to a nearby location using disturbance
21. Culling flying-foxes– apply for licence from State Government

Based on the respondents top five cumulative rankings the most preferred options in order were:

1. Subsidising property modification to reduce the impacts of flying-foxes
2. Provision of flying-fox education and awareness programs
3. Active dispersal of a flying-fox camp using disturbance
4. Early dispersal before a camp is established at a new location
5. Advising about property modifications

As can be seen based on the top five cumulative rankings, 'Subsidising property modification to reduce the impacts of flying-foxes' was the most preferred flying-fox camp management measure with 9 respondents ranking it as their 1st preference. 5 respondents also ranked highly 'Provision of flying-fox education and awareness programs' as their first preference.

Based on the respondents bottom five cumulative rankings the least preferred options in order were:

1. Culling flying-foxes– apply for licence from State Government
2. Actively nudging the camp to a nearby location using disturbance
3. Do Nothing- no management action required at this stage
4. Active dispersal of a flying-fox camp using disturbance
5. Artificial roosting habitat

Based on the bottom five cumulative rankings, 'Culling flying-foxes' to reduce numbers was the least preferred flying-fox camp management measure with 11 respondents ranking it as their last (21st) preference.

Smiths Lake Camp

The results for 12 respondents living within a 150m of the Smiths Lake Camp are as follows:

Based on the respondents cumulative re-rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Health and safety guidelines to manage incidents related to the camp
4. Subsidising services to reduce the impacts of flying-foxes
5. Guidelines for carrying out operations adjacent to camps
6. Revegetate and manage land to create alternative flying-fox habitat
7. Advising about property modifications
8. Fully-funding property modification to reduce the impacts of flying-foxes
9. Do Nothing- no management action required at this stage
10. Routine maintenance to improve the condition of the site
11. Artificial roosting habitat
12. Revegetating areas with plants that are unsuitable as roost habitat
13. Trimming vegetation at the camp boundary to create a small buffer
14. Land-use planning
15. Early dispersal before a camp is established at a new location
16. Installation of noise attenuation fencing
17. Passive dispersal of a flying-fox camp through selective vegetation removal
18. Active dispersal of a flying-fox camp using disturbance
19. Removing vegetation to create a substantial buffer
20. Actively nudging the camp to a nearby location using disturbance
21. Culling flying-foxes– apply for licence from State Government

Based on the respondents top five cumulative rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Subsidising property modification to reduce the impacts of flying-foxes
3. Do Nothing- no management action required at this stage
4. Revegetate and manage land to create alternative flying-fox habitat
5. Fully-funding property modification to reduce the impacts of flying-foxes

As can be seen based on the top five cumulative rankings, ‘Provision of flying-fox education and awareness programs’ was the most preferred flying-fox camp management measure with 7 respondents ranking it as their 1st preference.

Based on the respondents bottom five cumulative rankings the least preferred options in order were:

1. Culling flying-foxes– apply for licence from State Government
2. Actively nudging the camp to a nearby location using disturbance
3. Active dispersal of a flying-fox camp using disturbance
4. Do Nothing- no management action required at this stage
5. Removing vegetation to create a substantial buffer

Based on the bottom five cumulative rankings, ‘Culling flying-foxes’ to reduce numbers was the least preferred flying-fox camp management measure with 10 respondents ranking it as their last (21st) preference.

Pacific Palms Camp

The results for 3 respondents living within a 150m of the Pacific Palms Camp are as follows:

Based on the respondents cumulative re-rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Routine maintenance to improve the condition of the site
3. Revegetate and manage land to create alternative flying-fox habitat
4. Subsidising property modification to reduce the impacts of flying-foxes
5. Guidelines for carrying out operations adjacent to camps
6. Land-use planning
7. Health and safety guidelines to manage incidents related to the camp
8. Subsidising services to reduce the impacts of flying-foxes
9. Do Nothing- no management action required at this stage
10. Advising about property modifications
11. Fully-funding property modification to reduce the impacts of flying-foxes
12. Revegetating areas with plants that are unsuitable as roost habitat
13. Artificial roosting habitat
14. Passive dispersal of a flying-fox camp through selective vegetation removal
15. Trimming vegetation at the camp boundary to create a small buffer
16. Installation of noise attenuation fencing
17. Early dispersal before a camp is established at a new location
18. Actively nudging the camp to a nearby location using disturbance
19. Active dispersal of a flying-fox camp using disturbance
20. Removing vegetation to create a substantial buffer
21. Culling flying-foxes– apply for licence from State Government

Based on the respondents top five cumulative rankings the most preferred options in order were:

1. Provision of flying-fox education and awareness programs
2. Revegetate and manage land to create alternative flying-fox habitat
3. Do Nothing- no management action required at this stage
4. Passive dispersal of a flying-fox camp through selective vegetation removal
5. Artificial roosting habitat

As can be seen based on the top five cumulative rankings, ‘Provision of flying-fox education and awareness programs’ was the most preferred flying-fox camp management measure with all 3 respondents ranking it as their 1st preference.

Based on the respondents bottom five cumulative rankings the least preferred options in order were:

22. Culling flying-foxes– apply for licence from State Government
23. Removing vegetation to create a substantial buffer
24. Actively nudging the camp to a nearby location using disturbance
25. Artificial roosting habitat
26. Revegetate and manage land to create alternative flying-fox habitat

Based on the bottom five cumulative rankings, 'Culling flying-foxes' to reduce numbers was the least preferred flying-fox camp management measure with 2 respondents ranking it as their last (21st) preference.

6. Conclusion

With 139 valid online submissions, respondents favoured flying-fox camp management measures that provide a long term solution, ensures the risk of disease transmission remains low, reduces the impact of noise and odour from flying-foxes roosting at the camp on nearby residents and reduces the impact of the flying-fox excrement on the property of nearby residents. Based on cumulative re-ranking totals of all respondents, subsidising property modification to reduce flying-fox impacts ranked highest as the most preferred management option followed by flying-fox education and awareness programs. Culling flying-foxes while preferred by some (13 respondents first preference), it was the least preferred management option overall with 101 respondents placing it as their last preference.

Appendix 5: Desktop ecological assessment

Table 3a Results of ecological desktop assessment

Source	Links	Results
Protected Matters Search Tool (PMST)	www.environment.gov.au/epbc/protected-matters-search-tool	Searches were carried out on the EPBC Act PMST on 18 March 2021 for the MidCoast Council LGA. The protected matters search tool (PMST) identified the following EPBC Act listed species and communities: • 114 threatened species as species or species habitat known, likely or may occur in the search area • nine threatened ecological communities (TECs) as likely or may occur in the search area.
NSW BioNet	www.bionet.nsw.gov.au/	Searches were carried out on the DPIE BioNet Atlas database on 18 March 2021 covering 10 km around the camps. Twenty threatened flora and 60 threatened fauna species were identified, excluding marine species and waders. A potential occurrence assessment of these species is provided in **Table 1b**.
Area of Outstanding Biodiversity Value register	www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/areas-of-outstanding-biodiversity-value/area-of-outstanding-biodiversity-value-register	The camps do not encompass any declared areas of outstanding biodiversity value.
Biodiversity Values map	www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap	Biodiversity Values mapping under the *Biodiversity Conservation Regulations 2017* was reviewed on 23 March 2021. The mapping showed: • Karloo Street camp: mapped. • Cocos Crescent camp: Not mapped. • Pacific Palms camp: Not mapped. • Smiths Lake camp: Not mapped. • Hawks Nest (Council land): mapped. This has potential implications for assessment pathways for activities at each camp.

A list of threatened species known to occur within 10 km of the camps on the BioNet Atlas database is provided in **Table 3b**, excluding marine species and waders. The potential occurrence of each species is provided for each camp.

Table 3b BioNet threatened species records and potential occurrence at each site

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
FAUNA								
Anthochaera phrygia	Regent Honeyeater	CE	CE	Possible	Possible	Possible	Possible	Possible
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		Possible	Unlikely	Possible	Possible	Possible
Botaurus poiciloptilus	Australasian Bittern	E	E	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Burhinus grallarius	Bush Stone-curlew	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		Possible	Unlikely	Unlikely	Possible	Possible
Cercartetus nanus	Eastern Pygmy-possum	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		Possible	Unlikely	Unlikely	Possible	Unlikely
Crinia tinnula	Wallum Froglet	V		Unlikely	Unlikely	Possible	Unlikely	Possible
Daphoenositta chrysoptera	Varied Sittella	V		Possible	Unlikely	Possible	Possible	Possible

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Unlikely	Unlikely	Possible	Possible	Unlikely
Dromaius novaehollandiae	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	EP		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Ephippiorhynchus asiaticus	Black-necked Stork	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Epthianura albifrons	White-fronted Chat	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Esacus magnirostris	Beach Stone-curlew	CE		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Possible	Unlikely	Possible	Possible	Unlikely
Glossopsitta pusilla	Little Lorikeet	V		Possible	Possible	Possible	Possible	Possible
Haematopus fuliginosus	Sooty Oystercatcher	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Haematopus longirostris	Pied Oystercatcher	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Unlikely	Unlikely	Known	Possible	Possible
Hieraaetus morphnoides	Little Eagle	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Hirundapus caudacutus	White-throated Needletail		V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Hoplocephalus stephensii	Stephens' Banded Snake	V		Unlikely	Unlikely	Possible	Possible	Unlikely
Ixobrychus flavicollis	Black Bittern	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Lathamus discolor	Swift Parrot	E	CE	Known	Possible	Possible	Possible	Possible
Litoria aurea	Green and Golden Bell Frog	E	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Lophoictinia isura	Square-tailed Kite	V		Possible	Unlikely	Possible	Possible	Unlikely
Macropus parma	Parma Wallaby	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		Possible	Possible	Possible	Possible	Possible
Miniopterus australis	Little Bent-winged Bat	V		Possible	Possible	Possible	Possible	Possible
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Possible	Possible	Possible	Possible	Possible
Myotis macropus	Southern Myotis	V		Unlikely	Unlikely	Possible	Possible	Possible

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Neophema pulchella	Turquoise Parrot	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Ninox connivens	Barking Owl	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Ninox strenua	Powerful Owl	V		Possible	Unlikely	Possible	Possible	Possible
Pandion cristatus	Eastern Osprey	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Petalura gigantea	Giant Dragonfly	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Petauroides volans	Greater Glider		V	Unlikely	Unlikely	Unlikely	Possible	Unlikely
Petaurus australis	Yellow-bellied Glider	V		Unlikely	Unlikely	Possible	Possible	Unlikely
Petaurus norfolcensis	Squirrel Glider	V		Known	Possible	Possible	Possible	Possible
Petroica boodang	Scarlet Robin	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Phascogale tapoatafa	Brush-tailed Phascogale	V		Possible	Unlikely	Possible	Possible	Possible
Phascolarctos cinereus	Koala	V	V	Possible	Possible	Possible	Known	Known
Phascolarctos cinereus	Koala, Hawks Nest and Tea Gardens population	EP	V	Unlikely	Unlikely	Unlikely	Unlikely	Known
Phoniscus papuensis	Golden-tipped Bat	V		Possible	Unlikely	Possible	Possible	Unlikely
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Potorous tridactylus	Long-nosed Potoroo	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Pseudomys novaehollandiae	New Holland Mouse	-	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Known	Known	Known	Known	Known
Ptilinopus magnificus	Wompoo Fruit-Dove	V		Unlikely	Unlikely	Unlikely	Possible	Unlikely
Ptilinopus superbus	Superb Fruit-Dove	V		Unlikely	Unlikely	Unlikely	Possible	Unlikely
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Possible	Possible	Possible	Possible	Possible
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Possible	Possible	Possible	Possible	Possible
Syconycteris australis	Common Blossom-bat	V		Possible	Possible	Possible	Possible	Possible
Tyto longimembris	Eastern Grass Owl	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Tyto novaehollandiae	Masked Owl	V		Unlikely	Unlikely	Possible	Possible	Unlikely
Tyto tenebricosa	Sooty Owl	V		Possible	Unlikely	Possible	Possible	Unlikely
Vespadelus troughtoni	Eastern Cave Bat	V		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
FLORA								

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Allocasuarina defungens	Dwarf Heath Casuarina	E	E	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Allocasuarina simulans	Nabiac Casuarina	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Allocasuarina thalassoscopica			E	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Angophora inopina	Charmhaven Apple	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Asperula asthenes	Trailing Woodruff	V	V	Known	Possible	Possible	Possible	Possible
Chamaesyce psammogeton	Sand Spurge	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Cynanchum elegans	White-flowered Wax Plant	E	E	Possible	Unlikely	Unlikely	Possible	Unlikely
Diuris praecox	Rough Doubletail	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Genoplesium littorale	Tuncurry Midge Orchid	CE	CE	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Lindernia alsinoides	Noah's False Chickweed	E		Possible	Unlikely	Possible	Unlikely	Possible
Melaleuca biconvexa	Biconvex Paperbark	V	V	Possible	Unlikely	Possible	Possible	Possible

Scientific Name	Common Name	BC Act	EPBC Act	Karloo Street Reserve	Cocos Crescent Reserve	Pacific Palms	Smiths Lake	Hawks Nest
Rhodamnia rubescens	Scrub Turpentine	CE		Possible	Unlikely	Known	Possible	Unlikely
Rhodomyrtus psidioides	Native Guava	CE		Possible	Unlikely	Unlikely	Possible	Unlikely
Senecio spathulatus	Coast Groundsel	E		Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Senna acclinis	Rainforest Cassia	E		Possible	Unlikely	Unlikely	Possible	Unlikely
Syzygium paniculatum	Magenta Lilly Pilly	E	V	Possible	Unlikely	Unlikely	Possible	Unlikely
Tetratheca juncea	Black-eyed Susan	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
Thesium australe	Austral Toadflax	V	V	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

E Endangered

V Vulnerable

CE Critically Endangered

EP Endangered Population

Known: BioNet shows record at the subject camp.

Possible: Suitable habitat occurs at the site, however the site is not known habitat and further investigations would be required to confirm presence or absence.

Unlikely: Habitat not suitable (other than rare vagrant occurrence).

Appendix 6: Analysis of camp management options

Management option	Relevant impacts	Cost	Advantages	Disadvantages
Level 1 actions				
Education and awareness programs	Fear of disease Noise Odour Faecal drop	$	Low cost, promotes conservation of flying-foxes, contributes to attitude change which may reduce general need for camp intervention and reduce anxiety, 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.
Property modification	Noise Odour Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	Property modification is one of the most effective ways to reduce amenity impacts of a camp without dispersal (and associated risks), relatively low cost, promotes conservation of flying-foxes, can be undertaken quickly, will not impact on the site, may add value to the property.	May be cost-prohibitive for private landholders, unlikely to fully mitigate amenity issues in outdoor areas.
Fully-fund/subsidise property modification	Noise Odour Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	Potential advantages as per property modification, but also overcomes the 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.
Service subsidies including rate rebates	Noise Odour Faecal drop Health/wellbeing Property devaluation Lost rental return	$–$$	May encourage tolerance of living near a camp, promotes conservation of flying-foxes, 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.

Management option	Relevant impacts	Cost	Advantages	Disadvantages
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 flying-foxes. 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.
Alternative habitat creation	All	$$–$$$	If successful in attracting flying-foxes away from high conflict areas, dedicated habitat in low conflict areas will mitigate all impacts, promotes flying-fox conservation. Rehabilitation of degraded habitat that is likely to be suitable for flying-fox use could be a more practical and faster approach than habitat creation.	Generally costly, long-term approach so cannot be undertaken quickly, previous attempts to attract flying-foxes to a new site have not been known to succeed.
Provision of artificial roosting habitat	All	$–$$	If successful in attracting flying-foxes 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 flying-fox conservation.	Would need to be combined with other measures (e.g. buffers/alternative habitat creation) to mitigate impacts; previous attempts have had limited success.
Protocols to manage incidents	Health/wellbeing	$	Low cost, will reduce actual risk of negative human/pet and flying-fox interactions, promotes conservation of flying-foxes, can be undertaken quickly, will not impact the site.	Will not generally mitigate amenity impacts.
Research	All	$	Supporting research to improve understanding may contribute to more effectively mitigating all impacts, promotes flying-fox conservation.	Generally cannot be undertaken quickly, management trials may require further cost input.

Management option	Relevant impacts	Cost	Advantages	Disadvantages
Appropriate land use planning	All	$	Likely to reduce future conflict, promotes flying-fox conservation. Identification of degraded sites that may be suitable for long-term rehabilitation for flying-foxes 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.
Property acquisition	All for specific property owners Nil for broader community	$$$	Will reduce future conflict with the owners of the acquired property.	Owners may not want to move, only improves amenity for those who fit criteria for acquisition, very expensive.
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and unlikely to be considered acceptable by the community.
Level 2 actions				
Buffers through vegetation removal	Noise Odour Health/wellbeing Property devaluation Lost rental return	$–$$	Will reduce impacts, promotes flying-fox 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.
Buffers without vegetation removal	Noise Odour Health/wellbeing Damage to vegetation Property devaluation Lost rental return	$$	Successful creation of a buffer will reduce impacts, promotes flying-fox conservation, can be undertaken quickly, options without vegetation removal may be preferred by the community.	May impact the site, buffers will not generally eliminate impacts, maintenance costs may be significant, often logistically difficult, limited trials so likely effectiveness unknown.
Noise attenuation fencing	Noise Odour Health/wellbeing Property devaluation Lost rental return	$$	Will eliminate/significantly reduce noise impacts, will reduce other impacts, limited maintenance costs.	Costly, likely to impact visual amenity of the site, will not eliminate all impacts, may impact other wildlife at the site.

Management option	Relevant impacts	Cost	Advantages	Disadvantages
Level 3 actions				
Nudging	All	$$–$$$	If nudging is successful, this may mitigate all impacts.	Costly, flying-foxes will continue attempting to recolonise the area unless combined with habitat modification/deterrents.
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 flying-foxes, 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.
Passive dispersal through water management	All at that site but not generally appropriate for amenity impacts only (see Section 8)	$$–$$$	Potential advantages as per passive dispersal through vegetation removal; however,' likelihood of success unknown.	Potential disadvantages as per passive dispersal through vegetation removal; however, likelihood of success unknown.
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.

Management option	Relevant impacts	Cost	Advantages	Disadvantages
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 flying-foxes that may have relocated from another dispersed camp, which may exacerbate impacts on these individuals.

Appendix 7: Dispersal results summary

Roberts and Eby (2013) summarised 17 known flying-fox dispersals between 1990 and 2013 (refer to **Table 1**), and made the following conclusions:

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

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

An overview of findings[5] is summarised below.

- There were attempts to disperse 25 separate roosts in Queensland (compared with nine roosts between 1990 and June 2013 analysed in Roberts and Eby (2013)). Compared with the historical average (less than 0.4 roosts/year) the number of roosts dispersed in the year since the framework was introduced has increased by 6250%.
- Dispersal methods included fog[6], birdfrite, lights, noise, physical deterrents, smoke, extensive vegetation modification, water (including cannons), paintball guns and helicopters.
- The most common dispersal methods were extensive vegetation modification alone and extensive vegetation modification combined with other methods.
- In nine of the 24 roosts dispersed, dispersal actions did not reduce the number of flying-foxes in the LGA.
- In all cases, it was not possible to predict where new roosts would form.
- When flying-foxes were dispersed, they did not move further than six kilometres away.
- As at November 2014 repeat actions had already been required in 18 cases.
- Conflict for the council and community was resolved in 60% of cases, but with many councils stating they feel this resolution is only temporary.

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

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

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

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

Mo et al, (2020) undertook a review of the management of the Kareela flying-fox camp, located in southern Sydney. Key adopted management actions included creation of buffers (10-15m) and dispersal. Dispersal and subsequent maintenance dispersal was undertaken on and off between 2015 and 2017 at a cost of $388,400. The dispersal was not effective, achieving only temporary absences of flying-foxes and requiring ongoing maintenance. The dispersal strategy was abandoned and buffers were increase to create 50m of separation through vegetation removal. Some stakeholders have reported odour and noise impacts being worse post buffer vegetation clearing.

Table 1 Summary of known documented attempts to disperse Australian flying-fox camps using non-lethal methods, during 1990 to 2013.

Location	Species	FF population estimate at time of dispersal	Method	Did the animals leave the local area?	Did the local population reduce in size?	How far did they move?	Were new camps formed (number of new camps if known)?	Number of separate actions	Cost (if known)	Was conflict resolved at the original site?	Was conflict resolved for the community?	Source+
Barcaldine, Qld	R	>50,000	VN	no	no	≈2 km	yes (1)	trees in township felled		yes	no	1,2
Batchelor, NT	B	200	BNS	no	no	<400 m	yes (1)	2		yes	yes	3,4
Boyne Island, Qld	BR	25,000	LNS	no	no	<500 m	yes (2)	3		yes	no	5,6,7
Bundall, Qld	GB	<400	V	no	no	uk, but 4 camps were within 5 km	yes (3)	1		yes	uk	8,9,10
Charters Towers, Qld	RB	variable	HLNPOW	no	no	200 m	no (returned to original site)	repeated since 2000	>$500,000	no	no	11,12
Dallis Park, NSW	BG	28,000	V	no	yes	300 m	yes (1)	2		yes	no	13
Duaringa, Qld	R	>30,000	VNFO	no	no	400 m	yes	1	$150,000	yes	uk	14
Gayndah, Qld	RB	200,000	VN	no	no	600 m	yes	3 actions, repeated		yes	no	9
Maclean, NSW	BGR	20,000	NS	no	no	350 m	yes (7)	>23	>$400,000 and ongoing	no	no	13
Mataranka, NT	BR	>200,000	BHLNOSW	no	no	<300 m	uk	>9		no	no	13
North Eton, Qld	B	4800	VNFB	uk	no	<1.5 km initially	yes (≈4 majority temporary)	2	$45,000	yes	yes (conflict at one site)	10,15,16, 17

Location	Species	FF population estimate at time of dispersal	Method	Did the animals leave the local area?	Did the local population reduce in size?	How far did they move?	Were new camps formed (number of new camps if known)?	Number of separate actions	Cost (if known)	Was conflict resolved at the original site?	Was conflict resolved for the community?	Source+
Royal Botanic Gardens, Melbourne, Vic	G	30,000	NS	no	no	6.5 km	yes (2)	6 mths	$3 million	yes	yes, ongoing management required	13
Royal Botanic Gardens, Sydney, NSW	G	3,000	LNPOW	no	no	4 km	no	ongoing daily actions for 12 mths	>$1 million and ongoing	yes	yes	13,18,19
Singleton, NSW	GR	500	LNUW	no	no	<900 m	no (returned to original site	>3	$117,000 and ongoing	no	no	13,20
Townsville, Qld	BR	35,000	BNS	no	no	400 m	no (returned to original site)	5		no	no	13
Warwick, Qld	GRB (dispersal targeted R)	200,000	NLBP	no	no	≈1 km	no (site known to be previously occupied by GB)	5 days	$28,000	yes	uk (complaints persisted until migration)	8,21,22
Young, NSW	L	<5000	VN	no	no	<600 m	yes (1)	uk		yes	no	23

* G = grey-headed flying-fox; B = black flying-fox; R = little red flying-fox

B = "birdfrite"; F = fog; H = helicopter; L = lights; N = noise; P = physical deterrent; O = odour; S = smoke; U = ultrasonic sound; V = extensive vegetation removal; W = water.

+ 1 Storm Stanford (Wildlife carer, pers comm. 2013); 2 Louise Saunders (Bats Qld, pers comm. 2013); 3 Phillips *et al.* (2007) Displacement of Black flying-foxes *Pteropus alecto* at Batchelor, Northern Territory *Australian Zoologist* 34: 119-124; 4 John McCarthy (Northern Territory Government, pers comm. 2010); 5 Roberts (2006) *Management of Urban Flying-fox Camps: Issues of Relevance to Camps in the Lower Clarence, NSW.* Valley Watch Inc., Maclean; 6 Information from Gladstone Regional Council in 2010 and 2013; 7 Joe Adair (formerly DEHP, pers. comm. 2010); 8 Trish Wimberly (Australia Bat Clinic pers. comm. 2013); 9 Information obtained from Department of Environment and Heritage Protection (DEHP) in 2013; 10 Billie Roberts unpublished data; 11 Scott Sullivan (DEHP, pers. comm. 2010); 12 Information from Charters Towers Regional Council in 2010 and 2013; 13 Roberts *et al.* (2012b) and additional references within; 14 Perry Deeds (Central Highlands Regional Council, pers. comm 2013); 15 Jarmaine (2010) *Species Management Plan,* Mackay Regional Council; 16 Heidi Jarmaine (Mackay Regional Council, pers. comm. 2013); 17 Daryl Barnes (Walkerston resident, per comm. 2013) 18 Peggy Eby (Ecologist, pers comm. 2013) 19 John Martin (RBG, pers comm. 2013); 20 Singleton Council Meeting Minutes; 21 Information from the Southern Downs Regional Council in 2013; 22 Tim Low (pers. comm. 2013); 23 Young Shire Council.

Appendix 8: Management Controls and Guidelines

Standard measures to avoid impacts

The following mitigation measures will be complied with at all times during Plan implementation.

All management activities

- All personnel will be appropriately experienced, trained and inducted. Induction will include each person's responsibilities under this Plan.
- All personnel will be briefed prior to the action commencing each day and debriefed at the end of the day.
- Works will cease and the Department consulted in accordance with the 'stop work triggers' section of the Plan.
- Large crews will be avoided where possible.
- The use of loud machinery and equipment that produces sudden impacts/noise will be limited. Where loud equipment (e.g. chainsaws) is required they will be started away from the camp and allowed to run for a short time to allow flying-foxes to adjust.
- Activities that may disturb flying-foxes at any time during the year will begin as far from the camp as possible, working towards the camp gradually to allow flying-foxes to habituate.
- Any activity likely to disturb flying-foxes so that they take flight will be avoided during the day during the sensitive GHFF/BFF birthing period (i.e. when females are in their final trimester or the majority are carrying pups, generally August – December) and avoided altogether during crèching (generally November/December to February).
- Where works cannot be done at night after fly-out during these periods, it is preferable they are undertaken in the late afternoon close to or at fly-out. If this is also not possible, a person experienced in flying-fox behaviour will monitor the camp for at least the first two scheduled actions (or as otherwise deemed to be required by that person) to ensure impacts are not excessive and advise on the most appropriate methods (e.g. required buffer distances, approach, etc.).
- DPIE will be contacted immediately if LRFF are present between March and October or are identified as being in their final trimester/with dependent young.
- Non-critical maintenance activities will ideally be scheduled when the camp is naturally empty. Where this is not possible (e.g. at permanently occupied camps) they will be scheduled for the best period for that camp (e.g. when the camp is seasonally lower in numbers and breeding will not be interrupted, or during the non-breeding season, generally May to July).
- Works will not take place in periods of adverse weather including strong winds, sustained heavy rains, extreme heat, cold temperatures or during periods of likely population stress (e.g. food shortages). Wildlife carers will be consulted to determine whether the population appears to be under stress.
- Works will be postponed on days predicted to exceed 35°C (or ideally 30°C), and for one day following a day that reached ≥35°C. If an actual heat stress event has been recorded at the camp or at nearby camps, a rest period of several weeks will be scheduled to allow affected flying-foxes to fully recover. Refer to https://www.environment.nsw.gov.au/topics/animals-and-plants/wildlife-

management/management-flying-foxes/heat-stress-in-flying-fox-camps for further details.

- Evening works may commence after fly-out. Noise generated by the works should create a first stage disturbance, with any remaining flying-foxes taking flight. Works should be paused at this stage to monitor for any remaining flying-foxes (including crèching young, although December – February should be avoided for this reason) and ensure they will not be impacted. All Level 1 and 2 works (including pack-up) will cease by 0100 to ensure flying-foxes returning early in the morning are not inadvertently dispersed.
- If impacts at other sites are considered, in the DPIE's opinion, to be a result of management actions under this Plan, assistance will be provided by the proponent to the relevant land manager to ameliorate impacts. Details of this assistance are to be developed in consultation with the DPIE.
- Any proposed variations to works detailed in the Plan must be approved, in writing, by the DPIE before any new works occur.
- The DPIE may require changes to methods or cessation of management activities at any time.
- Ensure management actions and results are recorded to inform future planning.

Human safety

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

Post-works

- Reports for Level 1 actions will be provided to the DPIE annually. Reports for Level 2 actions will be submitted to the DPIE one month after commencement of works and then quarterly in periods where works have occurred. Each report is to include:
    - results of pre- and post-work population monitoring
    - any information on new camps that have formed in the area
    - impacts at other locations that may have resulted from management, and suggested amelioration measures
    - an assessment of how the flying-foxes reacted to the works, with particular detail on the most extreme response and average response, outlining any recommendations for what aspects of the works went well and what aspects did not work well
    - further management actions planned, including a schedule of works
    - an assessment[7] of how the community responded to the works, including details on the number and nature of complaints before and after the works

[7] A similar approach should be taken to pre-management engagement to allow direct comparison, and responses should be assessed against success measures to evaluate success.

- detail on any compensatory plantings undertaken or required
- expenditure (financial and in-kind costs)
- Plan evaluation and review (see **Section 8.2**).

All Level 2 actions

Prior to works

- Residents adjacent to the camp will be individually notified one week prior to on-ground works commencing. This will include information on what to do if an injured or orphaned flying-fox is observed, a reminder not to participate in or interfere with the program, and details on how to report unusual flying-fox behaviour/daytime sightings. Relevant contact details will be provided (e.g. Program Coordinator). Resident requests for retention of vegetation and other concerns relating to the program will be taken into consideration.
- Where the Plan is being implemented by council, information will be placed on council's website along with contact information.
- DPIE will be notified at least 48 hours before works commence.
- A protocol for flying-fox rescue, in accordance with the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012), will be adopted including contact details of rescue and rehabilitation organisations (refer to **Appendix 9**). This protocol will be made available to all relevant staff, residents and volunteers prior to the action commencing.
- A licensed wildlife carer trained in flying-fox rescue and appropriately vaccinated will be notified prior to beginning works in the event that rescue/care is required.

Monitoring

- A flying-fox expert will undertake an on-site population assessment prior to, during works and after works have been completed, including:
  - number of each species
  - ratio of females in their final trimester
  - approximate age of any pups present including whether they are attached or likely to be crèched
  - visual health assessment
  - mortalities.
- Counts will be done at least:
  - once immediately prior to works
  - daily during works
  - immediately following completion
  - one month following completion
  - 12 months following completion.

During works

- A flying-fox expert will attend the site as often as the DPIE considers necessary to monitor flying-fox behaviour and ensure compliance with the Plan and the Policy. They must also be able to identify pregnant females, flightless young, individuals in poor health and be aware of climatic extremes and food stress events. This person will assess the relevant conditions and advise the supervisor/proponent whether the activity can go ahead.

- Deterrents in buffer areas will be assessed by a flying-fox expert so those that may cause inadvertent dispersal (e.g. canopy-mounted sprinklers) are not used during fly-in.
- At least one flying-fox rest day with no active management will be scheduled weekly. Static deterrents (e.g. canopy-mounted sprinklers) may still be used on rest days.

Vegetation trimming/removal

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

Canopy vegetation trimming/removal

Prior to works

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

During works

- Any tree lopping, trimming or removal is undertaken under the supervision of a suitably qualified arborist (minimum qualification of Certificate III in Horticulture (Arboriculture) who is a member of an appropriate professional body such as Arboriculture Australia).
- Trimming will be in accordance with relevant Australian Standards (e.g. AS4373 Pruning of Amenity Trees), and best practice techniques used to remove vegetation in a way that avoids impacting other fauna and remaining habitat.
- No tree in which a flying-fox is roosting will be trimmed or removed. Works may continue in trees adjacent to roost trees only where a person experienced in flying-fox behaviour assesses that no flying-foxes are at risk of being harmed. A person experienced in flying-fox behaviour is to remain on-site to monitor when canopy trimming/removal is required within 50 metres of roosting flying-foxes.
- While most females are likely to be carrying young (generally September – January) vegetation removal within 50 metres of the camp will only be done in the evening after fly-out, unless otherwise advised by a flying-fox expert.

Bush regeneration

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

Additional mitigation measures for any activity at a nationally important Grey-headed Flying-fox camp

The following additional mitigation measures apply to works at Karloo Street Reserve and Smiths Lake camps:

- The action will not occur if the camp contains females that are in the late stages of pregnancy or have dependent young that cannot fly on their own (generally August to February).
- Disturbance activities will be limited to a maximum of 2.5 hours in any 12-hour period, preferably at or before sunrise or at sunset. Disturbance activities can be defined as any activity, other than routine activities, that disturbs the camp and applies to Level 2 actions.

Flying-fox expert definition

Essential

- Knowledge of flying-fox habitat requirements.
- Knowledge and experience in flying-fox camp management.
- Knowledge of flying-fox behaviour, including ability to identify signs of flying-fox stress.
- Ability to differentiate between breeding and non-breeding females.
- Ability to identify females in final trimester.
- Ability to estimate age of juveniles.
- Experienced in flying-fox population monitoring including static and fly-out counts, demographics and visual health assessments.

Desirable

- It is strongly recommended that the expert is independent of the Plan owner to ensure transparency and objectivity. The Department may be able to help with finding flying-fox experts.
- ABLV-vaccinated (N.B. This is often an essential requirement during management implementation as detailed within the template).
- Trained in flying-fox rescue (N.B. This is often an essential requirement during management implementation as detailed within the template).

Local knowledge and experience.

Appendix 9: Flying-fox rescue protocol

Reference documents:

Office of Environment and Heritage (OEH) 2012, NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes, Office of Environment and Heritage, Sydney.

Office of Environment and Heritage (OEH) 2011, NSW Code of Practice for Injured, Sick and Orphaned Protected Fauna, Office of Environment and Heritage, Sydney.

Purpose

These work instructions are intended for licensed and ABLV-vaccinated wildlife rescue personnel on-site during dispersal activities to monitor, capture or provide first aid treatment for sick or injured flying-foxes that may require human intervention for their survival. Flying-fox rescue must only be attempted by personnel trained and experienced in flying-fox rescue and handling.

This work instruction provides rescuers with information regarding capture and first aid until a flying-fox is in the specialist care of a veterinarian or licensed bat carer.

Requirements

Wildlife rescue personnel involved in flying-fox rescue must:

- be trained and experienced in flying-fox rescue and handling
- be vaccinated against ABLV (titre levels checked at least once every two years)
- be aware of the hazards and risks of coming into contact with bats
- utilise appropriate PPE and equipment for capture, transport and treatment of flying-foxes
- undertake a risk assessment before carrying out a rescue – do not endanger yourself or others during a rescue
- have the contact details for a local veterinarian or bat carer who will accept the sick or injured flying-fox.

Local wildlife rescue organisations include:

- FAWNA (0438 526 660) which covers the Karloo Street Reserve, Cocos Crescent Reserve, Smiths Lake and Pacific Palms camp areas.
- WINC (1300 946 295) which covers the Hawks Nest camp area.

Human first aid

All bats in Australia should be viewed as potentially infected with ABLV. If bitten or scratched by a bat, immediately wash the wound with soap and water (do not scrub) and continue for at least five minutes, followed by application of an antiseptic with anti-viral action (e.g. Betadine), and immediate medical attention (post-exposure vaccinations may be required). Similarly, medical attention should be immediately sought if exposed to an animal's saliva or excreta through the eyes, nose or mouth.

Equipment

- lidded plastic carry basket or 'pet-pack' with bedding (juveniles) / transport container with hanging perch, tall enough for bat to hang without hitting its head (in accordance

with Section 5.1 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012))

- warm water bottle/cold brick
- wraps /towels
- teats for small bottle
- extension pole or broom
- bat first aid kit – juice drink/glucose powder, syringes, cloths for wounds, Betadine/saline, dummy for flying-fox pups. Flying-foxes are only to be offered liquids under advice from a licensed bat carer.

Work instructions

Case assessment

Observe, assess and then determine if/what intervention is required using the decision tree below, adapted from the NSW Code of Practice for Injured, Sick and Orphaned Protected Fauna (OEH 2011).

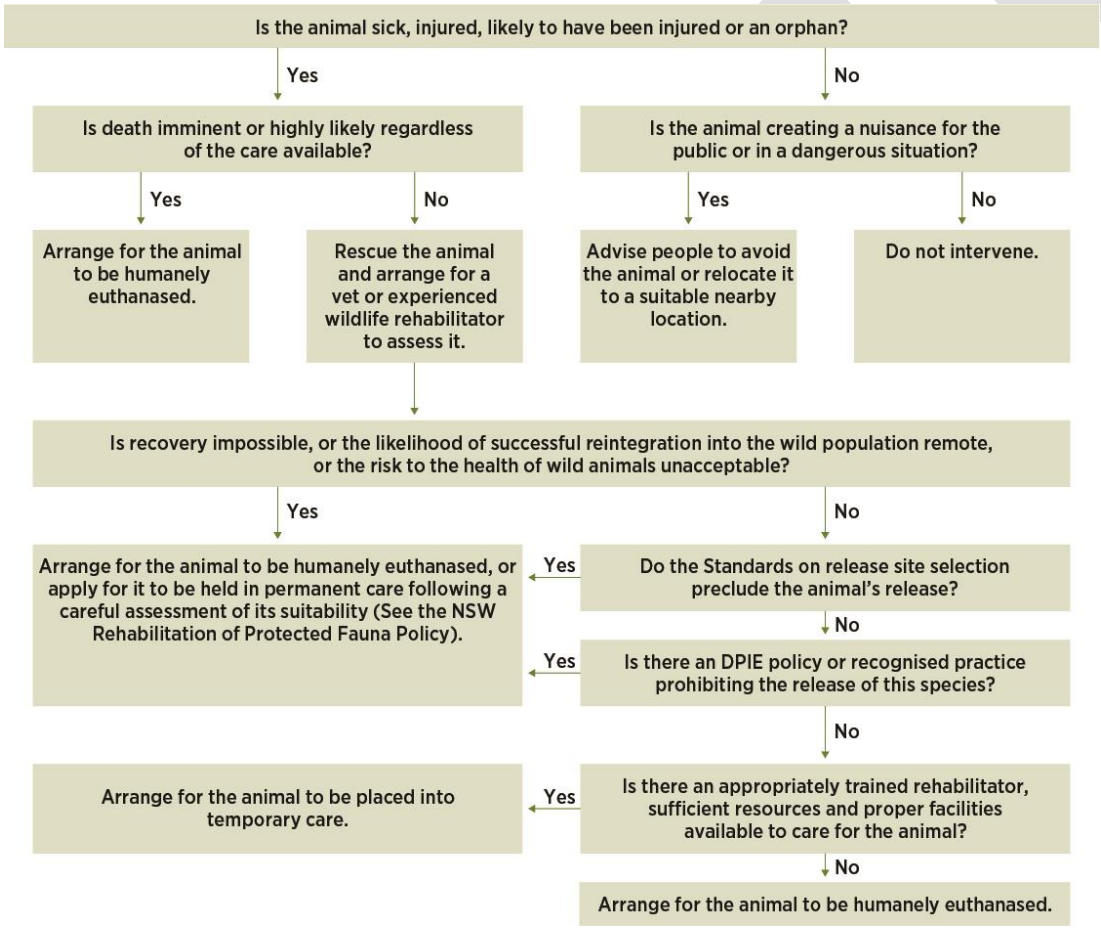


Figure 32 Assessment process

Personnel should approach stressed flying-foxes cautiously. If flying-foxes panic or fly this will waste energy; retreat and continue to monitor behaviour.

Stressed flying-foxes can be identified by the following clinical signs:

- Dehydration: Eyes dull or depressed in skull, change to skin elasticity, skin stays pinched, animal cold, wing membranes dry, mouth dry.
- Heat stress: wing fanning, shade seeking, clustering/clumping, salivating, panting, roosting at the base of trees, on the ground, falling from tree.
- Obvious injury: bleeding, broken bones.

Rescue instructions

As per Section 4 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012):

i The objective is to rescue a flying-fox while minimising further stress and injury to the animal.

ii Before a rescue attempt, rescuers must assess the risks to the flying-fox from environmental hazards and from capture.

iii Rescuers must employ the correct rescue equipment for the condition and location of the flying-fox and be trained in its use.

Example scenarios

1. Bat low in tree:
    - quickly place towel around bat before it can move away
    - grab hold of feet, toes may curl over rescuer's fingers
    - place in carry basket/transport container.
2. Bat high in tree:
    - place pole wrapped in towel in front of bat
    - coax bat onto towel
    - once on towel, quickly move away from branches and lower to ground
    - once on ground, cover with towel and place into carry basket/transport container.
3. A bat caught on barbed wire fence:
    - two people only – one to restrain with towel, while the other untangles
    - put towels on the wire strands under or around to avoid further entanglement
    - if the membrane has dried onto wire, syringe or spray water onto wing
    - use pliers or wire cutter if necessary.

Wear appropriate PPE for all scenarios.

Animal first aid

Physical assessment: Keep animal wrapped and head covered, only expose one part at a time. Examine head. Unwrap one wing and extend. Wrap and extend other wing. Check legs. Examine front and back of body.

Dehydration: Offer water/juice (low acid juice only, e.g. apple/mango) orally with syringe (under supervision/advice from licensed wildlife carer **only**).

Heat stress: Reduce temperature in heat exhausted bats by spraying wings with tepid water.

Hypothermia: May be seen in pups separated from mother – keep head covered and warm core body temperature slowly by placing near (not on) warm water bottle covered by towel.

Bleeding: Clean wounds with room temperature saline or diluted Betadine.

Transport to veterinarian/wildlife carer

See Section 5 of the NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes (OEH 2012) summarised below.

Objective

To transport a flying-fox so as to minimise further stress and injury to the animal.

Standards

a. The transport container must be tall enough for the flying-fox to hang by its feet without hitting its head on the floor.
b. The container must be designed, set up and secured to prevent injuries to the flying-fox. The sides of the container must prevent the flying-fox from poking its head or wings out.
c. The container must be designed to prevent the flying-fox from escaping.
d. The flying-fox must be allowed to hang by its feet from the top of the container or if it is unable to hang, wrapped in material (e.g. sheet or flannel) and placed in a sling so its feet are higher than its head.
e. The container must be kept at a temperature which is appropriate for the age and condition of the flying-fox. A range of 25–27°C is appropriate for an adult. A temperature of 28°C is appropriate for an orphan. A cool or warm water bottle may be required.
f. The container must be ventilated so air can circulate around the flying-fox.
g. The container must minimise light, noise and vibrations and prevent contact with young children and pets.
h. During transport, a container holding a flying-fox must have a clearly visible warning label that says ‘Warning – live bat’.
i. A flying-fox must not be transported in the back of an uncovered utility vehicle or a car boot that is separate from the main cabin.

Guidelines

- Flying-fox transport should be the sole purpose of the trip and undertaken in the shortest possible time.
- The wildlife rehabilitation group’s contact details should be written on the transport container in case of an emergency.

Appendix 10: Biodiversity conservation licence application form

At the time the Plan is submitted to the Department for approval, it should include a completed biodiversity conservation licence application form. The form can include information already contained in the Plan. Alternatively, the land manager should inform the Department that the proposed works are to be assessed under Part 5 of the EP&A Act and will not require a licence application under the BC Act.

The licence application is available at: Biodiversity Conservation Licence.