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A photograph of two grey-headed flying foxes hanging upside down from a tree branch. The foxes have grey faces and chests with a prominent orange-brown patch on their heads. Their wings are dark and folded. The background is a soft-focus green and yellow, suggesting a natural habitat. The image is framed by green circular overlays in the top-left and bottom-right corners.

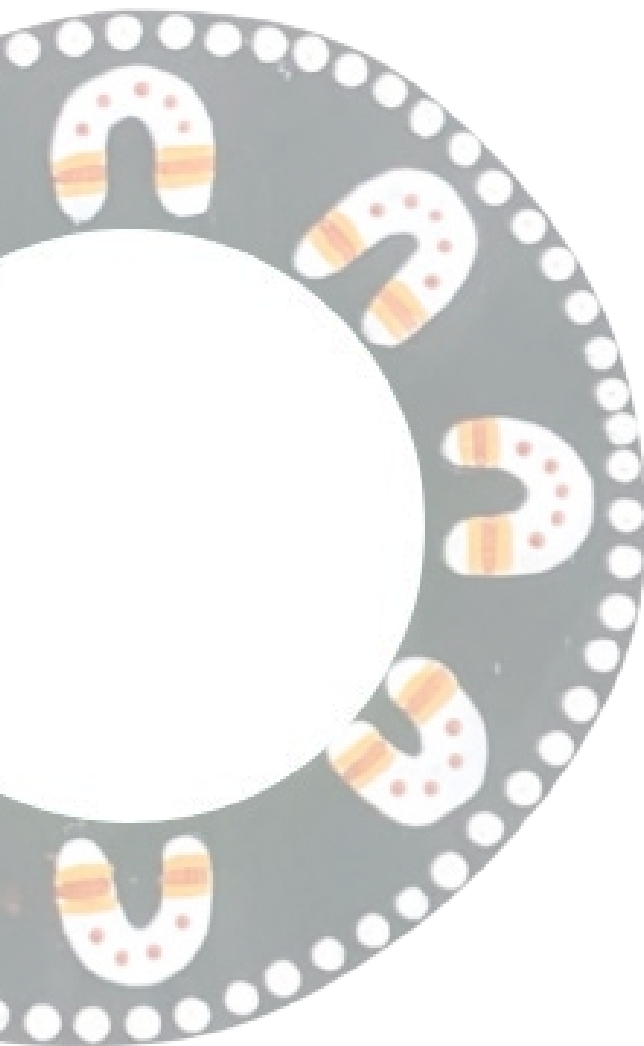
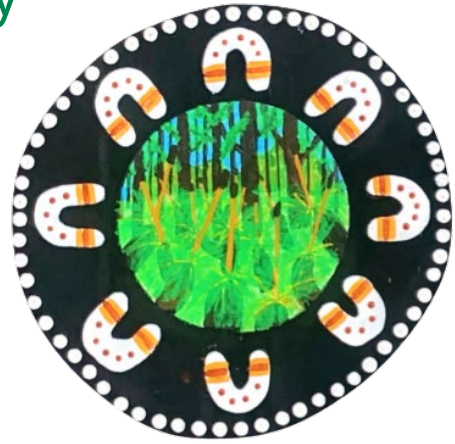
**COMMONWEALTH PARK GREY-HEADED
FLYING-FOX CAMP MANAGEMENT PLAN**

June 2026

NATIONAL CAPITAL AUTHORITY

Acknowledgement of Country

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



Acknowledgements

Ecosure acknowledges the National Capital Authority for assistance in developing this Commonwealth Park Flying-fox Camp Management Plan, particularly Nathan Ward. We also thank the Australasian Bat Society for their reports and data used in the development of this Plan. Additionally, we thank ACT Wildlife and the National Capital Authority for their review of the draft Plan and for providing feedback which was considered and incorporated into the final document.

Acronyms, abbreviations and definitions

ABLV	Australian Bat Lyssavirus
ABS	Australasian Bat Society
ACT	Australian Capital Territory
BFF	Black flying-fox (<i>Pteropus alecto</i>)
Camp extent	The maximum camp extent of Commonwealth Park
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EWE	Extreme weather event
Flying-fox Expert	A person knowledgeable about flying-fox behaviour and is able to demonstrate experience in successfully: (a) classifying species; (b) assessing population numbers; (c) identifying breeding cycles; (d) recognising signs of stress or harm. For example, ACT Wildlife rescuers and carers.
GHFF	Grey-headed flying-fox (<i>Pteropus poliocephalus</i>)
Ha	Hectare
HeV	Hendra Virus
High-risk activity	Activities that have the potential to disturb or harm flying-foxes due to sudden loud noise, intense lighting, high-pitched or vibrational sounds, or the presence of large plant machinery within sight of a camp. Examples include fireworks, flyovers, sound checks, vegetation chipping, temporary fencing installation/removal, rock unloading, excavators, and elevating work platforms.
HSE	Heat stress event
LRFF	Little-red flying-fox (<i>Pteropus scapulatus</i>)
MNES	Matter of national environmental significance
NCA	National Capital Authority
NC Act	<i>Nature Conservation Act 2014</i>
NSW	New South Wales
the Guideline	Referral guideline for management actions in grey-headed and spectacled flying-fox camps (Commonwealth)
the Park	Commonwealth Park
the Plan	This Commonwealth Park Flying-Fox Camp Management Plan
PALM Act	Australian Capital Territory (<i>Planning and Land Management Act 1988</i>)
PPE	Personal protective equipment
WHA	Wildlife Health Australia
Qld	Queensland

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1 Introduction

The National Capital Authority (NCA) engaged Ecosure to review and update the Commonwealth Park Flying-fox Camp Management Plan (the Plan)¹. This Plan complements the Grey-headed Flying-fox Native Species Conservation Plan (ACT Government 2024) and National Recovery Plan for the Grey-headed Flying-fox (DAWE 2021) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Canberra's Commonwealth Park (the Park; Figure 1) is part of National Lands (Commonwealth owned) in the Australian Capital Territory (ACT) and is managed by the NCA. The Park features landscaped gardens, mature trees (some with recognised heritage value), an outdoor performance venue (known as Stage 88), playgrounds, barbeque areas, ponds, cycling paths, and walking trails. The Park hosts a wide range of events each year, including concerts at Stage 88 and major festivals such as Floriade, which has been held annually since 1988.

NCA is committed to conserving flying-foxes as important ecologically and culturally important species at the Park. Consistent presence of flying-foxes at the Park indicates that disturbance (e.g. those related to events, maintenance works and extreme weather events) have been within the camps level of tolerance to date. This Plan outlines mitigation measures to foster coexistence, minimise human-wildlife conflict, maintain public use of the Park and protect this native species.

¹ This Plan supersedes the previous Flying-fox Management Plan for Commonwealth Park (Ecosure 2020).



Flying-fox species in the Park

There are four flying-fox species that inhabit mainland Australia, two of which have been recorded within the Park, **grey-headed flying-foxes** (*Pteropus poliocephalus*; GHFF) and **little red flying-foxes** (*P. scapulatus*; LRFF). Male, female and juvenile GHFF are recorded each year, with breeding and pupping also observed. LRFF have been recorded in 2020 within the Park, though they have not been recorded again (ABS 2021). No black flying-foxes (*P. Alecto*; BFF) have been counted as part of the monitoring at this site, however, four BFF were rescued by ACT Wildlife in February 2020. The Park is a daytime flying-fox camp, which is also known as a roost².

All flying-foxes and their camp habitat are protected (Appendix 1). GHFF are listed as vulnerable under the ACT *Nature Conservation Act 2014* (NC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Flying-foxes are keystone species for their critical role in long-distance pollination and seed dispersal. Flying-foxes forage at night and roost during the day in camps. Camps can be occupied continuously to rarely and the number of flying-foxes can fluctuate significantly on a daily, seasonal, or annual basis.

Grey-headed flying-foxes



Grey-headed flying-foxes indicative species distribution (DPE 2023)

GHFF generally have an annual southerly movement in spring and summer, returning to the northern areas of their range in winter.

GHFF require foraging resources and camp sites within rainforests, open forests, closed / open woodlands. They forage on the fruit and blossoms of native and introduced plants, including orchard species at times. Normally they feed within 50 km of their camp and can travel up to 300 km in a single night.

Little red flying-foxes



Little red flying-foxes indicative species distribution (DPE 2023)

LRFF have the most nomadic distribution, strongly influenced by food availability (meaning the duration of their stay at a site is often very short). Generally, large groups of 1 million+ are found in the more northern sites during key breeding periods, returning to the southern sites in summer.

LRFF have diverse habitat preferences from semi-arid areas to tropical and temperate areas (e.g. sclerophyll woodland, melaleuca swamplands, bamboo and mangroves). They forage almost exclusively on nectar and pollen (occasionally fruit including at orchards).

1.1 Management objectives

The overall aim of the Plan is to support the ongoing management practices and legislative requirements for the flying-fox colony at the Park. The objectives of the Plan are to:

- provide advice to the NCA and its stakeholders (e.g. event managers and volunteer groups) regarding operations and acceptable behaviours of user groups around the colony
- outline suitable mitigation measures for the Park, with consideration to the dynamic nature of the camp (e.g. seasonal influxes), that maintain public use and heritage values of the Park whilst ensuring public safety and animal welfare
- ensure mitigation measures reflect NCA's intention to manage impacts and conserve flying-foxes and their habitat, while supporting ways for the community to coexist with flying-foxes
- facilitate ongoing engagement with Traditional Owners, community, community groups, government, and other stakeholders
- foster community understanding and appreciation of flying-foxes including their ecological role
- ensure compliance with legislation.

1.2 Stakeholders

Preparation of the Plan has involved consultation with NCA staff and key stakeholders (Table 1).

Table 1 Stakeholder groups for Commonwealth Park and flying-fox conservation

Flying-fox conservation	Park and tree management	Event management
NCA Estate Management	NCA Estate Management	NCA Events
ACT Wildlife	NCA Open Space Contractors	Event ACT – ACT Government
Department of Climate Change, Energy, the Environment and Water	National Capital Exhibition	Event organisers
Australasian Bat Society	Canberra and Region Visitor Information Centre	Event Artists, Retailers, and Installers
ACT Government	The Marion (Events Centre) and Walter (Café) Building Tenant	Patrons
Veterinarians able to treat flying-foxes	Park users	Park users
Park users		



Figure 1: Site context

National Capital Authority
Commonwealth Park Grey-Headed Flying-Fox Plan

 Commonwealth Park boundary



2 Site context and values

Table 2 Site values at Commonwealth Park

Site values	Site values description
Camp location	The flying-fox camp is located in the Rhododendron Glade within Commonwealth Park, near Regatta Point (Figure 2). The Park is a large (33 ha) landscaped park on the edge of Lake Burley Griffin on the corner of Parkes Way and Commonwealth Avenue (Figure 1).
Land tenure	The Park is managed by the NCA on behalf of the Commonwealth Government. It is located on National Land, as defined under the <i>Australian Capital Territory (Planning and Land Management) Act 1988</i> (PALM Act) and the land use is mapped as 'Park'.
Camp description	The maximum camp extent is 1.74 ha (Figure 2). Roost trees primarily consist of pine trees, eucalypts, poplars and oaks with an intermittent understory. Canopy trees appear in good condition with limited defoliation. The condition and quality of trees are maintained by park contractors including the removal of dead or dying trees for staff and visitor safety.
Flying-fox occupancy	The camp has been occupied seasonally every year and the maximum number of GHFF recorded at the camp was 8,190 in March 2019 (Figure 3 and Figure 4). The camp meets the criteria of matters of national environmental significance and is classified as a nationally important camp (Appendix 2). Since 2017, there have been more than 2,500 GHFF seasonally occupying the Park. The GHFF consistent presence indicates that the camp can tolerate and habituate to disturbance (e.g. noise from events). Over 40 LRFF were recorded in 2021 within the Park, though they were not recorded again (Figure 4). Four black flying-foxes (BFF) were rescued by ACT Wildlife following the hailstorm in February 2020; however, no BFF have ever been counted as part of the monitoring program.
Potential habitat	While it is recognised that flying-fox camp selection is difficult to predict, known favoured characteristics were modelled up to 20km from the Park (Figure 5) to identify where the camp might relocate due to intended or inadvertent disturbance (detailed methods for this modelling are provided in Appendix 3²). This map shows that the Park is a low conflict site compared to other potential habitat that the flying-fox could move to if they are disturbed. For example, in January 2018 there were anecdotal reports of flying-foxes roosting at a nearby site located on Anzac Parade in heritage trees. Peak numbers recorded at the Park in January 2018 were 4,477, almost half the maximum. Therefore, it is likely this splinter group was not the result of an influx, more likely a temporary disturbance at the Park. This reiterates the importance of conserving the flying-fox camp at the Park for the benefit of the community.
Management response to date	The Australasian Bat Society (ABS) has been surveying the camp since it was first recorded in 2003. However, no formal surveys were completed between 2005-2007. In 2012, NCA and ABS entered an agreement allowing ABS to monitor the camps on NCA land. The ABS provide quarterly census data to the ACT and Commonwealth Governments as part of the National Flying-Fox Monitoring Program. Management to date (Appendix 4) focuses on continuing established actions, including education programs, staff training and collaboration with ACT Wildlife for monitoring and animal care. Measures are in place to manage habitat and limit impacts from events and park operations.

² Note that this assessment was based on known camp preferences, but there were some limitations to the available data. The modelling does not mean that flying-foxes will select highlighted areas, or that camps will not form in less preferable habitat.



Figure 2: Maximum camp extent

National Capital Authority
Commonwealth Park Grey-Headed Flying-Fox Plan

- Commonwealth Park boundary
- Maximum flying-fox camp extent



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Revision: 0
Author: VH
Date: 6/05/2026



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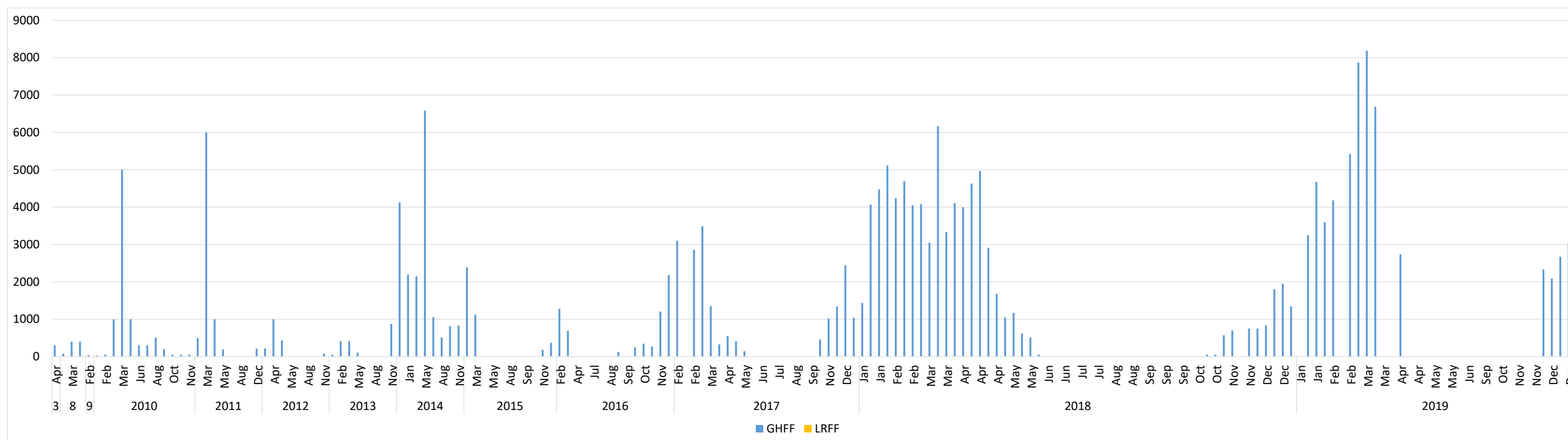


Figure 3 Commonwealth Park flying-fox camp population monitoring from 2003 to 2019 (Source: ABS 2019)

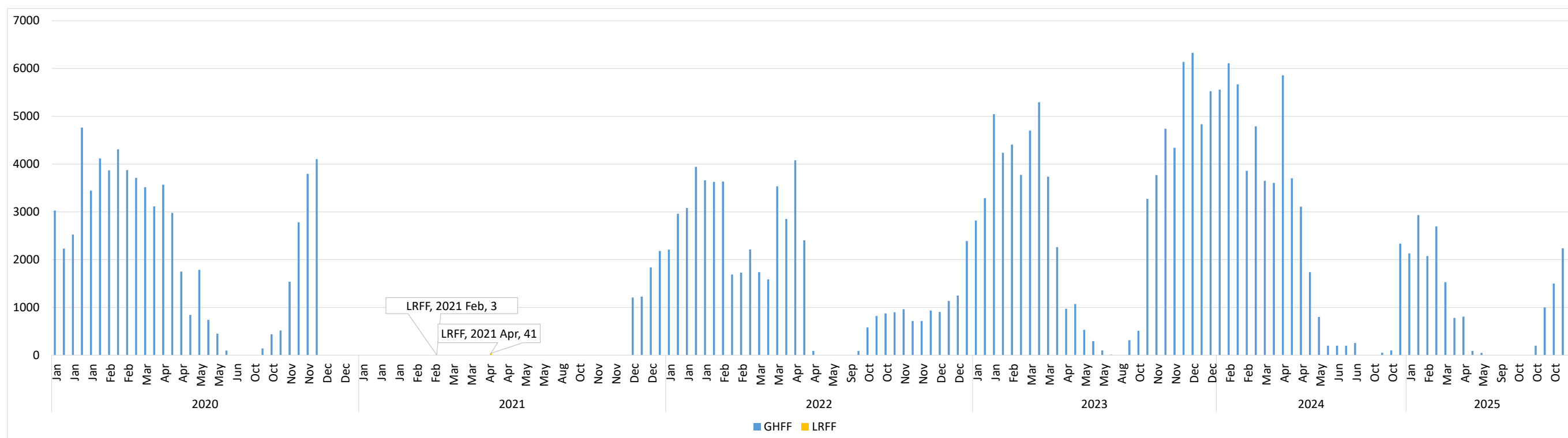


Figure 4 Commonwealth Park flying-fox camp population monitoring from 2020 to 2025 (Source: ABS 2019-2025)



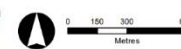
Figure 5: Proximity of sensitive sites to existing and potential flying-fox camps

National Capital Authority
Commonwealth Park Grey-Headed Flying-Fox Plan

- | | |
|---|--------------------------|
| ● Existing/previous flying-fox camp locations | Habitat Potential |
| □ Potential future flying-fox camp locations | ■ 4 - 15 Low |
| ★ Canberra International Airport | ■ 16 - 20 Medium |
| ■ School or child care facility | ■ 21 - 25 High |



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Revision: 2
Author: RSC
Date: 20/03/2019



GDA94 MGA zone 55
Projection: Transverse Mercator
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Report Figure 13 Commonwealth Park Sensitive sites and Habitat Potential
A4

3 Risk-based approach

The Park meets the criteria for a nationally important GHFF camp (Table 2; Appendix 1) as it has been occupied by more than 2,500 GHFF permanently/seasonally for 10 years. Therefore, the Park will be managed using best practice approach to ensure the highest level of protection is afforded to the GHFF and their habitat. NCA is committed to protecting the GHFF as a Matter of National Environmental Significance (MNES) and will continue to promote their value to Park personnel and patrons.

The criteria that classifies a camp as nationally important in the 'Referral guideline for management actions in grey-headed and spectacled flying-fox camps' (the Guideline) (DoE 2015). Appendix 2 includes further information from the Guideline.

While data on the cumulative impacts of organised events around flying-fox camps remain limited, observations at the Park indicate that organised events have resulted in minimal detectable impacts to the camp. No event-related mortality has been recorded in the past five years (ABS 2020–2025), and GHFF population numbers have remained relatively stable (Figure 4). The camp has also demonstrated resilience to recurring organised events and ongoing local disturbances associated with everyday Park use.

However, limitations remain in understanding the potential cumulative effects of high-risk activities. To address this knowledge gap, it is recommended that camp observations and monitoring be undertaken before, during, and after high-risk activities (see Section 4.5 and Section 6).

This Plan provides guidelines for the three management sectors relevant to flying-foxes at the Park, including General Management (Section 4), Park and Tree Management (Section 5) and Event Management (Section 6). Data gathered through this Plan will serve as a baseline for future management decisions and assist with adapting mitigation where necessary.

NCA takes a risk-based approach to proposed mitigation strategies based on:

- potential health, safety, wellbeing and economic implications for the staff and public
- potential flying-fox welfare and conservation impacts
- risk of splintering the camp to other locations that are equally or more problematic.

Current and proposed users of the Park should assess whether their activity requires management or mitigation to reduce direct or indirect impacts to the camp. The process for assessing a proposed activity and its risk to the flying-fox camp includes:

1. determine the type of activity
2. determine the risk to flying-foxes or camp habitat
3. identify suitable mitigation options
4. describe how these options will be applied
5. report on the outcomes of the mitigation.

It is the responsibility of all personnel to ensure compliance with the Plan.

4 General impact avoidance measures

General measures outlined below to avoid impacts to flying-foxes are relevant to all activities carried out within the Park.

4.1 Modification of activity

Modification of proposed activities to reduce impacts can be achieved using the hierarchy of controls (Figure 6).

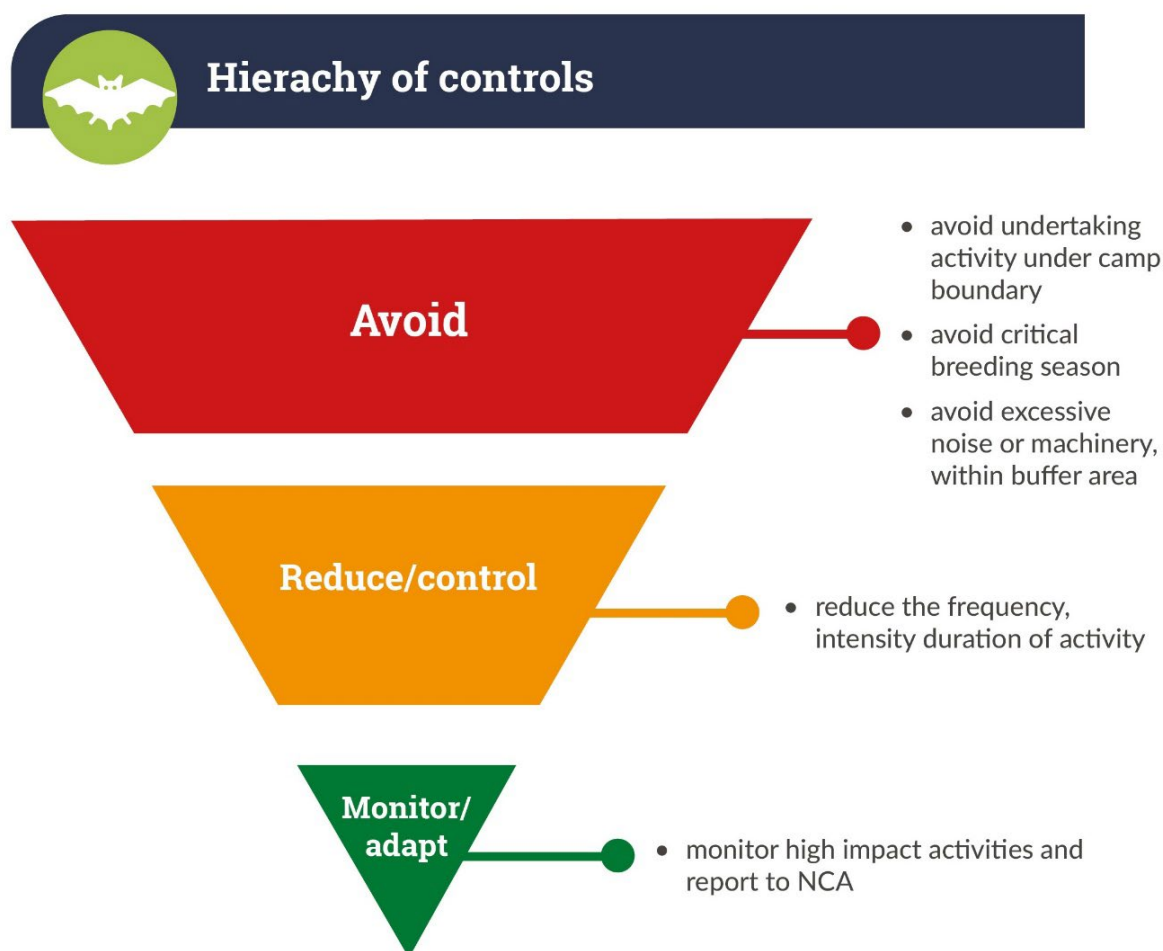


Figure 6 Hierarchy of controls

4.2 Type of activity/disturbance

The type of activities considered low impact (routine) camp management or high impact camp management for the Park are outlined below (Table 3). It is important to note that activities that are identified as routine camp management may have the potential to reach high impact on the camp depending on their duration, frequency, intensity (i.e. noise level produced) and timing (e.g. weather conditions and breeding cycle).

High-risk activities are those that result in:

- Sudden, loud noise and intense lighting e.g. gun salute, flyovers, fireworks, sound checks, lasers.
- High-pitched, percussive or vibrational sounds e.g. motorised chainsaws, vegetation chipping, unloading/loading fence panels during event bump in and bump-out.
- Any large plant machinery within visual line of sight of the camp e.g. excavators, elevating work platforms.

High-risk activities should be avoided in close proximity to the camp during the moderate- to high-risk time of year (i.e. critical breeding season; see Section 4.3) where possible. Where rescheduling or moving activities is not possible, activities may be able to proceed where quarterly monitoring confirms that pups are not present and there is no significant risk of disturbance or harm to flying-foxes. In such cases, the level of management required will be determined by the Flying-fox Expert, who will assess on-ground conditions and provide activity-specific advice, including whether higher or lower management measures are appropriate.

Table 3 Types of disturbance to flying-foxes or their camp and the likely level of impact

Low-risk (routine) camp management*	High-risk camp management*
• mowing grass and similar grounds-keeping activities • application of mulch or removal of leaf litter, rubbish or other material on the ground • weed removal, minor modification of understorey vegetation • removal of tree limbs or a small proportion of the whole trees in a camp if they are significantly damaged and pose a health and safety risk, as determined by a qualified and experienced arborist • planting vegetation and habitat restoration • minor habitat augmentation for the benefit of roosting flying-foxes • installation of signage or similar-scale infrastructure • passive recreation (i.e. low noise recreation) • educational activities, such as study or observation of roosting flying-foxes.	• habitat modification* • clearing vegetation* • acoustic disturbance • sound checks / concerts • visual disturbance • physical disturbance • disturbance with smoke • operations which result in excessive noise e.g. chainsaws, chippers • drones • fireworks • gunfire or explosions • low flying aircraft (including jets, helicopters and hot-air balloons).

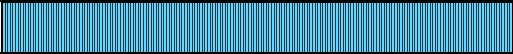
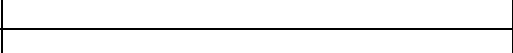
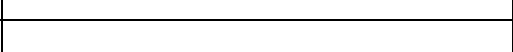
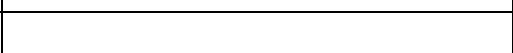
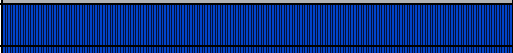
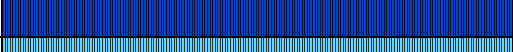
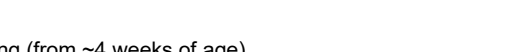
*Note: risk level may change between low and high depending on the activity's duration, frequency, intensity (i.e. noise level produced) and timing (e.g. weather conditions and breeding cycle). Risk level should be confirmed in consultation with a Flying-fox Expert when needed.

4.3 Determining risk to flying-foxes and appropriate timing

Spring to summer is the highest risk period in the GHFF breeding cycle (i.e. during pregnancy, when dependent young are present or crèching and flightless, or when they are left in the camp overnight). Summer is also when flying-foxes will be susceptible to heat stress events. Medium risk periods are generally later in the summer to account for late breeding. Low-risk is considered outside the breeding season. Mitigation and management measures applied should increase with each level of risk (Table 4).

Note: This timing is indicative only and out of season breeding commonly occurs. Regular monitoring by a Flying-fox Expert is critical to ensure pregnant females and/or dependent young are not impacted.

Table 4 Critical breeding period and potential level of risk for grey-headed flying-foxes* from disturbance.

Month	Breeding	Risk
Jan		H
Feb		H
Mar		M
Apr		L
May		L
Jun		L
Jul		L
Aug		L
Sep		M
Oct		H
Nov		H
Dec		H

Legend

	Crèching (from ~4 weeks of age).
	Peak conception.
	Final trimester.
	Peak birthing.
	Lactation.
	Low-risk (L) – Dependent young unlikely to be present/impacted. Activities/disturbance unlikely to cause impacts, preferred time for management and non-urgent maintenance/construction.
	Moderate risk (M) – Dependent young may be present/impacted. Activities/disturbance s may cause impacts without sufficient controls, advice required for any activities with high-risk of impacts.
	High-risk (H) – Dependent young likely to be present/may be impacted. Activities/disturbance likely to cause impacts without sufficient controls, advice and monitoring required for any activities with high-risk of impacts.

*LRFF breeding information has been omitted from the Plan as it is highly unlikely that LRFF would birth as far south as Canberra. Additionally, they have only been recorded in low numbers and have not been observed in the Park since 2021. If LRFF are observed in the Park during their peak breeding season (April-June), an expert flying-fox assessment is required to determine if pups are present.

4.4 Extreme weather events

Along with anthropogenic impacts (e.g. land clearing), climate-driven impacts such as associated increase in the severity and frequency of heat-stress events (HSE), droughts, bushfires, cold snaps and hailstorms, can greatly impact flying-fox populations and their habitat. In 2020 an estimated 600 GHFF died in the Park over several months because of bushfires and their lingering smoke, high temperatures, and a devastating hailstorm (ACT Government 2024). Therefore, protection of flying-foxes and their habitat needs to be a primary consideration in any flying-fox management plan.

NCA has developed an Extreme Weather Event Response Plan (Ecosure 2022), which outlines how to effectively facilitate and support a response to extreme weather events (i.e. heat, storms or cold snaps; EWE). This plan takes an adaptive management approach based on observing flying-fox behavioural responses, with works to be modified or ceased if monitoring identifies stress indicators or disturbance behaviours.

ACT Wildlife has also written the Act Wildlife Flying-Fox Extreme Weather Event Plan (2023), which provides key information and an approved approach for ACT Wildlife volunteers assisting with EWEs affecting the ACT flying-fox population.

Decision-makers must refer to the EWE plan and ACT Wildlife HSE Plan during periods of elevated risk, or where activities have the potential to disturb roosting flying-foxes during extreme weather conditions. This will help ensure that appropriate monitoring, adaptive management measures and response protocols are implemented.

The NCA, in collaboration with the ABS and ACT Wildlife, has implemented HSE mitigation measures at the Park. This includes using a sprinkler system activated under high-temperature conditions and an in-camp weather station installed to improve microclimate data accuracy. The weather station, supported through ACT Government funding and installed with NCA assistance, complements external reference data and enables more robust evaluation of misting effectiveness. This integrated monitoring approach supports adaptive management while contributing to improved understanding of HSE interventions (ABS 2025).

4.5 Monitoring and buffer distances

Regular and robust monitoring of the flying-fox camp by a Flying-fox Expert will enable NCA to assess impacts associated with management activities and events. Long-term monitoring data, including quarterly surveys undertaken by the ABS, provide an established baseline for understanding camp dynamics, seasonal patterns, and population trends.

Monitoring will be used to:

- assess flying-fox camp resilience and tolerance to disturbance
- evaluate the effectiveness of mitigation measures
- identify thresholds for when management intervention is or is not required, such as:
 - noise disturbance thresholds
 - site-specific climatic variables (e.g. temperature, humidity).
- inform proportional monitoring and management effort over time.

Monitoring requirements will be risk-based and informed by existing long-term data. The type of flying-fox monitoring and frequency are outlined below (Table 5).

Table 5 Flying-fox monitoring type and frequency

Monitoring type	Frequency	Details
Routine monitoring	Quarterly	Will continue to track long-term trends (aligned with ABS surveys).
Targeted monitoring	As required	Additional monitoring may be undertaken during periods of increased sensitivity (e.g. breeding season) or high-intensity park use
Monitoring during major construction works within 300 m*	As required	Where new major construction is planned, additional monitoring and activity-specific advice will be required as needed.
Event-based monitoring (high-risk activities – see section 5.1 and 6.1 for more details))	- Prior to the activity - During the activity (duration determined by a Flying-fox Expert) - Immediately following completion.	Addressing the current knowledge gap regarding the cumulative impacts of disturbances on the GHFF camp is critical. Disturbance events may have compounding effects, increasing the likelihood of mass flushing and associated risks such as injury or mortality. Disturbances occurring during peak reproductive periods present additional risks, including pup separation, abandonment, and drops. Monitoring before, during and after events represents best practice for managing these risks. Pre-event monitoring enables the identification of camp conditions and informs the implementation of appropriate mitigation measures (for example, determining whether dependent pups are present). Monitoring during an event allows for the detection of any immediate behavioural responses or adverse impacts to the camp, while post-event monitoring assesses the effectiveness of mitigation measures and identifies any delayed impacts. Overall, these monitoring phases provide an evidence base for adaptive management and help inform future event planning and risk mitigation³.

*any major construction or development in the Park will require review of this Plan.

Monitoring data will be periodically reviewed to:

- assess cumulative impacts of disturbance (including noise)
- refine mitigation measures and buffer distances
- determine whether specific activities require ongoing monitoring.

Where sufficient evidence demonstrates that activities pose low-risk to the camp, monitoring and mitigation requirements may be reduced accordingly.

Monitoring data will inform buffer distances. The distances should be applied using an adaptive management approach and adjusted if monitoring indicates that flying-foxes are tolerating the activity without observable signs of stress (Table 6). Any adjustments should occur under observation by a Flying-fox Expert. During periods of elevated risk or sensitivity, a precautionary approach should be adopted, with more conservative buffers informed by previous behavioural observations and site-specific flying fox response data. If signs of stress are shown, the Flying-fox Expert observing may propose to cease, delay or modify the activity and/or undertake additional monitoring.

³ Where multiple events occur in close succession or are close to a previous monitoring event (e.g. quarterly monitoring), and post-event monitoring from the preceding events confirms that camp conditions have not changed, additional pre-event monitoring may not be necessary. Findings from the most recent monitoring program may be used to inform management measures for the subsequent event, provided the information remains current and relevant.

4.6 Flying-fox Expert

A suitably experienced Flying-fox Expert will have the following understanding of signs of stress in flying-foxes (Table 6) and may advise higher (e.g. cessation or delays) or lower management advice (modifications and/or additional monitoring) based on what is occurring on-ground. Management advice given by the Flying-fox Expert will ensure flying-fox welfare and compliance with legislation and the Plan. The Flying-fox Expert should be vaccinated and able to competently evaluate the effects of the event as listed in the monitoring form (Appendix 5).

ACT Wildlife currently care for injured, sick and orphaned native animals and are the primary group to attend the Park in response to GHFF issues (injured, sick, or orphaned pup). The NCA signed an Environmental Agreement with ACT Wildlife regarding activities where coordination between parties is necessary to protect the flying-fox. The Agreement expires 30 June 2026 and the NCA will be looking to enact a new arrangement going forward.

Table 6 Signs of stress in flying-foxes

Potential impact and signs	Action
Initial signs of stress: flying-foxes are generally agitated and likely to take flight.	Reduce the intensity, duration or proximity of works where practicable. Increase buffers and continue behavioural monitoring by a Flying-fox Expert. If behaviours escalate: - during event works, contingency measures (e.g. misters and sprinklers) and additional monitoring are to be implemented based on advice from the Flying-fox Expert. - non-critical activities (e.g. maintenance works, bump-in/out) are to be delayed in the immediate area and contingency measures implemented.
Unacceptable levels of stress: - panting and/or spreading saliva on their body by licking - located on or within 2 m of the ground - unusual vocalisations >50% of the camp take flight - flying-foxes in flight for more than 2 minutes - flying-foxes leave the camp during daylight hours.	During event works, contingency measures and additional monitoring are to be implemented based on advice from the Flying-fox Expert. Non-critical events (e.g. maintenance works, bump-in/out) to be delayed in the immediate area until the supervising Flying-fox Expert advises that works can safely commence. The supervising Flying-fox Expert may determine whether works can continue in alternative areas of the site. If works or activities cannot be modified, the Flying-fox Expert must be contacted immediately for advice. Buffer distances and work methods to be reviewed before recommencement. Incident and behavioural observations to be documented.
Dependent young at risk: - adults moving away from dependent young - adults carrying young being disturbed.	During event works, contingency measures and additional monitoring are to be implemented based on advice from the Flying-fox Expert. Non-critical events (e.g. maintenance works, bump-in/out) to be delayed in the area and the need for rescue/intervention determined by a Flying-fox Expert. If dependent young are dropped, abandoned or separated, ACT Wildlife are to be contacted immediately to determine the appropriate response. ACT Wildlife and/or other Flying-fox Expert/s are to be notified prior to works and available if required. Non-critical works must not recommence until the risk to dependent young has been addressed.

Potential impact and signs	Action
Injury/death: a flying-fox appears to have been injured/killed on site (including aborted foetuses).	Non-critical works (e.g. maintenance works, bump-in/out) to be delayed and the area secured. Where possible, event works in the immediate area to be moved or temporarily ceased and the area secured. Implement additional monitoring based on advice from the Flying-fox Expert Injured wildlife is to be managed in accordance with relevant health considerations and wildlife care protocols (Appendix 6 and Appendix 7). Works to be rescheduled or adapted sufficiently so that significant impacts (e.g. injury or mortality) are highly unlikely to occur, following consultation with the Flying-fox Expert.

4.7 Education and awareness programs

With the flying-fox camp located in an accessible area to park users, routine visitor activities have the potential to disturb and/or stress roosting flying-foxes. There is also potential for park users to encounter flying-foxes, e.g. dropped pups, which must not be touched by unvaccinated and untrained persons.

Education and awareness programs help increase community understanding and improve perceptions of flying-foxes. The greater the understanding of flying-foxes, the greater the safety – to flying-foxes and humans.

NCA will improve awareness of flying-fox ecology and management by installing signage about:

- flying-fox ecological role
- flying-fox conservation status
- public health advice and appropriate behaviour near the camp
- significance of the site as the only persistent flying-fox camp in the ACT.

This initiative complements broader education and engagement activities, including “bat nights” and flying-fox training provided by ACT Wildlife.

The NCA has also undertaken training for relevant staff/volunteers and contractors involved in any flying-fox management actions (see Appendix 4 for further details).

4.8 Human health and safety

All animals have the potential to pose human health risks (Appendix 6). Any animal excrement can have bacteria or fungus present which can cause human health impacts if inhaled/swallowed. Issues can be easily avoided with standard hygiene practices, such as avoiding contact with faeces, and washing hands after working under the camp.

Under no circumstances should any staff, contractor, or visitor attempt to touch or handle a live flying-fox without the appropriate training and vaccinations. If a flying-fox is on or near the ground, an exclusion area should be established and clearly demarcated to prevent human interaction with the animal. If a flying-fox needs to be rescued, a flying-fox specialist (e.g. ACT Wildlife) must be contacted immediately and the flying-fox injury and rescue guidelines outlined in Appendix 7 should be followed.

The following measures should be adopted when working within or near the flying-fox camp (note, contractors are responsible for conducting their own risk assessment prior to commencing):

- all personnel inducted and briefed prior to works commencing
- all personnel to wear appropriate personal protective equipment (PPE): long sleeves and pants, eye protection, gloves, broad-brimmed hat
- adopt appropriate hygiene practices such as hand washing with soap and water before eating or smoking
- assess the risk of aerosoling excrement (e.g. ground disturbance) and provide suitable dust respirators if required [Working with Bird and Bat Droppings](#)
- if working underneath the active camp, wash clothes daily. Work crews should also have a spare set of clothes to change into at end of shift in the event clothes are contaminated with flying-fox urine/faeces. Contaminated clothes should be placed in a plastic bag for transport home and then immediately washed.
- if a person is bitten or scratched by a bat, the wound should immediately be washed (**not scrubbed**) with soap and water for at least fifteen minutes, followed by application of an anti-viral antiseptic (e.g. Betadine) and seek immediate medical attention (post-exposure vaccinations may be required)
- medical attention should also be immediately sought if a person is exposed to an animals' saliva or excreta through the eyes, nose or mouth.

Carcass (dead animal) removal can be safely undertaken by staff or contractors using the following precautions.

Disposal of Individual or Small Numbers of Flying-foxes:

- Deceased flying-foxes may be double-bagged, with bags tied, and disposed of in the general waste (red-lidded bin).
- Alternatively, carcasses may be taken to the [Mugga Lane Resource Management Centre](#) for disposal in the designated animal burial area. Disposal fees apply.

Temporary Storage:

- Where multiple deceased flying-foxes are found over a short period and immediate disposal is not practical, carcasses may be double-bagged and temporarily stored in a dedicated freezer until transport and disposal can be arranged.

Disposal of Larger Quantities:

- Where larger numbers of deceased flying-foxes are collected, disposal must be arranged through the on-site contractor at [Mugga Lane Resource Management Centre \(Remondis\)](#).
- Carcasses will be disposed of in the designated animal burial area and applicable disposal fees will apply.

Reporting Requirements:

- Any unusual mortality event, including the discovery of six or more deceased flying-foxes within a short period, must be reported immediately to ACT Wildlife.

- ACT Wildlife may undertake additional monitoring or investigations to determine the cause of increased mortality.
- Records of deceased flying-fox removals, including date, location, estimated number of animals, and disposal method, should be maintained by contractors and park staff.

Additional information on flying-fox injury and rescue guidelines is provided in Appendix 7.

5 Park and tree management

NCA Estate Management team is responsible for managing and maintaining the Park. To ensure the well-being of the flying-fox camp in the Park, opportunities should always be taken to modify park and tree management where possible or enforce mitigation management practices when required.

5.1 Potential impacts to the camp

5.1.1 Disturbance to flying-foxes from park maintenance

NCA's contractors are responsible for Park maintenance such as mowing of grass, garden care and path maintenance. Although machinery does create noise disturbance, flying-foxes can tolerate and habituate to consistent and low levels of noise. Excessively loud, sharp, sudden and high-pitched sounds, such as those from a wood chipper or chainsaw, will cause more stress for flying-foxes and should be considered a high-risk activity during the breeding season when flightless dependent young are likely to be present (see Section 3 and Section 4).

5.1.2 Damage to vegetation by flying-foxes

Large numbers of roosting flying-foxes can damage vegetation however, this should be considered in the context of the critical ecological services flying-foxes provide and the associated benefits to other species. Most native vegetation is resilient and generally recovers well (e.g. casuarina and eucalypts) and flying-foxes naturally move within a camp site allowing vegetation to recover. However, damage can potentially be significant and permanent, particularly in small patches of vegetation. Intervention may be required if permanent damage is likely.

5.1.3 Damage to vegetation from operations and events

Dead or damaged trees and other vegetation are removed from the Park as required. Damage to vegetation can be due to event-related activities, uneven watering and significant disruption to tree roots from construction and heavy equipment and vehicle movement (McIlroy 2016). Dead trees require removal for the safety of park users and staff working underneath vegetation.

5.2 Measures to avoid impacts

Protecting the camp vegetation structure and quality is important because of the limited roosting space available for the flying-foxes in the camp and the lack of other suitable camp

locations in the area. Effective tree and camp management will:

- help flying-foxes to cope with HSE and other extreme weather events
- reduce the likelihood of flying-foxes abandoning the camp and relocating to undesirable locations.

To protect the longevity of the camp and reduce impacts to the flying-foxes and their habitat, the following principles should be followed for park and tree management works (Table 7).

Table 7 Principles for park and tree management works within the Park

Management Component	Approach	Objective	Notes
Existing restoration works	Continue and build on habitat restoration undertaken to date	Maintain and improve camp habitat condition	See Appendix 4 for details of works completed by the NCA
Canopy management	Progressive replacement planting within the maximum camp extent (Figure 2)	Ensure long-term availability of roost trees	Supports camp persistence at the Park
Understory rehabilitation	Replace lawn and simplified ground layers with suitable understory species	Improve structural complexity and roost suitability	Provides refuge and supports preferred camp structure
Microclimate regulation	Maintain layered vegetation (canopy, mid-story, ground cover)	Reduce heat stress and exposure to extreme weather	Critical during heat stress events
Species selection	Prioritise hardy, fast-growing, and disturbance-tolerant species	Improve resilience of vegetation to flying-fox use	Avoid species prone to breakage or decline under roosting pressure
Camp extent planning	Restore vegetation across maximum camp footprint (not just currently occupied areas)	Allow for population growth and seasonal expansion	Reflects variable camp occupancy patterns
Implementation timeframe	Staged, long-term revegetation	Align expectations with tree maturation timeframes	Roost suitability may take several years to develop
Adaptive management	Adjust planting and management based on monitoring outcomes	Ensure effectiveness over time	Informed by ongoing monitoring and site conditions

The following mitigation measures (Table 8) are provided for park and tree management activities that could cause disturbance to flying-foxes and the camp. All general mitigation measures in Section 4 also apply.

Table 8 Mitigation measures to reduce disturbance to flying-foxes during park and tree management

Activity Type	Activity	Preferred Timing	Duration Limits	Mitigation Measures	Specific Controls
All	Various	Various	Various	Various	Refer to all general mitigation measures (Section 4)
Routine maintenance	Mowing	Winter to early spring preferred	≤6 hrs/day; ≤18 hrs/week	Start works away from camp and progress gradually	No mowers to be driven directly under roost trees; install/maintain bollards where required
	Operation of machinery	As required	≤2 hrs/day; ≤10 hrs/week (for loud equipment)	Use low-noise equipment where possible	Avoid sudden start-up near camp
Vegetation works	Chipping	As required	≤2 hrs/day; ≤10 hrs/week	Ensure sufficient distance to avoid disturbance of roosting flying-foxes (see Section 4.5)	Must not occur during late pregnancy or when dependent young are present
	Loud machinery (e.g. chainsaws)	As required	≤2 hrs/day; ≤10 hrs/week	Start equipment away from camp and allow acclimatisation	Ensure sufficient distance to avoid disturbance of roosting flying-foxes (see Section 4.5)
Tree works	Tree removal / trimming	Winter preferred (camp unoccupied)	≤2 hrs/day; ≤10 hrs/week (if camp present)	Supervised by qualified arborist	No tree with roosting flying-foxes to be removed or trimmed; observer required within 50 m
	Emergency tree works	As required	As necessary	Minimise disturbance	Flying-fox specialist to advise and monitor
Habitat restoration	Planting / revegetation	Annually (staged)	No limit (hand tools)	Maintain canopy and understory structure	Use species consistent with site; prioritise succession planting
	Weed control	As required	No limit (hand tools)	Prefer manual removal in core habitat	If required, undertake after fly-out and outside crèche period
Events & infrastructure	Bump in / bump out	As scheduled	Short-term	Minimise disturbance and ground impact	No construction under canopy dripline
	Displays / structures	Temporary	Event duration only	Minimise disturbance and ground impact Use existing disturbed areas where possible Rotate locations where possible.	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5). If lighting (ground based only) is required in Rhododendron Glade for events (e.g. Floriade) these are not to shine directly into camp trees.
	Temporary paths	As required	Temporary	Use existing disturbed areas where possible	No construction under canopy

6 Event management

NCA Events team is responsible for managing organisers of events on NCA estate. To ensure the well-being of the flying-fox camp in the Park, opportunities should always be taken to modify events where possible or enforce mitigation management practices when required.

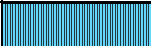
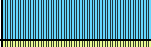
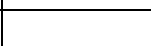
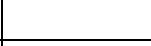
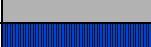
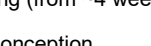
6.1 Potential impacts to the camp

Potential impacts to flying-foxes from events include disturbance to rest periods, particularly during the day due to noise. Sharp, sudden and high-pitched sounds such as those from fireworks or cannons will cause more stress for flying-foxes and should be considered a high-risk activity. Aircraft (e.g. hot air balloons, planes, helicopters, military aircraft, drones) can cause stress on the flying-fox. As the flying-fox can take flight en masse, they also pose an increased risk to the aircraft.

Event impacts are not limited to the event itself. Concerts and events include bump in and bump out periods for set up and pack down, extending the duration of impact for a one-day event (see Section 4.2).

In addition to direct disturbances, some events may result in indirect impacts to flying-foxes. For example, Floriade runs for one month but spends another eight months of the year in construction and is deemed a high-risk activity. Although the impacts from Floriade are indirect, the cumulative impacts from changed water regimes and compaction of soil and roots is known to contribute to the death of trees on an annual basis. This is a major concern for the available habitat and the limited extent of roosting space for the colony. outlines required mitigation measures. Events occurring during high and medium risk periods of the GHFF breeding season are outlined below (Table 9). This breeding season timing is indicative only and out of season flying-fox breeding commonly occurs. Regular monitoring by a Flying-fox Expert is critical to ensure pregnant females and/or dependent young are not impacted.

Table 9 Events occurring during the low, medium and high-risk periods of the grey-headed flying-fox* breeding season

Month	Breeding	Risk	Events [^]
Jan		H	Australia Day
Feb		H	
Mar		M	Skyfire, Canberra Day Symphony in the Park, Floriade
Apr		L	Floriade, Anzac Day
May		L	Floriade
Jun		L	Floriade
Jul		L	Floriade
Aug		L	Floriade
Sep		M	Floriade
Oct		H	Floriade
Nov		H	
Dec		H	New Years Eve

Legend

	Crècheing (from ~4 weeks of age).
	Peak conception.
	Final trimester.
	Peak birthing.
	Lactation.
	Low-risk (L) – Dependent young unlikely to be present/impacted. Activities/disturbance unlikely to cause impacts, preferred time for management and non-urgent maintenance/construction.
	Moderate risk (M) – Dependent young may be present. Activities/disturbance may cause impacts without sufficient controls, advice required for any activities with high-risk of impacts.
	High-risk (H) – Dependent young may be impacted. Activities/disturbance likely to cause impacts without sufficient controls, advice and monitoring required for any activities with high-risk of impacts.

*LRFF breeding information has been omitted from the Plan as it is highly unlikely that LRFF would birth as far south as Canberra. Additionally, they have only been recorded in low numbers and have not been observed in the Park since 2021. If LRFF are observed in the Park during their peak breeding season (April-June), an expert flying-fox assessment is required to determine if pups are present.

[^]High-risk activities associated with any event require additional monitoring particularly in high-risk times of year

6.2 Mitigation measures to reduce impacts

To reduce impacts to the flying-foxes and their habitat, the following mitigation measures should be followed for all events within the Park:

- Food vendors, temporary structures and their associated back of house areas must not be set up within the camp extent (Figure 2), including the drip zone of the associated trees. These facilities must be located outside the camp extent and, where possible, maintain a buffer from the camp. The Flying-fox Expert must confirm the appropriate buffer distance based on site-specific conditions (see Section 4.5).
- All excavation is to be excluded within the camp extent (Figure 2), including the drip zone of the roost trees.
- Aircraft (e.g. hot air balloons, planes, helicopters, military aircraft) will need to maintain a conservative initial distance of 200 m (Figure 7) from Rhododendron Glade at the Park for the welfare of the flying-foxes unless at sufficiently high altitude to avoid disturbance.
- Monitoring before, during and after high-risk activities must be undertaken by a suitably qualified Flying-fox Expert with appropriate vaccinations (see Section 4.6).

Events that may disturb flying-foxes and the camp, their activity risk status, along with specific mitigation measures, are outlined below (Table 10). All general mitigation measures in Section 4 also apply.

Table 10 Summary of event activities, risk levels (breeding and activity risk), and mitigation measures.

Event	Risk Period^	Activity Risk*	Action	Frequency	Duration	Mitigation Measures
All	Various	Various	Various	Various	Various	Refer to all general mitigation measures (Section 4). E.g. camp monitoring and vaccinated person on site to rescue if required, adjust timing of event if flying-fox impacts confirmed.
Australia Day	Medium	High	Drones	4 nights, annually	15 minutes per show	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5).
		High	Gun salute	1 day, annually	10 minutes	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5).
		High	Military aircraft fly over	1 day, annually	20 minutes	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5) unless at sufficiently high altitude to avoid disturbance.
Skyfire	Medium	High	Fireworks	1 night, annually	20 minutes	Maintain a suitable buffer distance between launch sites and camp boundary(see Section 4.5). Where possible, avoid displays near dusk and dawn when disturbance is higher. Refer to all general mitigation measures (Section 4).
		High	Military aircraft fly over	1 night, annually	1 – 2 fly overs for 20 minutes each	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5) unless at sufficiently high altitude to avoid disturbance.
		High	Gun Salute	1 night annually	5 minutes	Ensure sufficient distance from Rhododendron Glade to avoid disturbance of roosting flying-foxes (see Section 4.5).
Floriade	High	High	All Activities	1 month, annually (event)	9 months total (includes set and pack down)	Reconfigure displays so that roost trees are not impacted. Delineate exclusion zone of camp boundary. Replace (like for like) any damaged roost tree or understorey vegetation. Event organisers and/or designers to ensure displays not set up under or inside camp boundary. If lighting must be installed within the camp boundary, it must be ground based only and can not shine directly into camp trees.
New Years Eve	High	High	Fireworks	1 night, annually	20 minutes	Maintain a suitable buffer distance between launch sites and flying-fox camp boundary (see Section 4.5). Where possible, avoid displays near dusk and dawn when disturbance is higher. Refer to all general mitigation measures (Section 4).
Concerts / Festivals (including touring acts, Symphony in the Park, Carols by Candlelight etc)	Various	High	Increased noise during day and night	1-5 annually	Up to 12 hours	Refer to all general mitigation measures (Section 4). E.g. camp monitoring and vaccinated person on site to rescue if required, adjust timing of event if flying-fox impacts confirmed.

Event	Risk Period [^]	Activity Risk [*]	Action	Frequency	Duration	Mitigation Measures
Low impact community / cultural events with EPA Authorisation	Various	Low	Increased noise during day and night	1-5 annually	Up to 12 hours	Refer to all general mitigation measures (Section 4). E.g. camp monitoring and vaccinated person on site to rescue if required, adjust timing of event if flying-fox impacts confirmed.
Low Flying Aircraft over the Park	Various	High	Aircraft and Drones	Various	Various	Ensure sufficient distance from Rhododendron Glade (horizontal and/or vertical distance as required) to avoid disturbance of roosting flying-foxes (see Section 4.5).

^{*}Further information on activity risk is provided in Section 4.2.

Note: the activity risk level may change between low and high depending on the activities duration, frequency, intensity (i.e. noise level produced) and timing (e.g. weather conditions and breeding cycle). Activity risk level should be confirmed in consultation with a Flying-fox Expert when needed.

[^] Further information on the risk period is provided in Table 9 Events occurring during the low, medium and high-risk periods of the grey-headed flying-fox^{*} breeding season



Figure 7: Commonwealth Park camp location

National Capital Authority

Commonwealth Park Grey-Headed Flying-Fox Plan

 Aerial exclusion zone -
unless at sufficiently high
altitude to avoid disturbance.



Job number: PR9556.1
Revision: 0
Author: KF
Date: 19/03/2019



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Metres

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

7 Plan evaluation and review

7.1 Plan administration

This Plan adopts an adaptive management approach, whereby mitigation measures are continuously refined in response to monitoring outcomes, emerging research, and changes in site conditions within the Park.

This Plan will be reviewed annually by NCA including ongoing evaluation of the monitoring data and mitigation measures. A comprehensive review of the Plan will be undertaken every five years, incorporating new research, updated policy, and long-term monitoring trends. The following may also trigger a review of the Plan:

- changes to relevant legislation
- major construction work or development in the Park
- any negative incident associated with roosting or foraging flying-foxes at the Park.

7.2 Monitoring plan implementation

NCA will monitor and keep internal records to allow the effectiveness of each management action to be evaluated and inform future planning.

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Appendix 1 Legislation overview

The various legislation and policy that governs how flying-foxes and their habitat can be managed in Australia and the ACT are outlined below.

Instrument	Relevance to the Plan
Commonwealth	
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Approval under the EPBC Act may be required for any action likely to impact a MNES e.g. nationally threatened species (such as the GHFF) or ecological communities, world heritage sites, wetlands of international importance. The referral guideline for management actions in GHFF camps (DoE 2015) specifies requirements for camp management, and when referral is required. This legislation only applies if NCA aimed to reduce or remove the GHFF roosting habitat.
EPBC Act - Significant Impact Guidelines 1.1	Provides self-assessment criteria to determine whether an action is likely to have a “significant impact” on a vulnerable species. Triggers include long-term population decline, habitat degradation, fragmentation, or interference with recovery. These guidelines inform whether referral under the EPBC Act is required.
<i>Australian Capital Territory (Planning and Land Management) Act 1988 (PALM Act)</i>	Establishes the NCA and the National Capital Plan, which governs land use and management of National Land (including the Park) and prevails over the ACT Territory Plan. Flying-fox management must align with national capital values and land-use controls.
National Recovery Plan for the Grey-headed Flying-fox (DAWE 2021)	Provides national direction for the conservation and recovery of the GHFF as a listed vulnerable species under the EPBC Act. The recovery plan identifies key threats including habitat loss, urban conflict, and extreme heat events, and outlines actions to maintain population viability, protect critical habitat, and improve management of camps.
ACT	
<i>Nature Conservation Act 2014 (NC Act)</i>	Primary ACT legislation for protecting native species and ecological communities. Provides for licensing, conservation actions, and protection of threatened species. Enables development of Native Species Conservation Plans (such as for GHFF) and requires consistency with conservation objectives and any applicable Action Plans.
NC Act – Special Protection Status Provisions	Species listed as threatened under the EPBC Act or NC Act receive special protection, increasing penalties for harm and requiring stricter management controls. GHFF qualifies due to its national listing.
<i>Animal Welfare Act 1992</i>	Requires humane treatment of animals. All management actions (e.g. disturbance, dispersal) must minimise stress, injury, and suffering. They must comply with animal welfare standards and any relevant codes of practice.
Urban Forest Strategy 2021-2045	Guides the protection and expansion of urban tree canopy across the ACT to improve resilience, biodiversity, and cooling. Relevant to flying-fox habitat management, as urban trees provide roosting habitat and influence camp persistence, structure, and distribution within areas such as the Park.
Canberra’s Living Infrastructure Plan: Cooling the City ACT Climate Change Strategy 2019-2025	Focuses on reducing urban heat through integrated green and blue infrastructure. Highly relevant to flying-fox management as extreme heat is a major driver of the species mortality and camp movement. Supports incorporation of cooling strategies (e.g. canopy cover, water availability) into camp management. Sets targets and actions for climate mitigation and adaptation in the ACT. Relevant to the Plan through increasing frequency of extreme heat events, changing habitat suitability, and the need for adaptive management of flying-fox camps in response to climate pressures.
Queensland (Qld)	
Qld Flying-fox Codes of Practice	Provide best-practice guidance for camp management (e.g. low-impact disturbance, habitat management, and humane control measures). They are often adopted as benchmarks for nationally consistent management.
New South Wales (NSW)	
NSW Flying-fox Camp Management Policy (2015) & Code of Practice (2018)	Provide additional best-practice frameworks for managing flying-fox camps, including impact minimisation and community engagement. Useful as supporting guidance given the species’ cross-jurisdictional population.

Appendix 2 Nationally important camp

Excerpt of the 'Referral guideline for management actions in grey-headed and spectacled flying-fox camps' (DoE 2015)

Actions taken at grey-headed or spectacled flying-fox camps that are likely to require referral under the EPBC Act because they are likely to have a significant impact include:

- clearing vegetation, dispersal of animals, in situ management or other impacts on nationally-important flying-fox camps that are not carried out in accordance with relevant mitigation standards
- dispersal actions at nationally-important flying-fox camps that are proposed during a period of significant population stress regardless of whether they adopt mitigation measures
- multiple camp dispersals or repeated in situ management actions that are likely to, over time or collectively, result in the total loss of roosting vegetation at a nationally important camp or result in mortality levels that constitute significant population stress.

If a proponent is proposing dispersal of multiple camps or repeated in situ management actions at one or more camps they should consider their action more strategically as a single, larger action and undertake appropriate strategic planning which conforms with the mitigation and outcomes outlined in this policy.

Actions taken at camps of grey-headed or spectacled flying-fox that are unlikely to require referral under the EPBC Act because they are unlikely to have a significant impact include:

- minor, routine camp management at any camp
- clearing some vegetation or other indirect impacts on nationally-important flying-fox camps that are carried out in accordance with the mitigation standards
- dispersal of nationally-important flying-fox camps, that are carried out in accordance with the mitigation standards and are done so when the national population is not subject to significant stress
- clearing vegetation, dispersal of animals, in situ flying-fox management or other impacts on flying-fox camps that are not nationally-important flying-fox camps that is carried out in accordance with state or territory regulatory requirements.

The referral decision-making process is summarised below.

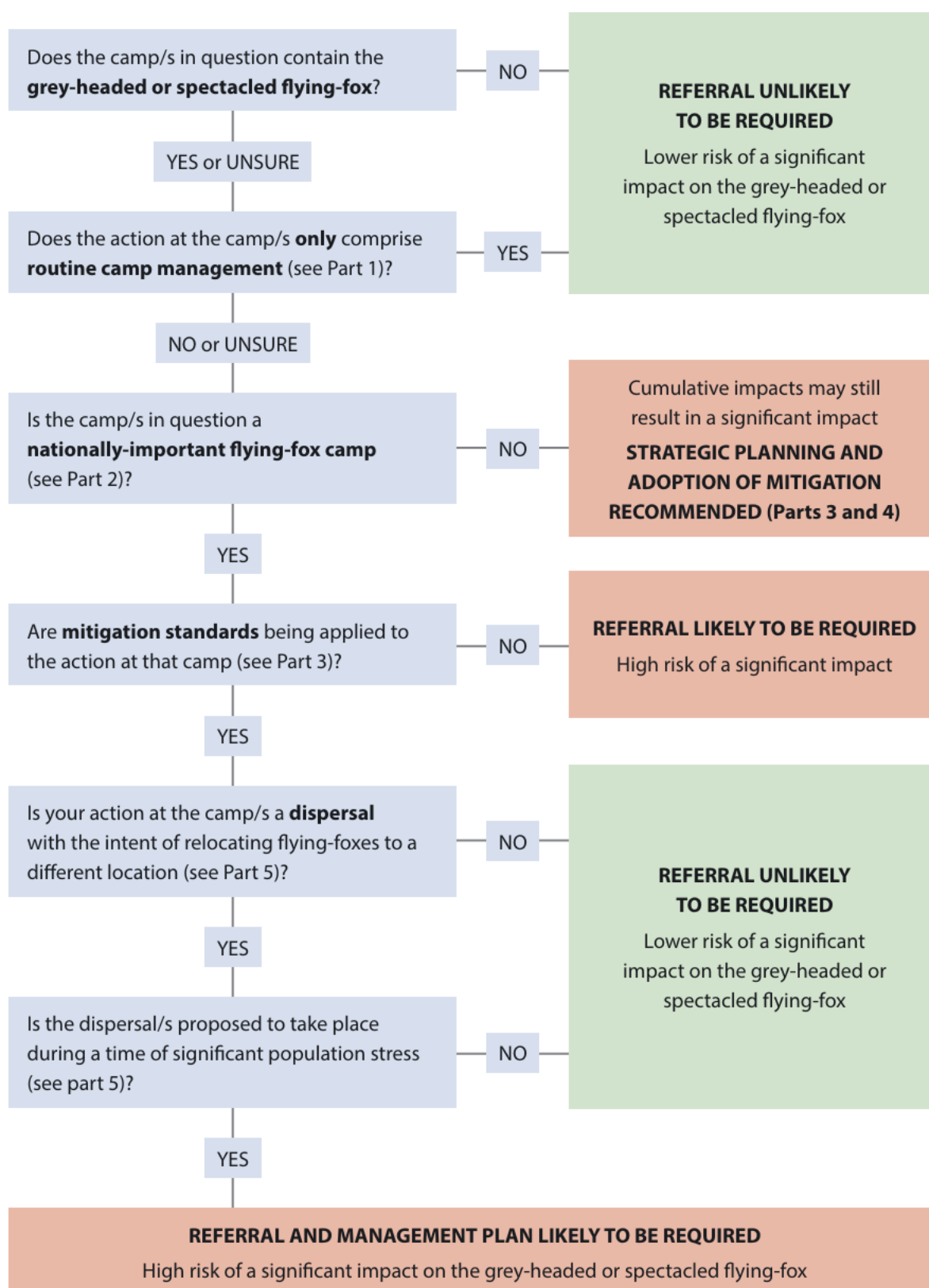


Figure 8 Summary of the referral decision-making process for proponents (DoE 2015)

The adoption of the mitigation standards described below will assist in avoiding or reducing significant impacts on EPBC Act-listed flying-foxes arising from management actions at their camps. Referral under the EPBC Act is less likely to be required if such mitigation standards are implemented. Proponents should either implement the following mitigation standards where relevant, or an equivalent state or territory mitigation standard that achieves the same outcome. For example, the Queensland Code of Practice: Ecologically sustainable management of flying-fox roosts (2013) requires all management actions to immediately cease if flying-foxes appear to have been killed or injured. This is considered to achieve a similar outcome to the mitigation standards below.

Mitigation standards:

- The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependent young.
- The action must not occur during or immediately after climatic extremes (heat stress event⁴, cyclone event⁵), or during a period of significant food stress⁶.
- Disturbance must be carried out using non-lethal means, such as acoustic, visual and/or physical disturbance⁷ or use of smoke.
- Disturbance activities must be limited to a maximum of 2.5 hours in any 12 hour period, preferably at or before sunrise or at sunset.
- Trees are not felled, lopped or have large branches removed when flying-foxes are in or near to a tree and likely to be harmed.
- The action must be supervised by a person with knowledge and experience relevant to the management of flying-foxes and their habitat, who can identify dependent young and is aware of climatic extremes and food stress events. This person must make an assessment of the relevant conditions and advise the proponent whether the activity can go ahead consistent with these standards.
- The action must not involve the clearing of all vegetation supporting a nationally-important flying-fox camp. Sufficient vegetation must be retained to support the maximum number of flying-foxes ever recorded in the camp of interest.
- The mitigation standards are applicable to all actions at nationally-important flying-fox camps other than routine camp management. In circumstances where mitigation standards are not applied, significant impacts are likely and the proposed action is more likely to need to be referred for assessment and approval under the EPBC Act.

⁴ A 'heat stress event' is defined for the purposes of this document as a day on which the maximum temperature does (or is predicted to) meet or exceed 38°C.

⁵ A cyclone event is defined as a cyclone that is identified by the Australian Bureau of Meteorology (www.bom.gov.au/cyclone/index.shtml).

⁶ Food stress events may be apparent if large numbers of low body weight animals are being reported by wildlife carers in the region.

⁷ This may include water sprays/sprinklers or other methods of physical disturbance that will not cause harm or injury to flying-foxes

Appendix 3 GIS methods for modelling potential flying-fox habitat

Purpose

GIS analysis was undertaken to identify potential flying-fox camp habitat within the study area based on known ecological preferences and available spatial data. The model provides a relative assessment of habitat suitability to inform management planning.

Data sources

Dataset	Source	Purpose
Vegetation communities	ACT Government	Identify potential roost vegetation
Woody vegetation extent	ACT Government / TERN	Capture urban and non-mapped canopy
Foliage Projective Cover (FPC)	Geoscience Australia	Assess canopy density
Water features	ACT Government	Distance to water analysis
Digital Elevation Model	Geoscience Australia	Slope analysis
Land use / zoning	ACT Government	Urban proximity assessment

Data preparation

Software: ESRI ArcGIS

Coordinate system: GDA94 MGA Zone 55

Analysis resolution: 5 m × 5 m grid

Model extent: 20 km radius from Regatta Point flying-fox camp

Model variables and scoring

Potential camp habitat was modelled using the following key variables:

- vegetation suitability
- vegetation height (>5 m)
- canopy density
- distance to water
- distance to urban areas
- slope.

Areas of inherently unsuitable habitat (e.g. grasslands, heathlands) were excluded from further analysis. Each variable was scored on a standardised scale and combined to produce a composite suitability surface.

Vegetation and habitat suitability assessment

Vegetation communities were classified as suitable or unsuitable based on:

- tree height and structure
- canopy complexity and closure
- presence of known or likely roosting species.

To address limitations in urban vegetation mapping:

- woody vegetation extent and FPC layers were used to identify tree cover outside mapped forest communities.
- areas with very low foliage cover were excluded.
- vegetation suitability was weighted using empirical data from known flying-fox camps in NSW and the ACT.

Habitat suitability modelling

All scored raster layers were combined using raster calculator to produce a cumulative suitability index. The final model classifies potential camp habitat into three categories:

Suitability class	Description
Low	Unlikely to support roosting
Medium	May support roosting under favourable conditions
High	Likely to support roosting

Limitations

- the model represents a snapshot in time and is dependent on the currency and resolution of available datasets.
- fine-scale habitat features (e.g. individual tree characteristics) are not captured.
- urban vegetation composition is generalised due to limited species-level data.

Model outputs should therefore be interpreted as indicative and used to support, not replace, field-based assessment and management decision-making.

Appendix 4 Previous management actions

Details of the management actions from the previous Plan (Ecosure 2020) and the progress since the management action was recommended are outlined below.

Management type	Management action	Review/progress	Action	Timeframe
Education and awareness programs	Work with stakeholders to develop and implement public education programs that help increase understanding and awareness of flying-foxes, their behaviours and ecological role	Current programs include 'bat nights' and flying-fox rescue courses held by ACT Wildlife.	Continue current programs.	Ongoing.
	Relevant training for all staff/volunteers and contractors involved in any flying-fox management actions	The NCA and ACT Wildlife attended a contractor toolbox in January 2025, using the Ecosure toolbox talk to deliver a training session on 'Working around a flying-fox camp'. ACT Wildlife has hosted multiple information nights for the public during the last three years.	Continue staff/volunteers and contractor training for all staff who use the Park, including – where feasible – ACT government employees and contractors. Incorporate a web link to this Flying-Fox Camp Management Plan into the NCA events package of documentation.	From 2023 onwards.
	Install signage on flying-foxes and ecotourism near the camp.	NCA intends to install signage at the camp.	Install signage in 2026/27.	From 2026/27.
	Collaborate with wildlife rescue and care organisations to monitor HSES and complete the online data form for input into the national database (https://www.animalecologylab.org/heat-stress-data-form.html).	ACT Wildlife installed a new weather station on the western edge of the camp. This will provide accurate <i>in situ</i> data to inform cold and heat stress management. Use of misters during heat events.	Continue collaborations with ACT Wildlife. Continue using misters during heat events.	From 2025 onwards.
Camp monitoring	Monitor flying-fox numbers, camp extent, breeding status, signs of stress, morbidity/mortality to inform risk assessment and management decisions.	ABS provide quarterly census survey data to the ACT and Commonwealth Governments.	Continue quarterly surveys Continue contract renewal.	From 2003 onwards.
	Work collaboratively under an Environmental Care Agreement with volunteer groups such as ACT Wildlife to achieve the best animal welfare outcomes for the National Estate.	ACT Wildlife currently care for injured, sick and orphaned native animals and are the primary group to attend the Park in response to grey-headed flying fox issues (injured, sick, or orphaned pup).	Continue collaborations with ACT Wildlife.	Ongoing.

Management type	Management action	Review/progress	Action	Timeframe
		The NCA signed an Environmental Agreement with ACT Wildlife regarding activities where coordination between parties is necessary to protect the flying-fox.		
Operational park management	Modify routine maintenance activities (e.g. mowing, chipping, use of loud machinery) to minimise disturbance to roosting flying-foxes, particularly during sensitive periods (Section X).	Park maintenance is implemented.	Continue current maintenance programs	Ongoing.
Operational park modifications	Habitat and restoration landscaping in understory using species consistent with current habitat.	Tree Renewal Program in progress as per NCA Tree Management policy.	NCA to continue investigating/implementing staged management actions proposed in the Plan.	Ongoing.
	Succession planting. Offset trees lost on site with fast growing species (where possible) to replace canopy lost. Species selected for revegetation will be consistent with the habitat on site.	Park Tree Renewal Program in progress as per NCA Tree Management policy.	NCA to continue investigating/implementing staged management actions proposed in the Plan.	Ongoing.
	Weed control in the core habitat area using hand tools only (where possible). If chemical use is required, it's not to be applied during times of strong winds. or in the evening after fly-out while cr�ching dependent young are not present).	As per best per best practice.	Continue current maintenance programs.	Ongoing.
Mitigate impacts during events	Delineate exclusion zones to protect flying-foxes, monitor camps and have a vaccinated person on site to rescue if required.	Currently in action.	NCA to continue implementing management actions proposed in the Plan.	Ongoing.
	Limit (where practicable) activities within the camp extent (Figure 2) during or immediately after (heat stress events or during a period of significant food stress)	Currently in action.	Continue collaborations with ACT Wildlife.	Ongoing.
	Limit event infrastructure (where practicable) within the camp extent (Figure 2), including the drip zone of the associated trees, to prevent damage to tree roots and the potential loss of habitat and roosting trees.	Currently in action.	Adhere to Tree Protection Zones (TPZ).	Ongoing.

Appendix 5 Monitoring form

Camp	
Proposed activity (if relevant)	
Type of disturbance	
Level of risk	
Frequency (Dates to and from)	
Duration (Time)	
Proposed mitigation	
Monitoring required (yes if high-risk)	
Monitoring submitted to NCA	
Approved by NCA	
Supporting Photos/Maps	
Monitoring	
Date and time	
Assessors	
Temperature and humidity	
Rain and cloud cover	
Wind speed and direction	
Available food resources	
Topography/aspect	
Grey-headed flying-fox	
Count	
Females visibly pregnant	
Dependent young	
Independent young	
Behavioural observations	
Stress indicators	
Body condition	
Deceased adults/juveniles	
Little red flying-fox	
Count and other observations (breeding, behaviour, stress indicators etc)	
Camp extent	
Add boundary points	
% currently occupied	
% available suitable habitat	
Vegetation condition	
Proximity to water	

*behavioural observations could include resting, grooming, vocalising and social interaction, mating or breeding activity,

^stress indicators could include lifting or flight response to disturbance (e.g. sudden noise)

Appendix 6 Flying-foxes and health

All animals may pose human health risks. In Australian bats, the most well-defined of these include Australian Bat Lyssavirus (ABLV) and Hendra Virus (HeV). Specific information on these viruses is provided below.

Excluding those people whose occupations require contact with bats, such as wildlife carers and vets, human exposure to ABLV and HeV, their transmission, and frequency of infection is extremely rare. These diseases are also easily prevented through vaccination, PPE, safe flying-fox handling (by trained and vaccinated personnel only) and appropriate horse husbandry.

Below is current information at the time of writing. Please refer regularly to [ACT Health](#) for up-to-date information on bats and health.

Australian bat lyssavirus

ABLV is a rabies-like virus that may be found in all flying-fox species on mainland Australia. It is assumed that all bats may be capable of hosting ABLV (WHA 2025). The probability of human infection with ABLV is very low with less than 1% of the flying-fox population being affected (WHA 2025) and transmission requiring direct contact with an infected animal that is secreting the virus. In Australia, four people have died from ABLV infection since the virus was identified in 1996 (Australian Centre for Disease Control 2025).

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 (WHA 2025, Merritt et al. 2018). ABLV is unlikely to survive in the environment for more than a few hours, especially in dry environments that are exposed to sunlight (Young and Stobart 2023). 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 (Young and Stobart 2023).

The incubation period in humans is assumed to be similar to rabies, generally around three to eight weeks (Merritt et al. 2018). However, in few cases, the incubation period has ranged from a few days to several years (Merritt et al. 2018). The disease in humans presents essentially the same clinical picture as classical 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 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-vaccination and have their level of protection regularly assessed. Like classical 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.

Domestic animals are also at risk if exposed to ABLV. In 2013, ABLV infections were identified in two horses (Shinwari et al. 2014). A dog that caught and consumed a flying-fox also tested positive for ABLV antibodies in 2013 (Wright 2013). Clinical symptoms appear in animals after an incubation period of several weeks to a few months, although this period is highly variable and influenced by factor such as the site of exposure, viral load, and species affected. Given the incubation period variability, animals that are bitten or scratch by a flying-fox should monitor for clinical symptoms for months to years following potential exposure (Merck

Veterinary Manual 2024a). Consultation with a veterinarian should be sought if exposure is suspected.

If a person or pet 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.

Please refer to WHA's [Australian bat lyssavirus fact sheet](#) for further information.

Hendra virus

Flying-foxes are the natural host for HeV, 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 (WHA 2024). There is no evidence that the virus can be passed directly from flying-foxes to humans or to dogs (WHA 2024). Clinical studies have shown cats, pigs, ferrets and guinea pigs can carry the infection, though there is no evidence of direct HeV transmission from flying-foxes to any species other than horses (WHA 2024). As of 2023, over 100 HeV infections in horses (confirmed or possible cases) have been reported (WHA 2024). These infections occurred across over 65 disease outbreak events, five of which also involved human infections. 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.

The transmission of HeV from flying-foxes to horses is thought to be complex and involve several host and environmental factors (WHA 2024). The most likely route of transmission is through exposure of horse mucous membranes to infected flying-fox urine, body fluids, or excretion (WHA 2024). This may occur directly (direct contact of infected fluids with mucous membranes) or indirectly (e.g. ingestion of contaminated forage or water). The incubation period of HeV in horses is estimated to be 5 – 16 days (WHA 2024). The case fatality rate of HeV in horses is approximately 75% (Merck Veterinary Manual 2024b).

While considered very rare, humans may contract the disease after close contact with an infected horse (WHA 2024; Qld Government 2025). Similarly, the dogs may become infected following close contact with infectious bodily fluids of infected horses (Qld Government 2025). HeV 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 case fatality rate of HeV in humans is approximately 57% (Merck Veterinary Manual 2024b).

Previous studies have shown that HeV spillover events have been associated with foraging flying-foxes rather than camp locations. Therefore, risk is 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 (Merck Veterinary Manual 2024b), 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 HeV 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 HeV via aerosol of heavily contaminated substrate should consider additional PPE (e.g. respiratory filters), and potentially dampening down dry

dusty substrate.

Horse owners can also take practical steps to reduce the risk of horses being exposed to flying-fox excreta. Feed and water troughs should be placed under cover where possible, or covered when not in use, to prevent contamination by urine, faeces or dropped fruit. Horses should be kept away from areas where flying-foxes are actively feeding or roosting, particularly when trees are flowering or fruiting. This may include removing or fencing off access to known flying-fox foraging trees within paddocks, relocating horses during peak flowering or fruiting periods, and avoiding placing feed or water beneath trees that attract flying-foxes. Maintaining good paddock hygiene by promptly removing fallen fruit or partially eaten fruit can also help reduce the likelihood of exposure.

Vaccination of horses against HeV, where appropriate, remains the most effective way to reduce the risk of infection and subsequent transmission to humans.

Further information for horse owners is provided in the Department of Agriculture, Fisheries and Forestry [HeV information page](#). Please refer to WHA's HeV and Australian wildlife fact sheet for other HeV information.

General health considerations

All animals, including flying-foxes, can carry bacteria and other microorganisms in their guts, some of which are potentially pathogenic to other species. Bat urine and faeces should be treated like any other animal excrement. As with any accumulation of animal faeces (bird, bat, domestic animals), fungi or bacteria may be present and care should be taken when cleaning faeces. This includes wetting dried faeces before cleaning or mowing, wearing appropriate PPE and maintaining appropriate hygiene. If disturbing dried bird or bat droppings, particulate respirators should be worn to prevent inhalation of dust and aerosols. See the WorkSafe '[Work with bird and bat droppings](#)' for detail.

ABLV is not transmitted through drinking or using rainwater, even where tanks may be contaminated with bat faeces. Infection is known to occur only through direct inoculation via bites or scratches from infected bats (Australian Centre for Disease Control 2025). For households that rely on rainwater for drinking and food preparation, the likelihood of gastrointestinal illness from bat faecal contamination is comparable to that posed by other animals, such as birds.

Where bat faeces enter domestic swimming pools, any associated health risks can be minimised through appropriate pool management. This includes maintaining effective disinfection by running filtration systems daily, regularly backwashing filters, keeping free chlorine levels at approximately 2 mg/L (ppm), and ensuring pH levels remain within the recommended range of 7.2 to 7.8. Additional guidance on pool maintenance can be obtained from local pool service providers.

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 water tanks/the roof of a house will also reduce wildlife activity and associated potential contamination. Tanks should also be appropriately maintained and flushed.

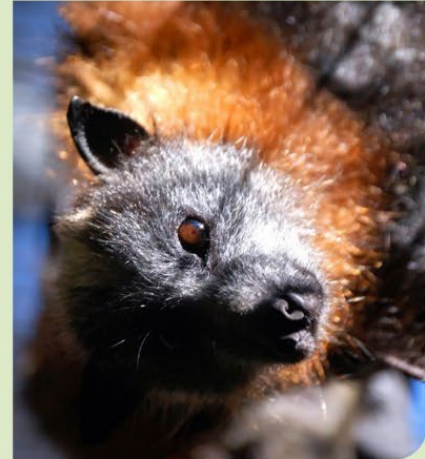
Appendix 7 Flying-fox injury and rescue guidelines



Flying-fox expert rescue procedure

The flying-fox expert will arrange rescue of injured or orphaned flying-foxes in the event rescue is required. Under no circumstance should other personnel on site touch or attempt to assist a flying-fox. The general rescue process for the flying-fox specialist is:

- i. Assess to confirm rescue is required.
- ii. Establish an exclusion zone for any person not essential to the rescue.
- iii. Contact relevant carer (e.g. ACT Wildlife) to advise of likely admission.
- iv. Plan the rescue to ensure risk to rescuer can be appropriately managed, and further stress/injury to the animal can be minimised i.e. appropriate tools and PPE available.
- v. Assess the animal for obvious signs of injury to determine whether veterinary care is required.
- vi. Transport the animal (in appropriate transport container) to a veterinarian (if injured) or suitable wildlife carer.



Should dependent young need to be rescued and hand-reared, or injured animals treated, NCA will coordinate or support costs associated with their care.



Public guidance: Injured, sick or orphaned flying-fox

Flying foxes in the Park are protected native wildlife. If they need to be handled, it must be by trained and appropriately vaccinated personnel.

If a member of the public encounters a flying-fox that appears injured, sick or orphaned:

Do not touch or handle the animal. This is for your safety and the safety of the flying-fox.

Keep a safe distance and prevent children, pets and other park users from approaching.

Observe from a distance to confirm whether assistance is required (e.g. animal is grounded, entangled, or visibly injured).

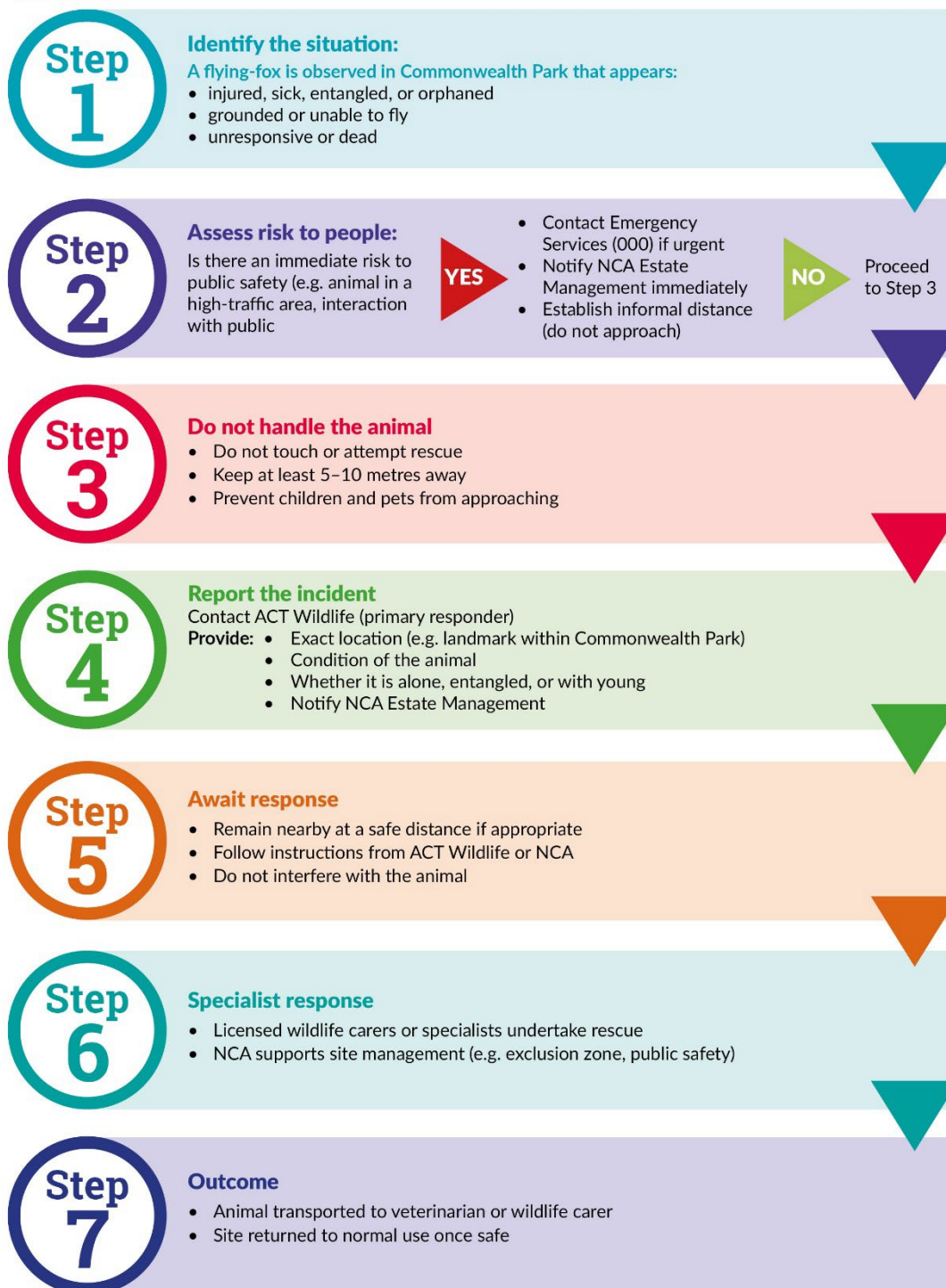
Contact ACT Wildlife or an appropriate wildlife rescue organisation immediately, providing the location within the Park and a description of the animal's condition.

If safe to do so, remain nearby at a distance until assistance arrives, particularly if the animal is at risk from disturbance or predation.

Members of the public should not attempt to provide food or water unless specifically instructed by a wildlife carer.



Flying-fox incident response – decision flow



Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	08/05/2026	Commonwealth Park Flying-Fox Camp Management Plan 2026 DRAFT	Amina Akbar, Graduate Ecologist	Jess Baglin, Senior Environmental Scientist	Jess Bracks, Principal Wildlife Biologist
01	19/05/2026	Commonwealth Park Flying-Fox Camp Management Plan 2026 DRAFT R1	Jess Baglin, Senior Environmental Scientist	Jess Bracks, Principal Wildlife Biologist	
02	25/06/2026	Commonwealth Park Flying-Fox Camp Management Plan 2026	Amina Akbar, Graduate Ecologist Melissa Davis, Marketing Coordinator	Jess Baglin, Senior Environmental Scientist	Jess Bracks, Principal Wildlife Biologist
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Report compiled by Ecosure Pty Ltd

ABN: 63 106 067 976

admin@ecosure.com.au

www.ecosure.com.au

PR9556.1-RE.Commonwealth Park Flying-Fox Camp Management Plan 2026.FI.R1

Brisbane

PO Box 675
Fortitude Valley QLD 4006
P 07 3606 1030

Coffs Harbour

PO Box 4370
Coffs Harbour Jetty NSW 2450
P 02 5621 8103

Gladstone

PO Box 5420
Gladstone QLD 4720
P 07 4994 1000

Gold Coast

PO Box 2034
Burleigh Waters QLD 4220
P 07 5508 2046

Rockhampton

PO Box 235
Rockhampton QLD 4700
P 07 4994 1000

Sunshine Coast

PO Box 1457
Noosaville QLD 4566
P 07 5357 6019

Sydney

PO Box 880
Surry Hills NSW 2010
P 1300 112 021

Townsville

PO Box 2335
Townsville QLD 4810
P 1300 112 021



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