



Burdekin Park, Singleton

# Flying fox Camp Management Plan

## March 2018 | Singleton Council



Office of  
Environment  
& Heritage



SINGLETON  
COUNCIL



Prepared by Hunter Councils Environment Division for Singleton Council



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## Acronyms and Abbreviations

|               |  |
|---------------|--|
| ABLV          | Australian Bat Lyssavirus  |
| BFF           | Black Flying-fox ( <i>Pteropus alecto</i> )  |
| DoE           | Commonwealth Department of the Environment   |
| DPI           | Department of Primary Industries (NSW)   |
| EP&A Act      | <i>Environmental Planning and Assessment Act 1979</i> (NSW)  |
| EPA           | Environment Protection Authority (NSW)   |
| EPBC Act      | <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)                          |
| GHFF          | Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )   |
| the Guideline | Referral guideline for management actions in Grey-headed and Spectacled Flying-fox camps 2015 (Commonwealth) |
| HeV           | Hendra virus   |
| LGA           | Local Government Area  |
| LGNSW         | Local Government NSW   |
| LRFF          | Little Red Flying-fox ( <i>Pteropus scapulatus</i> )   |
| MNES          | Matters of National Environmental Significance   |
| NPW Act       | <i>National Parks and Wildlife Act 1974</i> (NSW)  |
| NPWS          | National Parks and Wildlife Service (NSW)  |
| OEH           | Office of Environment and Heritage (NSW)   |
| PEPs          | Protection of the Environment policies   |
| the Plan      | Camp Management Plan   |
| POEO Act      | <i>Protection of the Environment Operations Act 1997</i> (NSW)   |
| the Policy    | Flying-fox Camp Management Policy 2015 (NSW)   |
| SEPPs         | State Environmental Planning Policies  |
| SIS           | Species Impact Statement   |
| TEC           | Threatened Ecological Community  |
| TSC Act       | <i>Threatened Species Conservation Act 1995</i> (NSW)  |

## Executive Summary

Burdekin Park is Singleton's premier park, and is located centrally in the town on the New England Highway. The Park is flanked by roads, with Elizabeth St to the west, Bourke St to the south and Hunter St to the east. The park is 1.25 ha and is home to the historical Singleton Museum, World War I and World War II memorials, the Boer War memorial, band shell as well as a children playground and amenities block.

Flying-foxes first established a camp at Burdekin Park around November 2000. Grey-headed Flying-foxes historically occupied the camp with populations varying seasonally over time (ranging from 2000 to up to 12,000). More recently, Little Red Flying-foxes (LRF) have been utilising the site in significant numbers of up to 35,000. The land occupied by the main camp area is managed by Singleton Council, and is surrounded by residential properties.

Grey-headed Flying-foxes are listed as a threatened species under both NSW and Commonwealth legislation, and management of flying-foxes and their habitat is guided by legislative requirements. This species is highly mobile and camp populations vary widely over time due to food resource availability. In addition, the Burdekin Park flying-fox Camp is designated as a Nationally Important Camp due to both numbers of flying-foxes and the rearing of young that occurs at the Camp.

The Burdekin Park flying-fox Camp Management Plan provides a tool to ensure appropriate management of the camp. This management plan outlines:

- Issues of concern to the community caused by the presence of flying-foxes
- NSW Department of Infrastructure-Lands and Council's response
- Measures that will be taken to manage the land and reduce conflict with the local community.

This approach may guide Council's approach in other locations in the local government area if flying-fox issues arise.

Experience in other areas has shown that attempts to move camps are generally unsuccessful, expensive, and likely to result in the relocation of problems. Therefore, management actions proposed at Burdekin Park are primarily to align with Level 1 and Level 2 actions as described by the NSW Office of Environment & Heritage.

In preparation of the Plan, community consultation was conducted through a survey, which aligned with the preparation of a Burdekin Park Plan of Management which will complement the Camp Management Plan. Contact was maintained with the NSW Office of Environment and Heritage, Councils of the Hunter Region and Hunter Councils Environment Division, and community feedback was utilised from the original Camp Management Plan development.

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

Given the mobility of flying-foxes and the expected variability of the population of the camp over time, the focus of implementation actions will be based upon:

- The Plan of Management for Burdekin Park
- The Landscape Plan for Burdekin Park
- Implementing Level 1 and Level 2 Actions

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

# 1 Overview

## 1.1 Background

This Camp Management Plan has been developed as part of a Hunter regional program to harmonise flying-fox Camp Management Plans for Central Coast Council, Mid Coast Council, Muswellbrook Council, Cessnock City Council, Port Stephens Council and Upper Hunter Shire Council.

Participating in this project has enabled strong alignment with the actions of other Councils and the creation of active working relationships with these Councils. If any management action undertaken affects the roosting behaviours of flying-foxes in one jurisdiction, a network of land management / ecology specialists can notify neighbouring Councils of any possible increased flying-fox movements.

The Singleton Camp Management Plan has been compiled by Hunter Councils Environment Division, utilising the NSW Office of Environment and Heritage's "Flying-fox Camp Management Plan Template 2016" and input from all participating Councils, the Office of Environment and Heritage, responses from Community Consultation and key stakeholders and with reference to the 2015 Burdekin Park Camp Management Plan.

Singleton Council adopted a Flying-fox Management Plan on 15 July 2013 after extensive consultation. Since then it has become known that some issues relating to the historical monuments needed to be considered. The significance of the Cenotaph, Boer War and Museum infrastructure needed to be emphasised, as it is part of the history of Singleton and holds great value within the town. As such Council re-worked the Camp Management Plan in 2015 to address these issues.

This 2018 Plan has been prepared to identify actions that are available to reduce the impact of flying-foxes on residents, and to provide Council with guidelines to assist in managing the flying-fox camps on Council land.

The purpose of this plan is to undertake camp management in accordance with the Office of Environment and Heritage (OEH) Flying-fox Camp Management Policy (OEH 2015). The plan has been prepared in consultation with OEH and the Hunter Joint Organisation of Councils. This plan will enable appropriate flying-fox management on Council land with current approvals under NSW state legislation. It will also provide a source of knowledge for Singleton residents.

The plan operates for a period of 10 years.

## 1.2 Objectives

The ultimate aim of the Plan is to provide a blueprint to enable co-existence of the flying-foxes with the Singleton community. The objectives of this Plan are to:

- Minimise impacts on the community from flying-fox roosting in Burdekin Park
- Enable land managers and other stakeholders to use a range of suitable management options to sustainably manage flying-foxes
- Manage all risks related to the flying-fox roosting site at Burdekin Park within the legislative requirements, community expectations and financial constraints
- Address the concerns of the local residents and the wider community of Singleton

This Plan provides details on the Camp site, flying-fox species, community inputs, management opportunities and an agreed Management Plan designed to achieve the above stated objectives within the short, medium, and long term. This strategy is designed to provide the community a

better understanding of flying-fox lifecycles and create a positive impact between flying-foxes and local residents and the broader community and provide a link and understanding to the range of flying-foxes in the Hunter Region (see Map 1). The objectives of the plan are consistent with the Office of Environment and Heritage Flying-fox Camp Management Policy (OEH 2015).

**Map 1: Flying-Fox Camps in and around Singleton LGA**





## 2 Context

### 2.1 Local Context

#### 2.1.1 Burdekin Park (Flying-fox Camp) and Surrounds

Singleton is located in the Hunter Valley NSW, on the banks of the Hunter River. It is approximately 80kms inland from Newcastle, and 200kms from Sydney. The Local Government Area is 4893km<sup>2</sup> and has a population of approximately 23,000.

Burdekin Park is Singleton's premier park, and is located on the New England Highway in the middle of the Singleton township. The park is surrounded by road ways with the New England Highway (George St) to the east, Elizabeth St to the west, Bourke St to the south and Hunter St to the east, as can be seen in Map 2. The 1.25ha park is home to the historical Singleton Museum, World War I and World War II memorials, the Boer War memorial, band shell as well as a children playground and amenities block.

The park is listed as a heritage item of local significance in the Singleton Local Environment Plan 2013. The mature trees impart the majority of the heritage value to the park which is located on the area Singleton Council owns. The museum building situated within Burdekin Park is of State significance and is located on Crown Land with Singleton Council acting as Trustee.

Burdekin Park holds a lot of history and sentimental value for the town of Singleton, with the first gaol and Council Chambers located on the site (the museum), and being a community space utilised for significant events including Australia Day, ANZAC Day and Christmas celebrations. The arrival of flying-foxes in November 2000 significantly changed the amenity and use of the park, which has directly impacted a large portion of the Singleton community to the point that community events are rarely held in the park.

Map 2: Burdekin Park Flying-fox Camp (image 2017)



Flying-foxes have long been a part of the Singleton Council history, with references appearing in past Council minutes and newspaper articles as far back as the late 1800's discussing large 'culls' of flying-foxes in Jerry's Plains in response to large-scale foraging on the local orchard industry. In 1869 there is a report of over 50,000 animals culled in Mount Royal. Since this time there has been an on-going flying-fox presence in the LGA. Up until 2000 flying-foxes maintained a Camp on Cranky Corner Road, but for some reason, this roosting location has changed now, in a similar way to the historical behaviour of these wild animals. It is clear from the outcomes of the recent Federal Senate Committee Hearing that there is insufficient data on the lifecycle of these animals to understand the reasons they would occupy a camp in the middle of a residential area.

Burdekin Park's permanent flying-fox maternity roosting camp was first recorded in November 2000. The flying-foxes remained in the park, fluctuating in numbers between nil and 35,000. This increase and decrease in numbers is seasonally related with food sources available and climatic change. In the warmer months of the year the flying-fox numbers often explode causing issues in the Park with roosting space-which has resulted in the camp spreading into other less desirable areas such as the local Singleton Public School, Singleton District Hospital and residential yards, creating an unsettled relationship between the flying-foxes and the residents nearby.

The destruction caused by the roosting of the GHFF by tree defoliation can be seen over time in Figure 1. These aerial shots have been taken over a 12 year period in which the obvious decline in the trees is quite visible. Not only has the tree canopy cover lessened over the years but the visual amenity of the park has declined as well, as the dense vegetative cover is what attracted many visitors to the site over the many number of decades.



Figure 1: Vegetation reduction in Burdekin Park over time

Burdekin Park Vegetation Cover 2000



Burdekin Park Vegetation Cover 2006



Burdekin Park Vegetation Cover 2009



Burdekin Park Vegetation Cover 2012



Burdekin Park Vegetation Cover 2015



Burdekin Park vegetation cover 2017



The flying-fox arrival created conflict with the previous Park usage, with common conflicts in the 2000's being reported as:

- Hunter Valley Guides used the park for monthly markets, however stall holders and visitors were being deterred by smell and excrement of the flying-foxes, particularly by spoiling of food and stock. The markets moved to a less prominent site and over time have discontinued as a result of the flying-foxes.
- The ANZAC Day and Remembrance Day events were relocated from the site until the 2017 ANZAC day ceremony which was adversely affected by the flying-foxes.
- Some sectors of the community believe the flying-foxes propose a health risk and are reducing visitor numbers to the park.
- Constant maintenance in the park by Council employees to overcome slip hazards, lawn damage, tree defoliation and spoiling of fixtures.
- Injuries to staff from falling limbs damaged by the flying-foxes.
- Westpac Helicopter Rescue Service expressed concern their aircraft were at risk of damage from the flying-foxes, if they had to fly over Burdekin Park on their way to an emergency.
- Damage to memorials.
- Damage to private property from flying-foxes roosting.

Activities that occurred prior to the flying-foxes arrival in Burdekin Park that no longer occur include:

- Garden weddings
- Bands in the Park (first weekend in November)
- Launch of Christmas Lights in Burdekin Park Trees
- Town Band concerts
- Carols by Candlelight



- Hunter Valley Guide monthly markets
- Remembrance Day/Armistice Day/Anzac Day ceremonies (with the exception of the 2017 ANZAC Day ceremony)

In 2016, a significant native tree flowering event occurred which attracted unprecedented flying-fox numbers in the Hunter region, some 35,000 choosing to roost in Burdekin Park. The Park and surrounding areas suffered the following damage and impacts:

- Broken tree limbs due to excessive weight on the branches (increased number of animals) creating a hazard to public and staff access to the Park, and requiring the Park to be closed to the general public, including closing the Museum
- Defoliation of the trees in the Park
- Excessive noise throughout the day (roosting behaviour)
- Increased faecal matter drop in and around the park monuments and residential dwellings (associated with morning and evening flight of the animals)
- Roosting in other areas as the Park was unable to support the significant number of animals in the region, leading to damage to residential and commercial properties
- Relocation of community events including ANZAC Day commemoration services

**Figure 2: Damage to trees in Burdekin Park from the Flying-fox occupation**





In 2017 Singleton Council completed the new Plan of Management for Burdekin Park as part of the service package for this park. From this, a new landscape plan was developed which will reflect the aspirations of the Singleton community.

This Camp Management Plan will complement the Plan of Management and also deliver a means for the care and management of Burdekin Park. Through these documents, and Council's actions, the park can move forward and provide a space for both the community and the flying-foxes.

### **2.1.2 Land Tenure**

Singleton Council manages the public open space of the Park, and is the Trustee of the Crown Land area housing the Museum (see Map 3). The Museum undertook an expansion in 2014 and as such land tenure details are likely to change in 2017/18. All land management activities related to the Park are undertaken by Council staff in accordance with the appropriate legislative requirements.



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



### 2.1.3 Flying-fox Population

#### Scientific Committee Recommendation for Listing as a Nationally Vulnerable Species

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

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

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

<sup>1</sup> <http://www.environment.gov.au/biodiversity/threatened/conservation-advice/pteropus-poliocephalus>, accessed 27 March 2017.

techniques that are widely acknowledged to be appropriate for estimating the abundance of this species.

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

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



### Flying Fox Population at the Burdekin Park Flying-Fox Camp

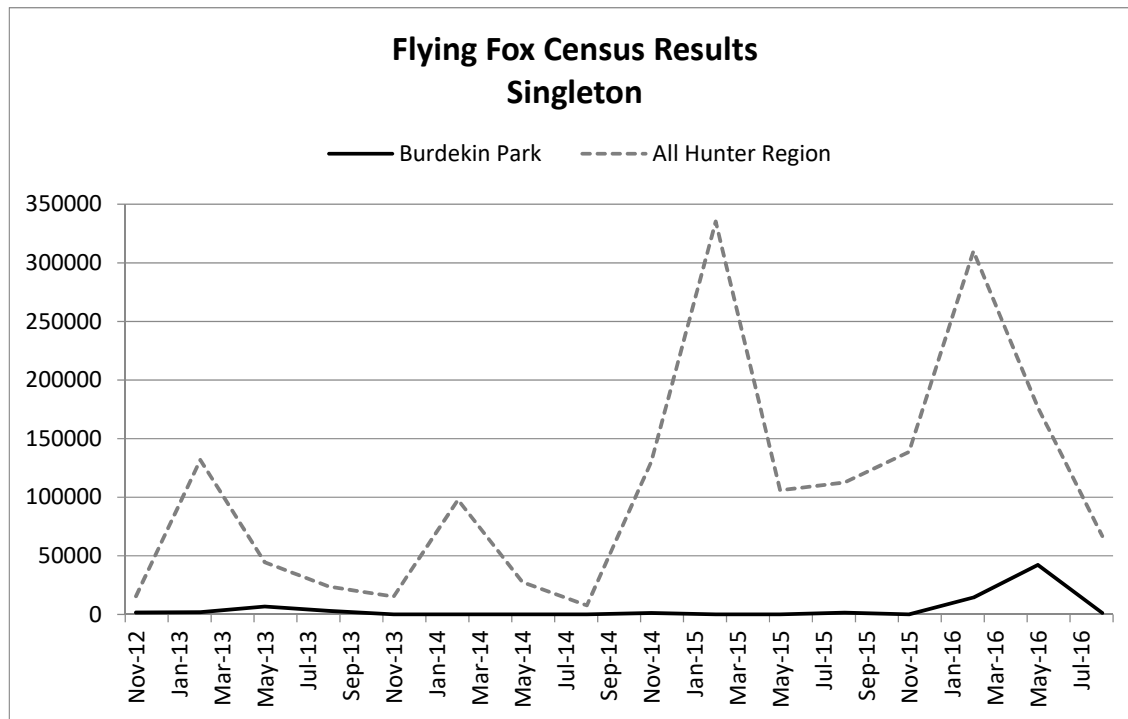
February - May is the peak occupancy period for flying-fox activity in Singleton (and the region) based on the census data described Table 1. The information below also shows the significant change in species composition of the Camp in 2016, with the increase in Little Red Flying-foxes displacing the Grey-headed Flying-fox Camp that has historically used the site.

**Table 1: Flying-fox population data (source: CSIRO National Flying-fox census).**

|                                    | Nov-12 | Feb-13  | May-13 | Aug-13 | Nov-13 | Feb-14 | May-14 | Aug-14 | Nov-14  | Feb-15  | May-15  | Aug-15  | Nov-15  | Feb-16  | May-16  | Aug-16 |
|------------------------------------|--------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|--------|
| Hunter Camps (all species)         | 15,387 | 131,768 | 44,519 | 23,649 | 15,172 | 97,769 | 27,533 | 7,681  | 130,269 | 335,279 | 105,926 | 112,624 | 138,593 | 309,962 | 176,703 | 66,784 |
| Burdekin Park Camp GHFF            | 938    | 6,595   | 2,626  | 0      | 0      | 0      | 0      | 1,129  | 0       | 0       | 1,400   | 0       | 4,572   | 2,000   | 810     | 1,396  |
| Burdekin Park Camp BFF             | 55     | 162     | 364    | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 20      | 0       | 0       | 200     | 119     | 0      |
| Burdekin Park Camp LRFF            | 863    | 0       | 0      | 0      | 0      | 0      | 0      | 0      | 0       | 0       | 0       | 0       | 9879    | 40,000  | 210     | 190    |
| % of Hunter Region FF in Singleton | 10.3%  | 1.4%    | 15.2%  | 12.6%  | 0%     | 0%     | 0%     | 0%     | 0.9%    | 0%      | 0%      | 1.3%    | 0%      | 4.7%    | 23.9%   | 1.7%   |

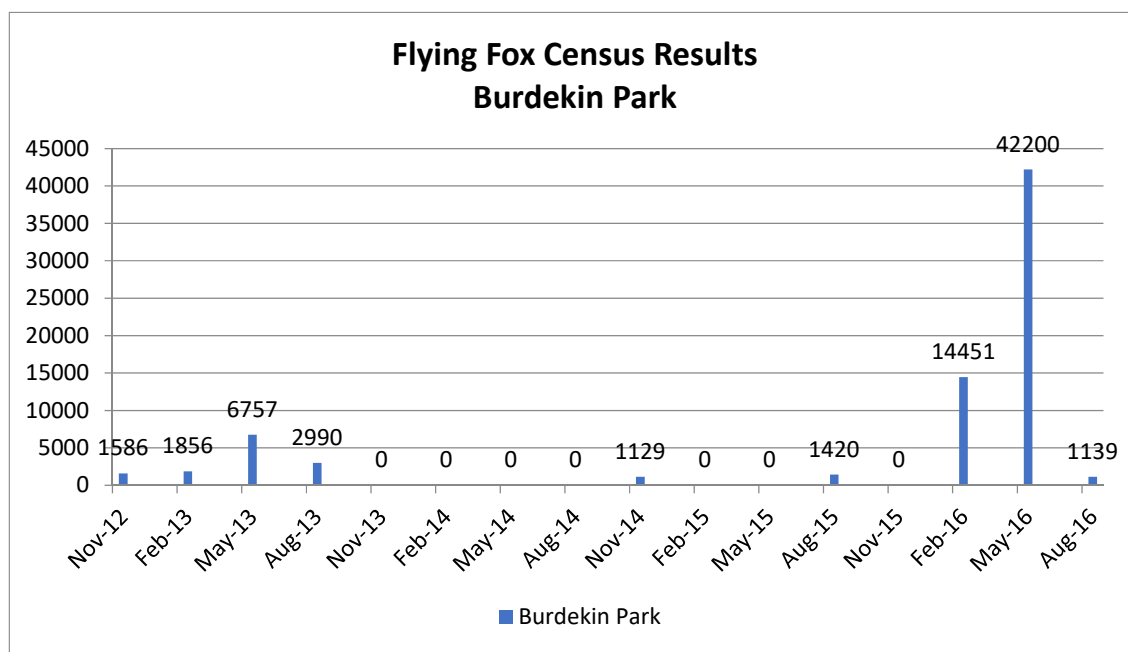
GHFF = Grey Headed Flying-fox; LRFF = Little Red Flying-fox; BFF = Black Flying-fox

Figure 3 provides a graphical presentation of the data presented in Table 1, clearly showing the increased numbers of flying-foxes utilising the Burdekin Park Camp over time.



**Figure 3: Graph of Flying-fox census results for the Burdekin Park Flying-fox Camp (source: CSIRO National Flying-fox census)**

Figure 4 provides graphical representation of the CSIRO census results specifically for the Burdekin Park Flying-Fox Camp.



**Figure 4: Graph of Flying-fox census results for Burdekin Park (2012-16)**

### 2.1.4 Community Interests and Issues Related to the Camp

Since 2000 numerous complaints have been received by Council due to the presence of flying-foxes. As previously stated, a large number of community events can no longer be held in the park, and the historic memorials are being damaged by the local Camp's presence. As a result of a significant spike in Little Red and Grey-headed Flying-fox populations several new issues have arisen in recent years including:

- destruction caused to the trees and hence safety issues for visitors and workers visiting the park,
- health issues to children using the playground on-site that is frequently covered in flying-fox excrement due to the roosting animals,
- Significant damage to the trees in the park from defoliation and excessive numbers of animals. In 2016 41 trees had to be removed due to safety concerns from significantly compromised trees in the park.

Burdekin Park has lost its status as the towns central park as many of the weddings, markets and Anzac Day Celebrations have moved away from the park and are being held at alternative locations, even though the park is home to World War I, World War II memorials, the Boer War and the Historical Museum. All of these problems have caused the community to become divided about flying-foxes, however most believe that Burdekin Park is not the idyllic park that it once was.

Since 2000, numerous contact between Council staff and community members has taken place. The following list is a collation of the issues related to the camp that have been reported by the community. Reported issues include:

- noise as flying-foxes depart or return to the camp
- noise from the camp during the day arising from use of the Park by the general public
- flying-foxes overhanging pathways and roosting in residential properties when numbers increase
- faecal drop on outdoor areas, cars and washing lines, and estimated resources associated with cleaning areas adjacent to the camp
- smell from males marking their territory, and young so their mothers can locate them on return from foraging trips
- fear of disease (Australian Bat Lyssavirus)
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- reduced general amenity
- damage to vegetation
- impacts on businesses
- property devaluation

### 2.1.5 Management Response to Date

In 2002/2003 in response to the GHFF issue, Singleton Council held a public meeting and subsequently formed a steering committee to discuss the issue and possible solutions. The steering committee comprised representatives from National Parks and Wildlife Service (NPWS), Singleton Council, Returned Services League (RSL) Singleton Sub-Branch, Wildlife carer groups and concerned citizens. After the public meeting, the steering committee convened on a further two occasions, to

review facts about the Grey-headed Flying-foxes and case studies in their management. After much consideration, the committee resolved to 'relocate the flying-foxes by non-lethal means' (Singleton Council 2008).

Over the years many actions to remove flying-foxes from the park were trialed. These methods included loud noises, machinery and water. Some of these methods were successful in moving the population out of the park, though unfortunately this merely resulted in them roosting in other unfavourable sites such as residential backyards. Hence these programs ceased and the flying-foxes were able to return to the park to roost. Having a threatened species such as the Grey-headed Flying-foxes residing in the park required Singleton Council to obtain a Section 91 Licence under the *Threatened Species Act 1995* and to gain approval from the Department of the Environment, Water, Heritage and the Arts (now Department of the Environment and Energy) through the *Environment Protection and Biodiversity Conservation Act 1999*, to do any maintenance works within the park that could potentially harm Grey-headed Flying-foxes.

The initial activities described above were deemed to be "not a controlled action" under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) as the work would not cause possible harm to the flying-foxes. Subsequent applications under the EPBC Act have been deemed "controlled actions". These licences took time and over the years the process to remove the flying-foxes became too costly and time consuming, and the focus was centered on the maintenance of the trees for public safety.

Over the years Singleton Council applied for a number of licences for tree maintenance works to be carried out in the park. Despite the communities concerns none of the licences were to disperse or move on the flying-foxes. Below in Table 2 outlines the effort that Council has committed to the management of the flying-foxes within the Park.

In January 2016 a large influx of Little Red Flying-foxes arrived in Burdekin Park. This influx was caused by the food shortages in western NSW, attracting the animals to the coastal fringe. The resident population of Grey-headed Flying-foxes had been increased by a large number of Little Red Flying-foxes. The sheer number and weight of the Little Red Flying-foxes caused branches to crack and fall to the ground causing an unreasonable level of risk to park users. Therefore the decision to close the park was made, and fences were erected on 3<sup>rd</sup> March 2016. Only minor maintenance occurred to the trees along the highway and Elizabeth Street due to traffic concerns.

This closure resulted in an arborist report being completed on the state and health of the trees within the Park. This was the evidence and trigger for the application for a section 91 licence as the threat to life and property was at a very high risk level. The NSW Office of Environment and Heritage assessed the application and due to the high risk was able to grant approval under the National Parks and Wildlife Act 1974 Section 121. This licence was approved from 24 May 2016 to 24 May 2021. This 5 year licence allows Council to continue to maintain and remove trees within the park that potentially cause a further threat to life and property.

In 2017 Council has undertaken to update the Burdekin Park Plan of Management. The outcome is a new plan focusing on the future of the Park and the way it can be managed for both the flying-foxes and community. A new Landscape Plan has been developed that will assist in the parks improvements over a ten year period. All the plans will follow the Level 2 Actions by creating buffers and zones in and around the Park.

Considering this Plan and the Burdekin Park Plan of Management is in effect for 10 years, any future maintenance beyond the Section 121 5 year licence will require additional approvals. Council understands the process and will apply for approvals that are necessary to ensure that the Camp and the Park are managed and maintained in accordance with this Plan and the Plan of Management for Burdekin Park.



**Table 2: Summary of Singleton Council's management of Flying-foxes in Burdekin Park**

| Year           | Action   |
|----------------|--|
| 2000           | Grey-headed Flying-foxes (GHFF) appear in Burdekin Park  |
| 2002/2003      | Steering Committee formed to address residents issues and concerns   |
| April 2003     | Approvals obtained and GHFF relocation attempted electronic noise deterrent. Not successful.   |
| August 2003    | Approvals obtained and GHFF relocation attempted using noise, water sprays, hoses, lighting reflective objects.<br><br>Only effective method was loud mechanical noise and water sprays. GHFF left the park but deterrents had to cease due to GHFF roosting near residences and hospital. |
| March 2005     | Council accepted an offer from Mr Les Shilton to organise a volunteer project to relocate GHFF.  |
| April 2005     | Mr Les Shilton and volunteers commenced relocation project. Main deterrent was loud mowers & whipper snippers. The relocation was unsuccessful.  |
| November 2007  | Applications to cull the GHFF were made to the Federal DEWHA and NSW DECCW. DEWHA refused the application.<br><br>Council withdrew the DECCW application as both consents were required.   |
| November 2007  | DECCW engaged Dr John Nelson to report on the Burdekin Park GHFF issue. Dr Nelsons report became the basis of a proposed GHFF relocation plan.   |
| March 2008     | Applications to relocate the GHFF were made to the DEWHA and NSW DECCW.  |
| May 2008       | DECCW Sec 95 approval received. Has restrictive timeframes and other conditions (expires 30 June 2009).  |
| October 2008   | DEWHA advise that the relocation project is deemed a 'controlled action'. Requires a public environment report (PER). On 21 January DEWHA gave Singleton Council guidelines to prepare PER.  |
| June 2009      | Singleton Council submitted a 66 page PER to DEWHA.  |
| September 2009 | NSW State Dept Environment and Climate Change - Section 95(2) Certification received – Expiration Date 31 July 2010  |
| October 2009   | DEWHA requested more information.  |
| Jan 2010       | The condition of the trees had declined and a major tree maintenance program and tree replacement design/planting program was organised.   |
| February 2010  | A DA was lodged to proceed with the tree maintenance program. DA249/2009 was approved on 10 February 2010. The work required approval from DECCW and DEWHA under threatened species legislation.   |
| March 2010     | DEWHA requested more information.  |
| April 2010     | Council considered the difficulties obtaining the DEWHA referral approval and resolved that "the Flying-fox relocation project at Burdekin Park be abandoned and the Burdekin Park Flying-fox Relocation Steering Committee be dissolved".   |
| 23 April 2010  | DEWHA required Council to engage an eminent bat expert to provide a report on the tree removal and maintenance. Tree removal reduced from 11 to 8 trees to gain approval. The trees in question were subject to heavy trimming.  |
| July 2010      | 8 trees were removed and 26 trees were trimmed in the Park.  |
| May 2011       | A tree planting succession plan was adopted by Council after extensive public consultation. Tree planting to replace the removed trees was completed.  |

| Year           | Action   |
|----------------|--|
| July 2011      | There are about 1500 GHFF currently in the Park. Numbers are expected to increase as the weather warms up. This has been the cycle since 2000.   |
| September 2011 | Council receives funding under the CMA Caring For Our Country Program for habitat restoration works to be undertaken at Heuston Lookout and Clydesdale reserves, to provide alternate habitat away from urban areas.   |
| April 2012     | Estimated to be up to 10,000 flying-foxes located within Burdekin Park and over the previous two weeks flying-foxes have been observed in trees located in streets surrounding Burdekin Park. Sites include Victoria Square Park and the Anglican Church located at the corner of Market and High Street,<br><br>Singleton Primary School in Elizabeth Street and The Methodist Church on corner Church and Hunter Street. It is normal at this time of year for the numbers of flying-foxes to reduce as they move to other feeding grounds to the north. |
| July 2012      | The Catchment Management Authority in conjunction with Singleton Council were granted an Environmental Trust grant to enhance vegetation for flying-foxes at Heuston Lookout   |
| July 2013      | Adoption of the Flying-Fox Management Strategy.  |
| September 13   | SC invites OEH for a meeting to discuss options for the management of the FF and Burdekin Park.  |
| June 2014      | SC rang OEH seeking assistance on 2 proposed management options: <ul style="list-style-type: none"> <li>1: Reclaim the Cenotaph under the Burra Charter;</li> <li>2: Pruning specific species of roosting trees.</li> </ul>  |
| November 2014  | SC amends the Flying-fox Management Strategy to include actions under the Burra Charter  |
| March 2015     | SC submitted a Section 91 licence to remove 2 trees and prune branches off 5 trees that surround the cenotaph and Boer war memorials to protect the monuments under the Burra Charter.   |
| August 2015    | SC contacts OEH to discuss the potential ability to remove the Bunya Nut pine cones without the need to complete a section 91 licence due to being normal maintenance within the park.   |
| October 2015   | SC closed the playground due to amount of flying-foxes within area.  |
| March 2016     | SC closes Burdekin Park due to high influx of Little Red Flying-foxes. Council seeks approval for emergency tree trimming to occur due to a branch falling on the highway.   |
| March 2016     | SC put in DA for removal of the 2 trees and pruning of 5 as per the section 91 licence application. SC completes tree trimming along the footway parallel with George St.  |
| April 2016     | DA is modified due to extensive damaged caused by GHFF. SC takes another reading on the Hoop Pine that is the near the toilet block on Elizabeth St. Even over the years that the tree has missed its monitoring the movement in the tree has been minor in comparison to community concerns. Due to the influx of FF to the park the damage caused is creating a type of optical illusion.  |
| May 2016       | Tree removal and pruning near the war memorial is undertaken based on approval received in 2015 under a section 91 licence application.<br><br>The first brochure outlining the events over the closure of Burdekin Park were hand delivered to 5000 residential homes.<br><br>On 24 May Council received permission under a Section 121 of the National Parks and Wildlife Act 1974. This approval allowed Council to clean up the park and open it again to the public.  |
| June 2016      | Work begins in Burdekin Park to remove the trees and clean up the debris.<br><br>3 June the toilets and museum are reopened.<br><br>17 June half of the park is opened to the public. Access is gained through the centre pathway.   |

| Year           | Action  |
|----------------|---|
| July 2016      | On the 6 July the last tree is felled in the project, and the park is reopened to the public on 12 July.<br>On the 31 July the first of a 5 year licence expires. Any future work will need to be carried out in the following years. |
| August 2016    | Singleton Council submits grant to OEH to gain funding for the tree works. The application was unsuccessful.  |
| September 2016 | Burdekin Park update released to the community outlining the works completed and the next stages of the park.   |
| November 2016  | Council writes a submission for the Senate Inquiry into the Protection and Management of the Flying-foxes in the Eastern States.  |
| December 2016  | Council accepts offer from HCCREMS to revise the Flying-fox Management Strategy to be in line with OEHs template.   |
| February 2017  | Singleton experiences an extreme heatwave event over the weekend of the 11/12. In excess of 1200 flying-foxes die in the park.<br>Report from the senate inquiry is released.   |
| March 2017     | Council staff start work on the revised Flying-fox Camp Management Plan with Hunter Councils.   |
| July 2017      | Council starts work on the new Burdekin Park Plan of Management.  |
| October 2017   | Council staff attend annual flying-fox forum in Sydney to gain more knowledge and information about the management of the camps.  |
| November 2017  | Council successful in gaining grant money from NSW Office of Local Government in Stream 3 funding.  |
| December 2018  | Council adopts the new Burdekin Park Plan of Management incorporating the Landscape Master Plan.  |
| January 2018   | Council assists in multiple heat stress events by turning on the irrigation. Less than 400 died.  |
| March 2018     | Council submits this plan for public exhibition.  |

Considering this Plan and the Burdekin Park Plan of Management is in effect for 10 years, any future maintenance beyond the Section 121 5 year licence will require additional approvals. Council understands the process and will apply for approvals that are necessary to ensure that the Camp and the Park are managed and maintained in accordance with this Plan and the Plan of Management for Burdekin Park.

Table 2, in April 2016, Council engaged an arborist to evaluate the condition and safety of trees in the Park. The investigation identified the extent of damage to most of the trees in the park was severe and posed high risk of injury from damaged, dead and imminently hazardous branches. Tree death was likely to occur in some trees where the roosting of flying-foxes has caused almost complete defoliation. Recommended actions were:

- Fifteen (15) trees require no action.
- Nine (9) trees require pruning to remove dead and hazardous branches.
- Twelve (12) trees require pruning to reduce the crown height to approximately 4 metres above ground level. These trees are to be retained after pruning.
- Seven (7) large trees require pruning within a specific height range where canopy damage is severe. These are larger trees.
- Forty (40) trees, mostly located in the central zone of the park are extensively damaged and require removal. The removal of trees includes the grinding of stumps.

Details of these actions are described in Figure 5. These works were approved and undertaken in April 2016.



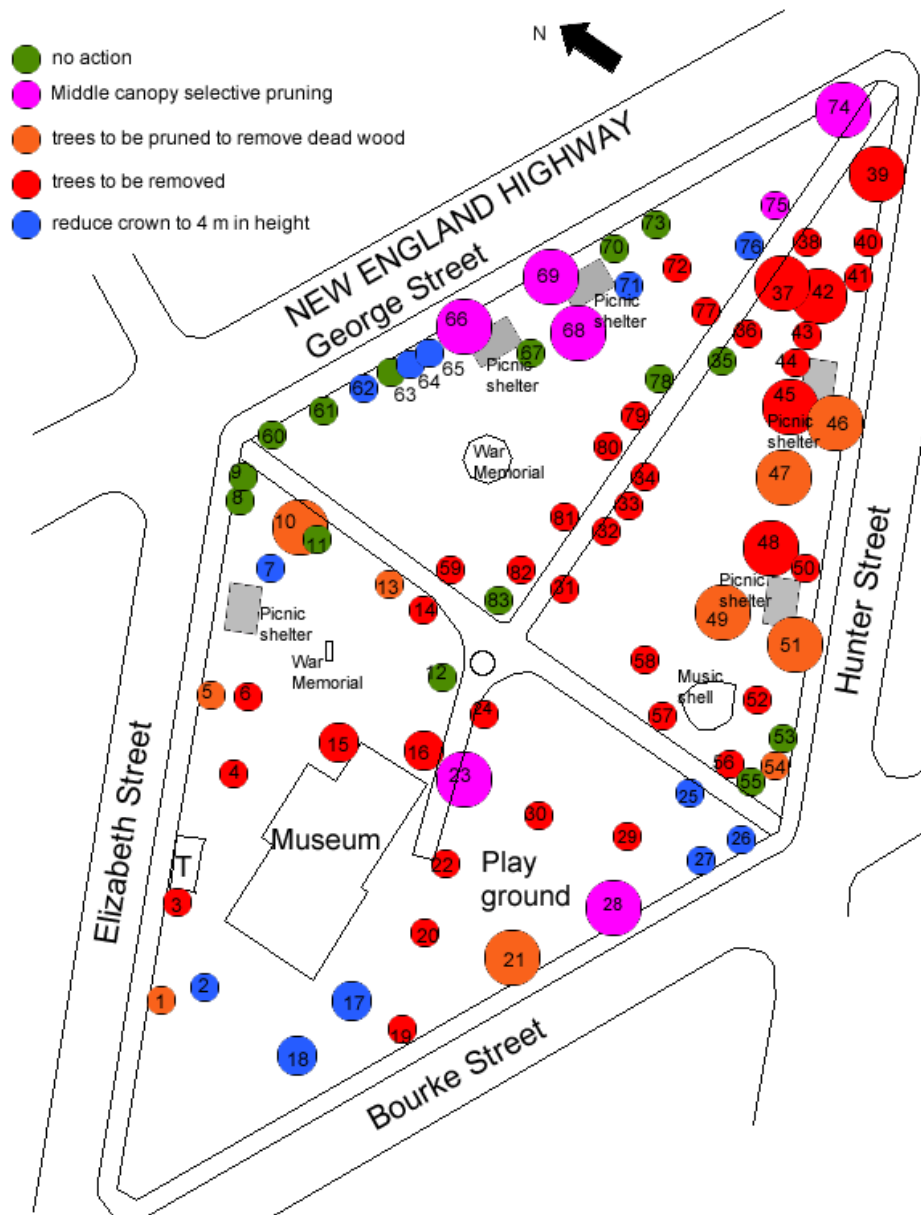


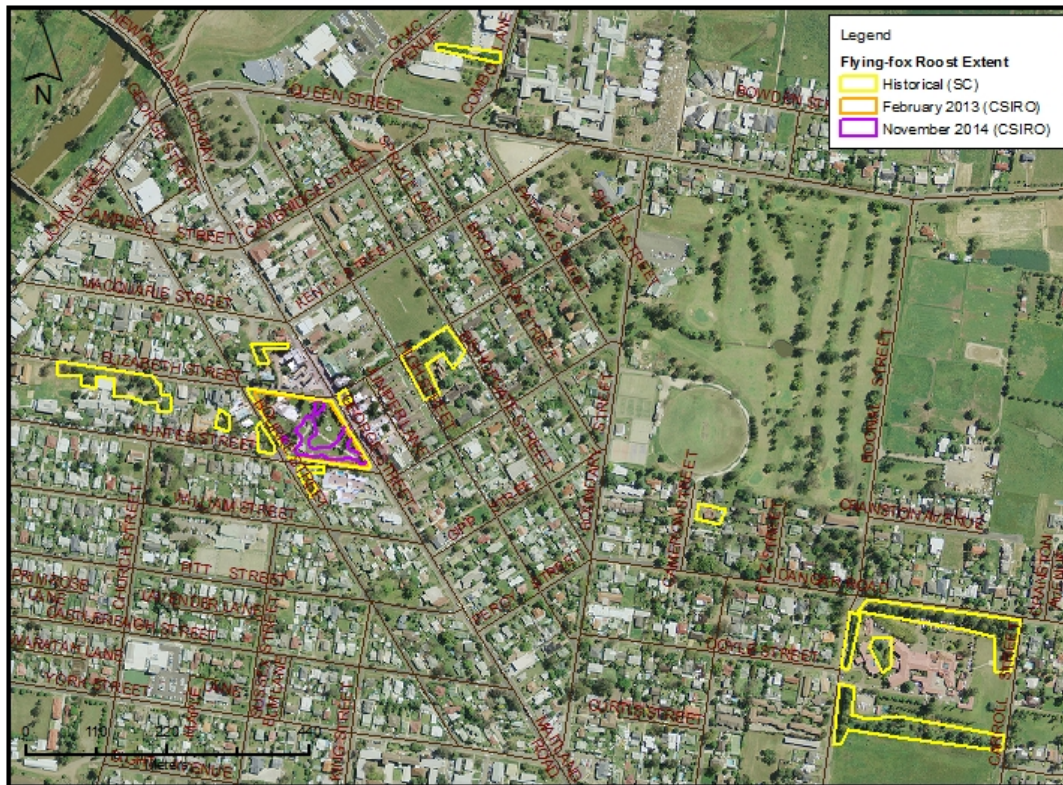
Figure 5: Tree management plan as actioned in April 2016 (an aerial photograph of the site following these works is included in Figure 1)

**Figure 6: Examples of damage created by Flying-foxes roosting in Burdekin Park, 2016**



The size and location of flying-fox roosting has been noted over the past few years. Map 5 provide details of the roosting locations from 2013-2016. Map 6 shows the current roosting area, which is greatly reduced due to the removal of trees, and a reduction in numbers of flying-fox utilising the site.

**Map 4: Historical Flying Fox Camp size and location**





Map 5: Historical roosting habitat inside Burdekin Park



Map 6: 2017 Flying-fox Roosting extent



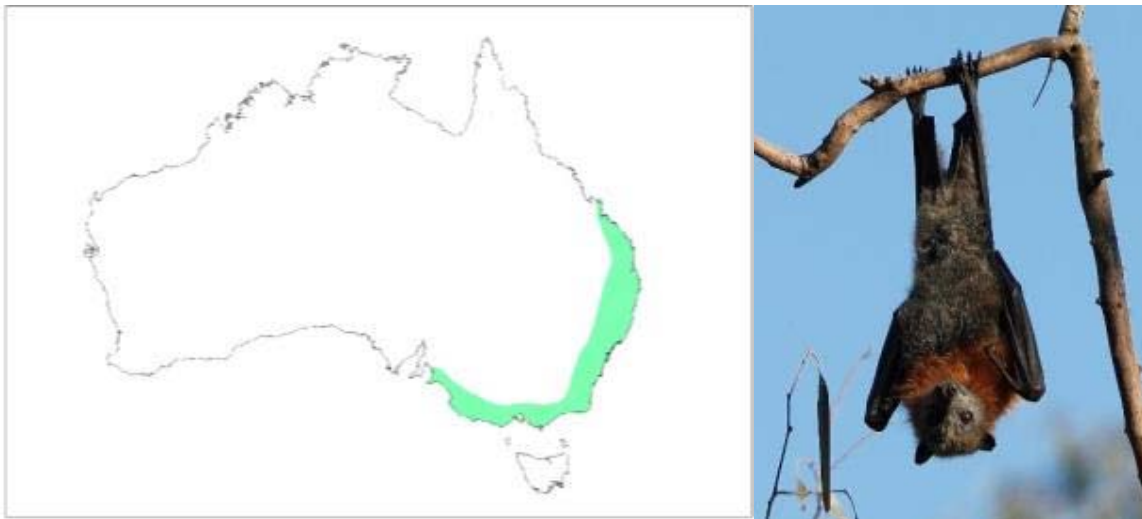


## 2.2 Ecological Values of Flying Foxes, the Camp and Surrounding Area

### 2.2.1 Flying-fox Species Description

Burdekin Park is largely utilised by Grey-headed Flying-foxes and Black Flying-foxes, however in 2016 Singleton experienced a large influx of the Little Red Flying-Foxes, details on these species follows.

#### Grey-headed Flying-fox (*Pteropus poliocephalus*)



**Figure 7: Grey-headed Flying-fox indicative species distribution, adapted from OEH 2015a**

The Grey-headed Flying-fox (GHFF) (Figure 7) is found throughout eastern Australia, generally within 200km of the coast, from Finch Hatton in Queensland to Melbourne, Victoria (OEH 2015d). This species now ranges into South Australia and has been observed in Tasmania (DoE 2016a). It requires foraging resources and camp sites within rainforests, open forests, closed and open woodlands (including melaleuca swamps and banksia woodlands). This species is also found throughout urban and agricultural areas where food trees exist and will raid orchards at times, especially when other food is scarce (OEH 2015a).

All the GHFF in Australia are regarded as one population that moves around freely within its entire national range (Webb & Tidemann 1996; DoE 2015). GHFF may travel up to 100 kilometres in a single night with a foraging radius of up to 50km from their camp (McConkey et al. 2012). They have been recorded travelling over 500km 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 & Auger 1992; Roberts et al. 2012). This results in large fluctuations in the number of GHFF in NSW, ranging from as few as 20% of the total population in winter up to around 75% of the total population in summer (Eby 2000). They are widespread throughout their range during summer, but in spring and winter are uncommon in the south. In autumn they occupy primarily coastal lowland camps and are uncommon inland and on the south coast of NSW (DECCW 2009).

There is evidence the GHFF population declined by up to 30% between 1989 and 2000 (Birt 2000; Richards 2000 cited in OEH 2011a). There is a wide range of ongoing threats to the survival of the GHFF, including habitat loss and degradation, deliberate destruction associated with the commercial

horticulture industry, conflict with humans, infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.) and competition and hybridisation with the BFF (DECCW 2009). For these reasons it is listed as vulnerable to extinction under NSW and federal legislation.

**Black flying-fox (*Pteropus alecto*)**



**Figure 8: Black flying-fox indicative species distribution, adapted from OEH 2015a**

The Black Flying-fox (BFF) (Figure 8) has traditionally occurred throughout coastal areas from Shark Bay in Western Australia, across Northern Australia, down through Queensland and into NSW (Churchill 2008; OEH 2015a). Since it was first described there has been a substantial southerly shift by the BFF (Webb & Tidemann 1995). This shift has consequently led to an increase in indirect competition with the threatened GHFF, which appears to be favouring the BFF (DoE 2016a).

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

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.

### Little Red Flying-fox (*Pteropus scapulatus*)



**Figure 9: Little red flying-fox indicative species distribution, adapted from OEH 2015a**

The Little Red Flying-fox (LRFF) (Figure ) is widely distributed throughout northern and eastern Australia, with populations occurring across northern Australia and down the east coast into Victoria.

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

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

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

### 2.2.2 Burdekin Park Flying Fox Camp Description

There is little evidence of the original native vegetation community at Burdekin Park, with the dominant tree species present in 2017 being endemic to Queensland. The park is now expansive lawns, formal pathways and gardens. The vegetation on site is sparse and contains no mid-storey providing flying-foxes with little protection from strong winds, and excessive heat conditions.

### 2.2.3 Ecological role of Flying Foxes

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

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

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

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

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

### 2.2.4 Flying Fox Habitat

#### Vegetation Communities

The main vegetation communities identified along and within close proximity to Singleton and the Hunter River are:

- Hunter Floodplain Redgum Woodland
- Hunter Valley River Oak.

Dry Sclerophyll forest communities (such as Central Hunter Ironbark Spotted Gum Grey-box Forest Community) occur in higher elevated areas such as Singleton Heights, to the north of the camp.

The area surrounding the Burdekin Park Camp is largely cleared for housing or agricultural activities, but there are a number of vegetation communities within 6km of the Camp, these are:

- Hunter Valley River Oak
- Hunter Floodplain Redgum Woodland Complex
- Central Hunter Grey Box-Ironbark Woodland
- Central Hunter Ironbark-Spotted Gum-Grey Box Forest

Table 3 provides details of the tree species present in Burdekin Park.



**Table 3: Vegetation Species Present in Burdekin Park (January 2017)**

| Species                         | Common Name   | Stratum | Percentage Cover* |
|---------------------------------|---------------|---------|-------------------|
| <i>Araucaria bidwillii</i>      | Bunya Pine    | Upper   | 5-25%             |
| <i>Pinus contorta</i>           | Shore Pine    | Upper   | 5-25%             |
| <i>Jacaranda spp.</i>           | Jacaranda     | Mid     | <5%               |
| <i>Eucalyptus camaldulensis</i> | River Red Gum | Upper   | <5%               |

\* 0 = not present, 1= <5%, 2=5 to 25%, 3 = 25 -50%, 4= 50-75%, 5= >75%

### Threatened Species & Endangered Ecological Communities

The vegetation in Burdekin Park has been substantially altered and therefore does not contain likely or known suitable habitat for state and federally listed threatened or endangered flora.

### Foraging Areas

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

The area surrounding the Singleton camp has been heavily cleared for agriculture and mining. Approximately 19% of land within 20 km of the site supports native forests and woodlands, primarily in small remnant patches. Dry rainforest is rare and provides insignificant food resources for flying-foxes during late summer and autumn. By contrast, flowering trees visited by the flying-foxes occur in >95% of the remaining forested land within 20km of Singleton. This resource includes small remnants of some of the most productive vegetation types for nectar-feeding animals found in south east Australia, notably Ironbark-Spotted Gum forests (Eby and Law 2008).

Ten species of trees in the flower diet of Grey-headed Flying-foxes occur within feeding range of the Singleton Camp (Table 4). They vary considerably in the amount of nectar they secrete, the frequency and duration of flowering, their seasonal flowering schedules and the area of distribution. Interactions between these characteristics determine their influence on the size and species composition of the population of flying-foxes roosting at Singleton.

A high proportion of diet species flower from late spring to autumn. The diversity of this resource base supports a consistent presence of animals in the warmer months despite variations in the species that flower in any year. Population size should fluctuate considerably in relation to nectar abundance. In years when the widely-distributed and productive Broad-leaved Ironbark flowers well (approximately 40% of years), the number of animals present in late spring and summer should be inflated.

However, the most dramatic shifts in population size at Singleton are driven by the flowering patterns of Spotted Gum. This is the most common species of tree in the lower and central Hunter. It produces abundant nectar for periods of up to 6 months, starting as early as late January and continuing into winter (Law and Chidel 2007). Mass flowering events occur approximately once every 4 years, and sparse flowering occurs more frequently (Pook et al. 1997; B. Dowling pers

comm). Large numbers of both Grey-headed Flying-foxes and Little Red Flying-foxes migrate to the Hunter Valley in response to mass flowerings of Spotted Gum, traveling distances of several hundred kilometres (Eby 1991) and flying-fox camps in Sydney diminish in size or empty when these events occur.

Native vegetation in the area is unlikely to support populations through winter in years when the Spotted Gum doesn't flower due to the highly-restricted distribution of diet plants productive in those months. Flying-foxes that more regularly over-winter in the Singleton camp are likely to be supported by urban and rural garden plantings, particularly in years of wide-spread food scarcity in native forests.

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

| Species                      | Common Name            | % Area of Native Vegetation | Flowering Characteristics |                   |                | Bi-monthly Flowering Schedule |         |         |         |         |         |
|------------------------------|------------------------|-----------------------------|---------------------------|-------------------|----------------|-------------------------------|---------|---------|---------|---------|---------|
|                              |                        |                             | Nectar Abundance          | Frequency (% yrs) | Duration (mth) | Dec-Jan                       | Feb-Mar | Apr-May | Jun-Jul | Aug-Sep | Oct-Nov |
| <i>Corymbia maculata</i>     | Spotted Gum            | 70%                         | 1.0                       | 0.25              | 4-6            |                               | X       | X       | X       |         |         |
| <i>Eucalyptus fibrosa</i>    | Broad-leaved Ironbark  | 60%                         | 0.7                       | 0.4               | 2              | X                             |         |         |         |         | X       |
| <i>Acacia floribunda</i>     | Rough-barked Apple     | 10%                         | 0.5                       | 0.4               | 1              | X                             |         |         |         |         |         |
| <i>E. acmenoides</i>         | White Mahogany         | 5%                          | 0.3                       | 0.7               | 1              | X                             |         |         |         |         | X       |
| <i>E. moluccaba</i>          | Grey Box               | 75%                         | 0.3                       | 0.7               | 2              |                               | X       |         |         |         |         |
| <i>E. propinqua</i>          | Small-fruited Grey Gum | 5%                          | 0.5                       | 0.4               | 2              | X                             | X       |         |         |         |         |
| <i>E. punctata</i>           | Large-fruited Grey Gum | 5%                          | 0.3                       | 0.7               | 1              | X                             | X       |         |         |         |         |
| <i>E. siderophloia</i>       | Grey Ironbark          | 5%                          | 1.0                       | 0.7               | 2              | X                             |         |         |         |         | X       |
| <i>E. tereticornis</i>       | Forest Red Gum         | 3%                          | 0.5                       | 0.7               | 2              |                               |         |         |         | X       | X       |
| <i>Syncarpia glomulifera</i> | Turpentine             | 2%                          | 0.5                       | 0.7               | 2              |                               |         |         |         | X       | X       |
|                              |                        |                             |                           |                   |                | 6                             | 4       | 1       | 1       | 2       | 5       |

### Roosting Areas

In 2016, extensive damage to multiple heritage-listed trees was caused by a high influx of Little Red Flying Foxes which lead to an approval for extensive tree removal and pruning. This has now significantly reduced the available flying-fox roosting habitat in Burdekin Park. During this period, flying-foxes were recorded roosting in nearby residential properties and seemed to favour Jacaranda trees (Singleton Council Pers. Comm). Flying-foxes also roosted in Cocos Palm, Silky Oak and Maple trees. The remaining mature trees in Burdekin Park now sustain the Flying-fox Camp.

### Potential Overflow Roosting Areas

Overall the number of potential overflow roosting sites in the Singleton area and surrounding townships/localities is limited as a result of extensive past clearing throughout the Valley floor.

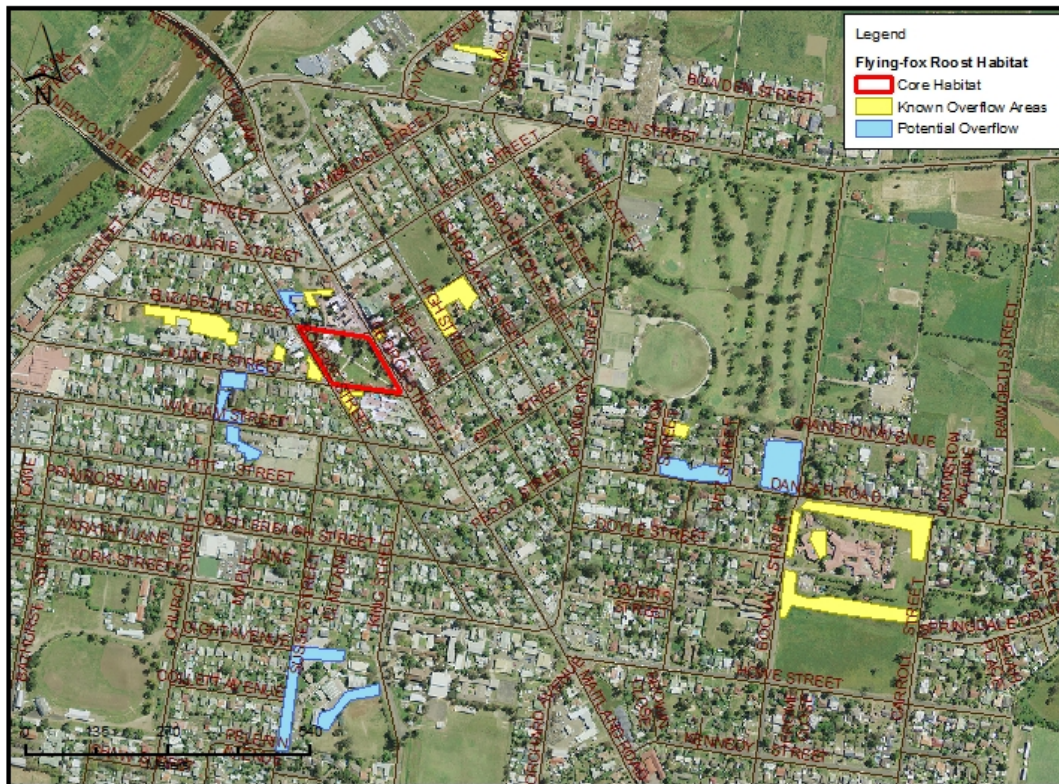
There are pockets of suitable roosting trees including Swamp Oak (*Casuarina glauca*) and River Oak (*Casuarina cunninghamiana*) and the introduced Willows (*Salix spp.*) along sections of the Hunter River. The Hunter River and surrounding low lying alluvial flats has been extensively cleared containing small and fragmented pockets of the original vegetation.

A number of council reserves are located north of the camp, which may contain suitable roosting habitat along drainage lines dominated by Swamp Oak (*Casuarina glauca*). There are also pockets of potential roosting habitat comprising of Central Hunter Swamp Oak Forest just east of Mt Thorley and south of Burdekin Park.

It is noted that at times, the Camp has grown to include areas surrounding Burdekin Park, including the local school, police station and back yards of adjoining properties. Flying-foxes have been observed preferring Jacaranda trees (see

Map 7).

**Map 7: Potential flying-fox camp overflow areas**



### 2.2.5 Flying-foxes in Urban Areas

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

- loss of native habitat and urban expansion



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

Over 90% of the natural vegetation has been cleared within the township of Singleton, significantly reducing suitable roosting habitat for flying-foxes. The mature and well-established trees in Burdekin Park are one of the few sites containing roosting habitat. Some adjacent private properties also contain suitable well established habitat

Singleton Local Government Area (LGA) has an abundance of Spotted Gums, a favoured foraging tree for flying-foxes, and the primary cause of the significant influx of flying-foxes (all species) in 2016, which exacerbated the flying-fox and urban conflict issues experience around Burdekin Park.

In and around Burdekin Park Flying-fox Camp the following threats and hazards have been noted:

- Natural food shortages – due to land clearing in combination with poor flowering seasons
- Fruit tree netting – females with young have been observed trapped in netting (2017)
- Heat events – recent heat waves have seen animal deaths throughout the region.
- Lack of connecting overflow areas – the Camp has very few trees in surrounding areas to expand into when numbers of animals swell.
- Fireworks – Wildlife Rehabilitators often get calls to attend injured animals after fireworks have been set off.

### 2.2.6 Flying-foxes Under Threat

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

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

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

There is a wide range of ongoing threats to the survival of the GHFF, including:

- habitat loss and degradation
- conflict with humans (including culling at orchards)

- infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.)
- predation by native and introduced animals
- exposure to extreme natural events such as cyclones, drought and heat waves.

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

### 2.2.7 Flying-foxes and Heat Stress

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

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

Singleton Council will consider intervention during a heat stress event, through the guidance and advice from licenced wildlife rehabilitators. As each camp is assessed on an individual basis within the Hunter, Singleton Council will assist the carers on a case by case event. Council will only be able to intervene on the basis that resources are available and no restrictions are in place, such as water restrictions. If at any time these are in place or resources are limited Council potentially will not be able to assist.

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

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

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

Burdekin Park experienced a heatwave event in February 2017 where temperatures were recorded in excess of 46°C causing the deaths of up to 1000 Grey-headed Flying Foxes (estimated at 50% of the population present at the Camp in February).

### Approval to assist Flying-foxes

Only people licensed to rehabilitate fauna under the *Biodiversity Conservation Act 2016* can undertake any assistance activities. Any licence (or Statutory role) must specifically endorse the person or group as being able to care for flying-foxes.

Council has worked constructively with these groups to assist with the welfare of the flying-foxes.

### What to do in a Heat Stress Event

During a heat stress event, flying-foxes will likely occupy the coolest microhabitats available to them at that temperature, and external disturbance may move flying-foxes into less desirable locations. Great care should be taken to avoid unnecessarily disturbing flying-foxes at this time.

- **Spraying animals in the camp** - Spraying of specific individuals by hand can cool highly distressed animals. Spraying should only be undertaken under the supervision of a licenced person. However, care must be taken not to disturb other flying-foxes, as this may cause them to leave the shelter of their relatively cool microhabitats and increase their body temperature, further stressing them.

Flying-foxes should not be approached if they show any indication that they are trying to move away or escape from the presence of the sprayer. Highly heat-stressed individuals that do not respond to spraying should be observed for 15 minutes before undertaking a second round of spraying. The individual may then be removed from the camp after a period of observation by an experienced wildlife rehabilitators for further treatment

- **Removing animals from a camp and rehydration therapy** - Animals that are severely affected by a heat stress event may need intensive cooling and rehydration. In some cases this may necessitate removal of the animal from the camp to a quiet and shady location

The NSW Office of Environment & Heritage has partnered with researchers from the University of Western Sydney to host workshops with Wildlife Rehabilitators and interested Councils to discuss appropriate response to heat stress events. It is expected that following these sessions, a protocol for response may be developed for considered inclusion in the Camp Management Planning process.

## 2.2.8 Human and Animal Health

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

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

Public water supplies are regularly monitored for harmful microorganisms, and are filtered and disinfected before being distributed. Management plans for community supplies should consider whether any large congregation of animals, including flying-foxes, occurs near the supply or

catchment area. Where they do occur, increased frequency of monitoring should be considered to ensure early detection and management of contaminants.

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

**Australian bat lyssavirus** - 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 2013) 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 2013).

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 2013).

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 2013).

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 (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 (DPI 2014). There is no evidence that the virus can be passed directly from flying-foxes to humans or to dogs (AVA 2015). Clinical studies have shown cats, pigs, ferrets and guinea pigs can carry the infection (DPI 2015a).

Although the virus is periodically present in flying-fox populations across Australia, the likelihood of horses becoming infected is low and consequently human infection is extremely rare.

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.

**Menangle virus** - 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 (AVA 2015). 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 was recorded (AVA 2015). The virus is thought to have been transmitted to the pigs from flying-foxes via an oral-faecal matter route (AVA 2015). 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.

**General health considerations** - Outside of an occupation that typically interact with flying-foxes, such as Wildlife Rehabilitators and vets, human exposure to these viruses is extremely rare and similarly transmission rates and incidence of human infection are very low. In addition, HeV infection in humans apparently requires transfer from an infected intermediate equine host and direct transmission from bats to humans has not been reported. Thus despite the fact that human infection with these agents can be fatal, the probability of infection is extremely low and the overall public health risk is judged to be low (Qld Health 2016).

## 2.3 Legislative and Regulatory Context

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

In NSW, the Grey-headed Flying-fox is listed as vulnerable under the NSW *Biodiversity Conservation Act 2016*. This listing is based on scientific evidence indicating a significant decline in the population of the species and that it is "likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate" (NSW Scientific Committee 2001).

This means that if present species population trends continue, the species could become extinct. A draft national recovery plan has also been prepared for the species (DECCW 2009, Geolink 2013). Provisions in the *Biodiversity Conservation Act 2016* and *Environmental Planning and Assessment Act 1979* mean that actions likely to adversely affect the species generally require approval or licensing, and that impacts on the species require assessment. The NSW Office of Environment and Heritage (OEH) has prepared the 'Flying-fox Camp Management Policy' 2015, intended to empower land managers, primarily local councils, to work with their communities to manage flying-fox camps effectively. It provides the framework within which OEH will make regulatory decisions. The Policy encourages local councils and other land managers to prepare camp management plans for sites where the local community is affected.

### The Burra Charter

The Burra Charter is a set of guidelines that outline the best practice standards for cultural heritage management in Australia. In 1979, the Australian ICOMOS Charter for the Conservation of Places of Cultural Significance was adopted at a meeting of Australia International Council on Monuments and Sites (ICOMOS) at the historic mining town of Burra, South Australia, hence the shortened title of The Burra Charter.

The Burra Charter identifies three levels of repair for heritage structures:

- Preservation – Maintaining a place in its existing state and preventing further deterioration.
- Restoration – Returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material.
- Reconstruction – Returning a place to a known earlier state and is distinguished from restoration by the introduction of new material.

Conservation is an integral part of the management of places of cultural significance and is an ongoing responsibility. Singleton Council needs to preserve and maintain places of cultural significance as these places enrich lives and provide a deep sense of connection to the community.

They are historical records that put an identity of the Australian landscape. They are irreplaceable and precious.

The Burra Charter advocates a cautious approach to change: do as much as necessary to care for the place and to make it useable, but otherwise change it as little as possible so that its cultural significance is retained.

### **Parliamentary inquiry into flying-fox management in the eastern states**

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

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

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

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

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

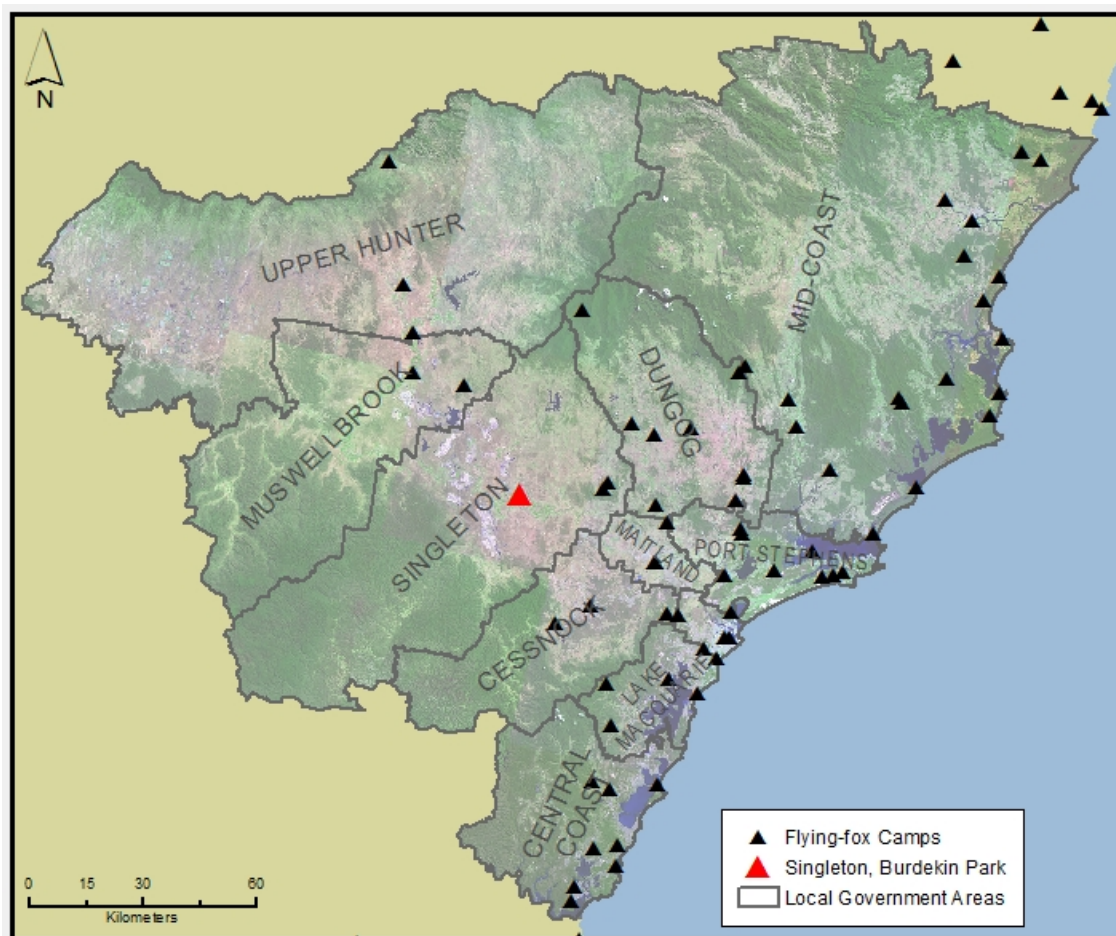
1. The Committee recommends that the Australian Government propose a national or eastern states flying-fox consultative committee or working group to the Council of Australian Governments. The consultative committee or working group would be responsible for centrally compiling information on referrals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

## 2.4 Regional Context

The Hunter & Central Coast Region is home to 59 known Flying-fox Camps (see Map 8), 54 of which have observed flying-foxes roosting in them since 2012. It is highly likely that there are additional Camps throughout the vegetated areas (private land and National Parks / State Forest) of the region that are well away from human settlements and are currently unaccounted in the CSIRO National Flying-fox Camp Census.

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

**Map 8: Known Flying-fox Camps throughout the Hunter & Central Coast region**



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

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

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

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

### 2.4.1 Regional Flying-fox Foraging Preferences

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

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

#### Management Actions at other Flying-fox Camps

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

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

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



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

## 3 Community Engagement

Singleton Council has over the past few years, undertaken extensive community engagement in relation to the management of Burdekin Park and the resident flying-foxes. As such, additional consultation was not undertaken to inform this updated Camp Management Plan, but previous input has been utilised to inform the management decisions.

### 3.1 Stakeholders

There are a range of stakeholders who are directly or indirectly affected by the flying-fox camp, or who are interested in its management. Stakeholders include those shown in Table 5

**Table 5: Stakeholders in the camp and Plan**

| Stakeholder   | Interest / Reported Impacts  |
|---|--|
| All community members   | Affected by location of Camp and roosting and foraging of animals.   |
| Residents living in the Singleton area directly impacted by the camp                                      | Directly affected by roosting animals  |
| Business owners   | Affected by location of Camp and roosting and foraging of animals.   |
| Civic leaders and influencers (including local, state and federal politicians)                            | Civic leaders need to be responsive to community concerns and manage legislative risk through Councils management activities.  |
| Indigenous community  | Significance of flying-foxes in local indigenous heritage  |
| Schools   | Impact on students and school property   |
| Hospitals / medical practises / Dept. of Health   | Interested in human health issues related to flying-fox / human contact.   |
| Equine facilities and vets  | Equine facility managers and local vets should be 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. |
| Orchardists and fruit growers   | Fruit growers may be impacted by flying-foxes raiding orchards.  |
| Researchers/CSIRO Researchers have an interest in flying-fox behaviour, biology and conservation.         | CSIRO – manages national flying-fox monitoring program   |
| Local Government NSW (LGNSW) is an industry association that represents the interests of councils in NSW. | The Flying-Foxes Grants Program has been established to help councils manage flying-fox camps in their areas, consistent with the Flying-Fox Camp Management Policy 2015.  |

| Stakeholder   | Interest / Reported Impacts  |
|---|--|
| <p>Wildlife rehabilitators and conservation organisations</p> <p>Wildlife rehabilitators and conservation organisations have an interest in flying-fox welfare and conservation of flying-foxes and their habitat.</p>                              | <p>Bat Support Group - aims to work peacefully and positively with the community, land managers and government bodies to enable bats to live and thrive in the region. Provides support to bats through: Promotion, Protection, Information, Nurture and Conservation activities.</p> <p>LandCare groups – involved in habitat rehabilitation</p> <p>Bird Observer Groups – provide data on flowering gum events – indicates possible arrival of flying-foxes</p> <p>Landholders interested in wildlife conservation and habitat creation/ rehabilitation</p> <p>Hunter Wildlife</p> |
| <p>Media</p> <ul style="list-style-type: none"> <li>• Regional / local</li> <li>• Singleton Argus</li> <li>• Hunter Valley News</li> <li>• Cessnock Advertiser</li> <li>• Newcastle Herald</li> <li>• ABC Local Radio</li> <li>• 2NUR FM</li> </ul> | <p>Work proactively with local media to deliver timely and correct information to the Singleton community.</p>   |
| Local government  | <p>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.</p> <p>Council is also responsible for administering local laws, plans and policies, and appropriately managing assets (including land) for which it is responsible.</p>   |
| Department of Environment and Energy  | <p>is responsible for the management of environment protection and conservation of biodiversity. DoE administers the <i>Environment Protection and Biodiversity Conservation Act 1999</i>, (EPBC Act), which is the Australian Government’s central piece of environmental legislation. The Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of national environmental significance.</p>  |
| NSW Office of Environment and Heritage  | <p>The Office of Environment and Heritage is responsible for the State government’s legislation in relation to the <i>Threatened Species Act, 1995</i>, which aims to protect populations and ecological communities of animals and plants.</p>  |
| Department of Infrastructure-Lands  | <p>The crown lands division of this State Government department administers the crown land portion of Burdekin Park (see Map 3), under the Crown Lands Act 1989</p>  |

### 3.2 Engagement Methods

Singleton Council has developed a Communication Plan for Burdekin Park, the purpose of which is to ensure the community has the opportunity for input and participation in the review of the Plan of Management, development of a landscape masterplan and ultimately, the future of Burdekin Park.

Consultation on Burdekin Park has been undertaken holistically, and not been restricted to flying-fox conflict issues, to fully understand the community's views and needs regarding the use of Burdekin Park into the future. The communication plan developed sought to achieve the following objectives:

- The community is well informed of the situation at Burdekin Park, and steps being taken to address the flying-fox population in the first instance and the impacts on the amenity of the park
- The community is provided the opportunity of asking questions and providing feedback at all stages during the review of the Burdekin Park Plan of Management and development of a landscape masterplan for the site
- Communication and consultation is genuine, timely and responsive
- The community is well informed of the outcomes of the review process

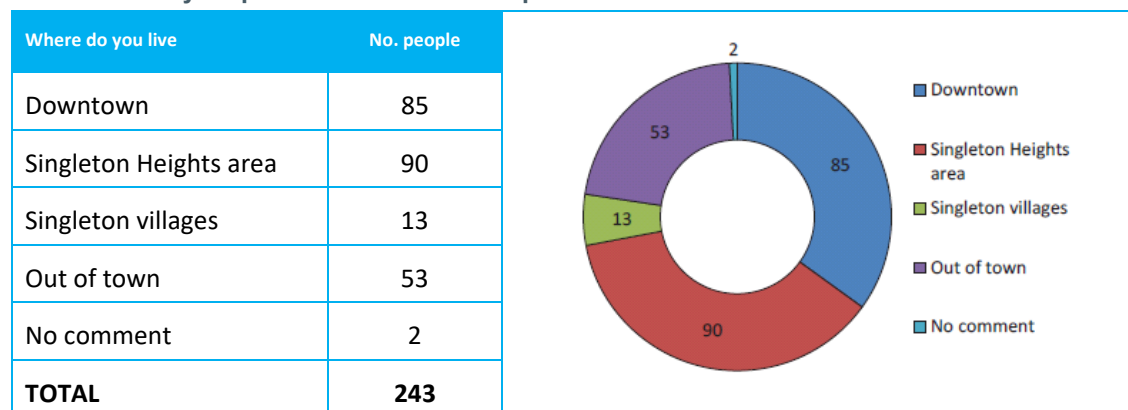
Consultation activities undertaken in 2016-2017 included a workshop with Councillors, and broad community consultation through the use of an on-line survey and targeted face-to-face meetings with stakeholders.

Promotion of the consultation opportunities utilised Council's website, Council's Facebook account, advertisements in the local newspaper and face-to-face meetings at the Johns Street Christmas event.

### 3.3 Community Feedback on Management Options

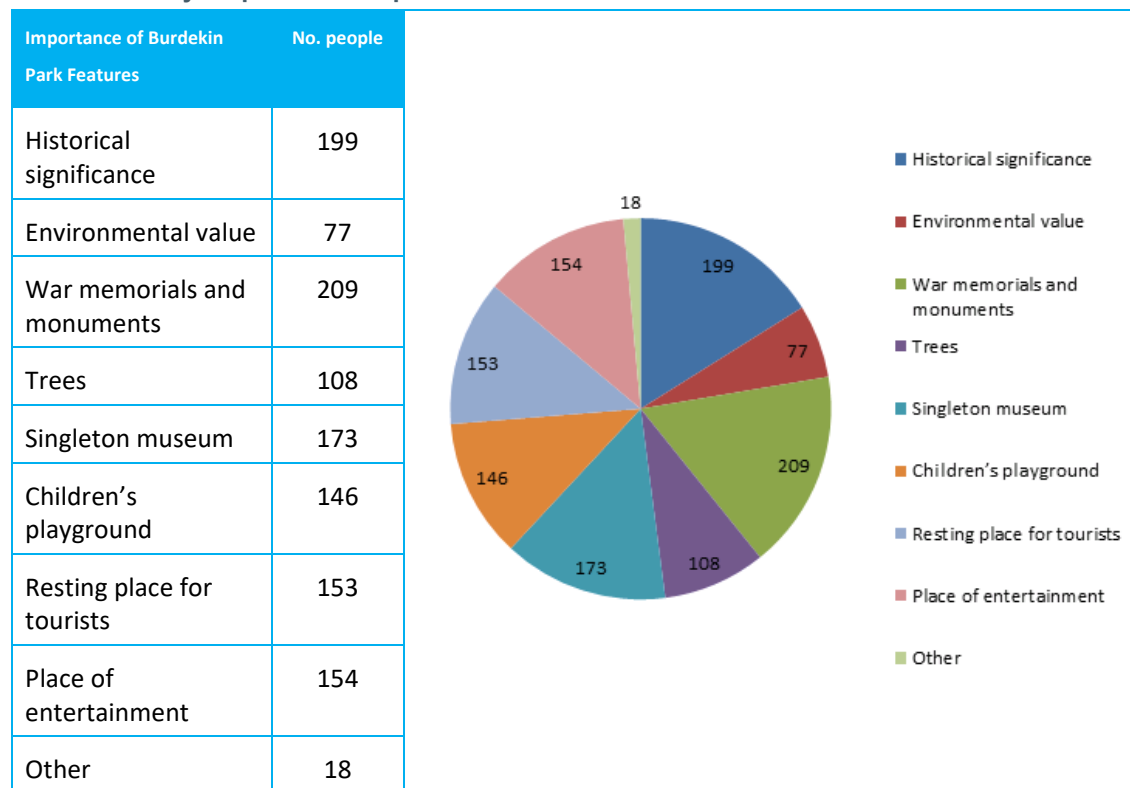
243 community members completed the survey in either hardcopy or via the online form. The results of key question are summarised below.

**Table 6: Survey responses - "Where do respondents live?"**



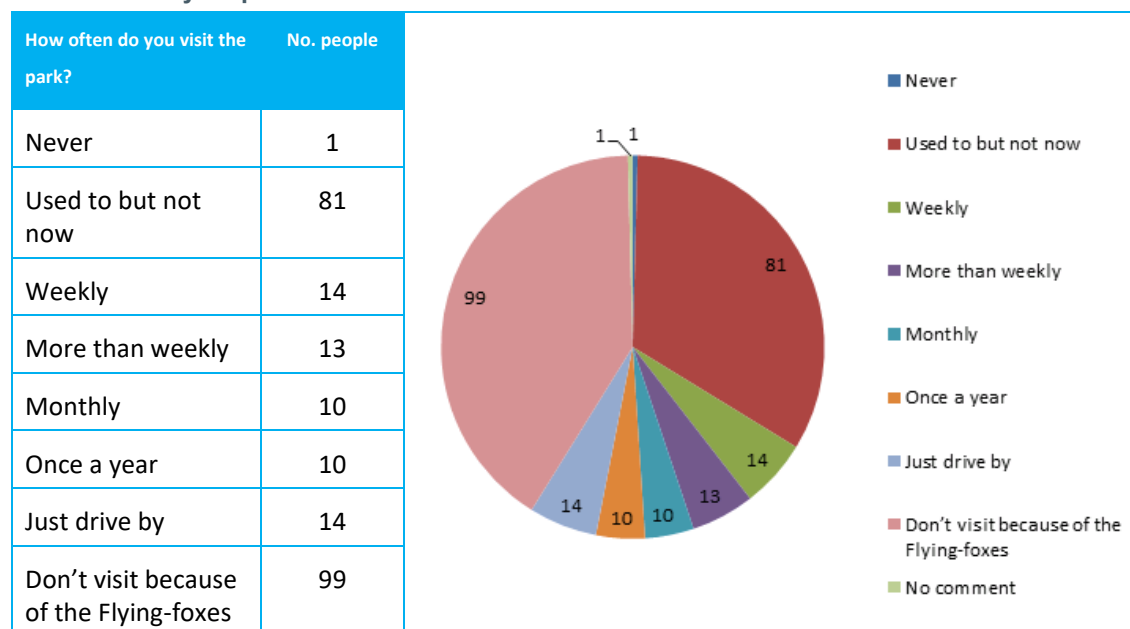
Just shy of 40% of respondent live near the park, with the bulk of surveys from people who live out of town, suggesting the Park is valued and utilised by a large portion of the Singleton community.



**Table 7: Survey responses - "Importance of Burdekin Park Features?"**

Respondents were asked to tick the listed park features of importance to them. For example 108 of 243 respondents said trees were important to them. (This equates to 44% of respondents ticking this box). Respondents could tick more than one box.

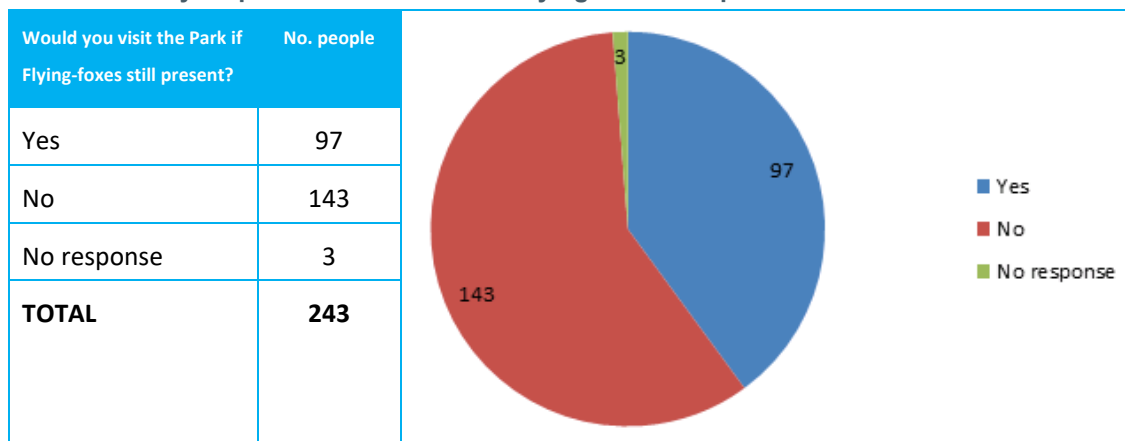
Based on survey responses, the Park's memorials and monuments, historical significance and museum are most highly valued, followed by recreational uses and finally environmental values.

**Table 8: Survey responses - "Park Visitation?"**

|              |            |  |
|--------------|------------|--|
| No comment   | 1          |  |
| <b>TOTAL</b> | <b>243</b> |  |

33% of people said that they used to visit the park, but do not now, and 41% said specifically that they do not visit because of flying-fox presence. The rest of the results indicate fairly low park usage levels

**Table 9: Survey responses - "Park visits if Flying-foxes still present?"**



The community is divided on this issue, with 40% of respondents stating they would visit the upgraded park if the flying-foxes were still present. However, the majority of respondents would not.

Interestingly, 29 people who said they used to, but no longer visited the park, were among those to say 'yes' to the above. 23 of those who wouldn't visit due to the flying-foxes also said they would visit the park again. Based on this result, it is unclear exactly how visitation may change following an upgrade to the Park.

A number of other questions relating to potential site upgrades were posed, none of these are relevant to the issue of management of the flying-fox roosting site. Details of the full consultation are included in the *Burdekin Park Plan of Management*.

Based on the feedback received, complaints received and previous management positions, Council will seek to upgrade and manage the Park to accommodate increased community events, whilst ensuring activity does not contravene the environmental controls placed on it by the Federal and State Governments that require protection of the flying-fox population.

In addition, Council has been releasing information directly to affected residents on a regular basis through letterbox drops of flyers which inform the community of management actions by Council, and advice on property maintenance to reduce any conflict issues. Both Council staff and affected community members feel this regular communications is assisting to ensure all affected parties are aware of management activities.

## 4 Management Opportunities

### 4.1 Site-specific analysis of camp management options

#### Flying-fox Culling

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

- *Commonwealth Environmental Protection & Biodiversity Conservation Act 1999*
- *NSW National Parks and Wildlife Act 1974*
- *Firearms Act 1996* or section 96G of the *Crimes Act 1900*
- NSW Flying-fox Management Policy 2015
- scientifically ineffective (due to the mobility of the species) and
- objectives of this Camp Management Plan.

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

#### Routine camp management actions (Level 1 actions)

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

These include:

- removal of tree limbs or whole trees that pose a genuine health and safety risk, as determined by a qualified arborist
- weed removal, including removal of noxious weeds under the Noxious Weeds Act 1993 or species listed as undesirable by a council
- trimming of under-storey vegetation or the planting of vegetation
- minor habitat augmentation for the benefit of the roosting animals
- mowing of grass and similar grounds-keeping actions that will not create a major disturbance to roosting flying-foxes
- application of mulch or removal of leaf litter or other material on the ground.

#### Creation of buffers (Level 2 actions)

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

Actions include:

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

### **Camp disturbance or dispersal (Level 3 actions)**

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

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

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

Table 10 provides details on the various management options available, an assessment of cost and effectiveness of the action to address the various conflict issues. The Table also provides details of the assessment undertaken by Singleton Council as to the suitability of the actions to be included in the Camp Management Plan. Section 4.2 provides details of the management actions that will be undertaken through the implementation of the Camp Management Plan.



Table 10: Analysis of management options

| Management Option                          | Relevant Impacts  | Cost                        | Advantages   | Disadvantages   | Suitability Determination   |
|--|---|-----------------------------|--|---|---|
| Level 1 Actions                            |   |                             |  |   |   |
| Education and awareness programs           | Fear of disease<br>Noise<br>Smell<br>Faecal drop  | \$1000<br><br>Grant funding | Low cost, promotes conservation of flying-foxes, contributes to attitude change which may reduce general need for camp intervention, increasing awareness and providing options for landholders to reduce impacts can be an effective long-term solution, can be undertaken quickly, will not impact on ecological or amenity value of the site. | Education and advice itself will not mitigate all issues, and may be seen as not doing enough.  | Ongoing communication with website. Updates delivered to the community via social media. Future communication to be delivered in a format that is necessary at that time. |
| Property modification                      | Noise<br>Smell<br>Faecal drop<br>Health/wellbeing<br>Property devaluation<br>Lost rental return | Up to \$5,000               | Property modification is one of the most effective ways to reduce amenity impacts of a camp without dispersal (and associated risks), relatively low cost, promotes conservation of FFs, can be undertaken quickly, will not impact on the site, may add value to the property.  | May be cost-prohibitive for private landholders, unlikely to fully mitigate amenity issues in outdoor areas.  | Low cost efforts would be considered such as car covers and other means. However Council resolution would need to determine the level of assistance.                      |
| Fully-fund/subsidise property modification | Noise<br>Smell<br>Faecal drop<br>Health/wellbeing<br>Property devaluation<br>Lost rental return | Nil                         | Potential advantages as per property modification, but also overcomes issue of cost for private landholders.   | Costs to the land manager will vary depending on the criteria set for the subsidy including proximity to site, term of subsidy, level of subsidy. Potential for community conflict when developing the criteria, and may lead to expectations for similar subsidies for other issues. | Council is unlikely to assist in property modifications due to legal and community requirements.  |
| Service subsidies including rate rebates   | Noise<br>Smell<br>Faecal drop<br>Health/wellbeing<br>Property devaluation<br>Lost rental return | Nil                         | 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.  | At this stage it will not be considered and any future requirements will be through a Council resolution.   |

| Management Option                        | Relevant Impacts  | Cost                           | Advantages  | Disadvantages  | Suitability Determination   |
|--|---|--------------------------------|---|--|---|
| Routine camp management                  | Health/wellbeing  | Operational cost up to \$5,000 | 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.  | Will continue as the current ongoing maintenance regime and management of the Park.   |
| Provision of artificial roosting habitat | All   | Nil                            | 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. | Alternate sites have been identified and efforts to establish them are currently ongoing. Artificial sites are not warranted in this area due to the alternate sites and national parks close by. |
| Protocols to manage incidents            | Health/wellbeing  | Nil                            | Low cost, will reduce actual risk of negative human/pet–FF interactions, promotes conservation of FFs, can be undertaken quickly, will not impact the site.   | Will not generally mitigate amenity impacts.   | All work health and safety protocols are currently in place and the site is well known and observed.  |
| Research                                 | All   | Up to \$1,000                  | Supporting research to improve understanding may contribute to more effectively mitigating all impacts, promotes FF conservation.   | Generally cannot be undertaken quickly, management trials may require further cost input.  | Council supports regional programs, as well as made a submission and attended the National Senate Hearing on flying-foxes.  |
| Appropriate land-use planning            | All   | Nil                            | Likely to reduce future conflict, promotes flying-fox conservation. Identification of degraded sites that may be suitable for long-term rehabilitation for FFs could facilitate offset strategies should clearing be required under Level 2 actions.  | Will not generally mitigate current impacts, land-use restrictions may impact the landholder.  | Council does not deem it necessary to add to any planning requirements due to the Camp being within a park.   |
| Property acquisition                     | All for specific property owners<br><br>Nil for broader community | Nil                            | Will reduce future conflict with the owners of acquired property.   | Owners may not want to move, only improves amenity for those who fit criteria for acquisition, very expensive.   | This is not an action that Council endorses.  |
| Do nothing                               | Nil   | Operational Budget             | No resource expenditure.  | Will not mitigate impacts and unlikely to be considered acceptable by the community.   | Council will take action as required.   |

| Management Option                  | Relevant Impacts   | Cost                 | Advantages  | Disadvantages   | Suitability Determination  |
|------------------------------------|--|----------------------|---|---|--|
| Level 2 Actions                    |  |                      |   |   |  |
| Buffers through vegetation removal | Noise<br>Smell<br>Health/wellbeing<br>Property devaluation<br>Lost rental return                         | \$20,000 - \$100,000 | Will reduce impacts, promotes FF conservation, can be undertaken quickly, limited maintenance costs.  | Will impact the site, will not generally eliminate impacts, vegetation removal may not be favoured by the community.  | The newly revised Burdekin Park Plan of Management will support suitable buffer areas.   |
| Buffers without vegetation removal | Noise<br>Smell<br>Health/wellbeing<br>Damage to vegetation<br>Property devaluation<br>Lost rental return | Nil                  | Successful creation of a buffer will reduce impacts, promotes FF conservation, can be undertaken quickly, options without vegetation removal may be preferred by the community. | May impact the site, buffers will not generally eliminate impacts, maintenance costs may be significant, often logistically difficult, limited trials so likely effectiveness unknown.  | Not possible to create a buffer without the need for some vegetation loss. Council will be supporting the above method.  |
| Level 3 Actions                    |  |                      |   |   |  |
| Nudging                            | All  | Nil                  | If nudging is successful this may mitigate all impacts.   | Costly, FFs will continue attempting to recolonise the area unless combined with habitat modification/ deterrents.  | This action is not suitable due to a number factors which include lack of suitable locations, resources or budget.   |
| Active dispersal                   | All at that site but not generally appropriate for amenity impacts only (see Section 8)                  | Nil                  | 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. | This action is not suitable due to a number factors which include lack of suitable locations, possibility of adverse impacts on the community resources or budget. |

| Management Option  | Relevant Impacts | Cost                | Advantages   | Disadvantages   | Suitability Determination   |
|--|------------------|---------------------|--|---|---|
| Early dispersal before a camp is established at a new location | All at that site | \$1,000 - \$100,000 | Potential advantages as per other dispersal methods, but more likely to be successful than dispersal of a historic camp. | Potential disadvantages as per other dispersal methods, but possibly less costly and slightly lower risk than dispersing a historic camp. Potential to increase pressure on FFs that may have relocated from another dispersed camp, which may exacerbate impacts on these individuals. | If new camps attempt to establish in the urban environment Council refers to the non-violent methods of level 1 actions, such as noise to deter them from roosting. |



## 4.2 Planned Management Approach

The planned management approaches included in

Table 11 have been determined after consideration of community views, ecological requirements and legislative / policy controls. The Actions have been grouped into the major thematic areas of:

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

The actions included in

Table 11 are directly linked to the management actions discussed in Table 10, but have been directly tailored to actions that will be planned for implementation at the Flying-fox Camp, depending on conditions and funding provision. Responsibility for the implementation of these actions will be shared across the various land managers as required; details of these responsibilities are included in the table.

**Table 11: Management Actions**

| Action ID                     | Issue   | Action Level | Actions & guidelines   | Responsibility   | Trigger / Catalyst for commencement             | Budget   |
|-------------------------------|---|--------------|--|--|---|--|
| <b>1. Resident Assistance</b> |   |              |  |  |   |  |
| 1.1                           | Car / Clothes-line / swimming pool covers                 | 1            | Provision of these items based upon selection criteria during times of high population occupancy   | Singleton Council  | Investigate community requests                  | \$2,500  |
| 1.2                           | Access to gurney / water cleaners to remove bat excrement | 1            | Access provided only when trigger reached  | Singleton Council  | Investigate community requests                  | \$2,500  |
| <b>2. Community Education</b> |   |              |  |  |   |  |
| 2.1                           | Advice on backyard vegetation management                  | 1            | <p>Advice on which trees residents may wish to remove (introduced or naturalised foraging species such as Cocos Palms, Poplars and Silky Oaks)</p> <p>Advice on trees to plant if residents want to encourage bats to forage in their properties.</p> <p>Advice on native fragrant trees that will assist to screen smells from Camp</p> | Singleton Council<br>Hunter Joint Organisation of Councils | Included in Regional Flying-fox educational kit | Funded through NSW Environmental Trust 2017-19 |

| Action ID                                  | Issue  | Action Level | Actions & guidelines  | Responsibility   | Trigger / Catalyst for commencement  | Budget  |
|--|--|--------------|---|--|--|---|
| 2.2  | Health and disease management  | 1            | Develop consistent regional information regarding health concerns   | Office of Environment & Heritage.<br>New England Health<br>Hunter Joint Organisation of Councils | Included in Regional Flying-fox educational kit  | Funded through NSW Environmental Trust 2017-19  |
| 2.3  | Lifecycle and nomadic timing of bat arrival  | 1            | Develop consistent regional information regarding flying-fox nomadic behaviour  | Office of Environment & Heritage.<br>Hunter Joint Organisation of Councils                       | Included in Regional Flying-fox educational kit  | Funded through NSW Environmental Trust 2017-19  |
| 2.4  | Implement Regional Flying-fox educational kit  | 1            | Develop a community education kit to assist residents to understand flying-fox movement patterns and reduce conflicts with Camps    | Hunter Joint Organisation of Councils<br>Singleton Council                                       | Project expected to deliver kit in November 2017   | Funded through NSW Environmental Trust 2017-19  |
| 2.5  | How to manage dead or injured flying-foxes   | 1            | Information on who to call when sick, injured or dead flying-foxes are seen   | Wildlife Rehabilitators<br>Singleton Council   | Immediate action required  | Within existing budget  |
| <b>3. Restoration &amp; Rehabilitation</b> |  |              |   |  |  |   |
| 3.1  | Strategic planting of shrubs, (particularly species known to be unsuitable Flying Fox foraging or roosting habitat) to improve amenity of the reserve. | 2            | Burdekin Park Plan of Management being developed which will establish a management regime, including a landscape plan for the Park. | Singleton Council  | The incident of 2016 with the influx of the flying-foxes to the Park.  | Within the existing budget. Annual budget allocation to the response within the plan of management. |
| 3.2  | Rehabilitation of damaged areas (from flying-fox occupation) and creation of necessary Flying-fox Habitat (restoration of mid-storey)                  | 2            | Removal of damaged vegetation and establishment of replacement vegetation.  | Singleton Council  | The incident of 2016 with the influx of the flying-foxes to the Park. The approval of the 5 year licence to assist in management of the trees. | Within the existing and future budget allocations.  |
| <b>4. Infrastructure</b>                   |  |              |   |  |  |   |

| Action ID                               | Issue  | Action Level | Actions & guidelines   | Responsibility   | Trigger / Catalyst for commencement   | Budget   |
|---|--|--------------|--|--|---|--|
| 4.1                                     | Signage  | 1            | Interpretive Signage   | Singleton Council / Stakeholder Group                  | New plan of management and landscape plan as well as the potential Regional Flying-fox education project and funding availability | Within the existing and future budget allocations. |
| <b>5. Flying-fox Species Management</b> |  |              |  |  |   |  |
| 5.1                                     | Flying-fox carer response  | 1            | Respond to calls of injured or dead flying-foxes   | Wildlife Rehabilitators                                | Resident calls, natural disasters   | Not funded by Council                              |
| 5.2                                     | Carer alerts (notification of upcoming events, e.g management activities, heat stress, etc.) | 1            | Notification of residents and Carers of any events that will impact on Camp Site or flying-fox population.                               | Office of Environment & Heritage.<br>Singleton Council | As required   | Within existing budget                             |
| <b>6. Routine Management</b>            |  |              |  |  |   |  |
| 6.1                                     | Dangerous Trees  | 2            | Assessments for potentially dangerous trees  | Singleton Council                                      | When reported   | Within existing budget                             |
| 6.2                                     | Mowing   | 1            | Routine mowing in and around camp and school   | Singleton Council                                      | As needed   | Within existing budget                             |
| 6.3                                     | Cleaning of Excrement  | 1            | Use of high pressure water cleaners to remove faecal matter from grounds   | Singleton Council                                      | As needed   | Within existing budget                             |
| <b>7. Monitoring</b>                    |  |              |  |  |   |  |
| 7.1                                     | Flying-fox Census  | 1            | Quarterly flying-fox animal counts to assist with determining likely national population   | CSIRO  | Quarterly monitoring as part of National Program  | Funded by CSIRO                                    |
| 7.2                                     | Wildlife / Rehabilitation carer data collection  | 1            | Collection and provision of count information, and other data collected when responding to calls   | Wildlife Rehabilitators                                | As responding to issues at the Camp   | NA   |
| 7.3                                     | Hunter Bird Observers data collection  | 1            | Collection and provision of count information, and other data collected  | Hunter Bird Observers                                  | When aware of flowering event that may signal an increase in flying-fox population  | NA   |
| 7.3                                     | Singleton Council management data  | 1            | Collection and dissemination of data related to flying-foxes, and vegetation that may impact on local or regional flying-fox populations | Singleton Council                                      | As made aware of issues   | Within existing budget                             |
| <b>8. Governance</b>                    |  |              |  |  |   |  |

| Action ID | Issue                       | Action Level | Actions & guidelines  | Responsibility   | Trigger / Catalyst for commencement   | Budget                      |
|-----------|-----------------------------|--------------|---|--|---|-----------------------------|
| 8.1       | Land Use Planning           | 1            | Consideration in the review of Land Use Planning provisions that impact on the Camp site (e.g. zoning, DCP, s149 considerations)    | Singleton Council  | Potential review of adding to planning, yet unlikely to occur as Camp is within a park. | Within existing budget      |
| 8.2       | Camp Management Plan review | 1            | Review in 5 years / when FF numbers increase past current capacity  | Stakeholder Group  | Revised in 2022   | NA                          |
|           |                             | 1            | Fire  | Fire & Rescue NSW  |   |                             |
|           |                             | 1            | Heat Stress   | Office of Environment & Heritage / Wildlife Rehabilitators |   |                             |
|           |                             | 1            | Community Response to dead / injured animals  | Wildlife Rehabilitators                                    |   |                             |
|           |                             | 1            | Hospital  | New England Health   |   |                             |
|           |                             | 1            | Equine  | Hunter Local Land Services                                 |   |                             |
|           |                             | 1            | Viticulture   | Vigneron Association                                       |   |                             |
|           |                             | 1            | Identify and map potential sites for restoration of suitable foraging and roosting habitats   | Singleton Council  | Has already been established and is continually ongoing.                                | Supported by grant funding. |
|           |                             | 1            | Liaise with Mining Companies about location and or presence of known FF roosting habitat on the Hunter River and on mining land     | Singleton Council  | Liaise with mining companies for current and future roosting sites.                     | Within existing budget      |
|           |                             | 1            | Identify potential land use and development conflicts which may potential impacts on remaining suitable Flying Fox foraging habitat | Singleton Council and State Government                     | Foraging occurs in natural areas away from residential areas generally.                 | N/A                         |

## 5 Assessment of Impacts to Flying Foxes

### 5.1 Flying-fox Habitat to be Affected

Based on the actions included in

Table 11, it is expected there would be little to no negative impacts on the flying-fox population that utilises the Burdekin Park Flying-fox Camp.

The majority of actions approved in this Camp Management Plan are considered Level 1 actions (routine management) and some Level 2 actions (creation of buffers), as the Land Managers have determined the cost and ongoing issues with drastic management actions including nudging, dispersal or culling are inappropriate for the Burdekin Park site and will not be undertaken whilst this current Camp Management Plan is in force.

There may be the need for Council to maintain its s91 licence to manage any ongoing issues with tree health. Given the vegetation in the Park is heavily modified, and no other threatened species or communities are found on site, no impact on other threatened species or communities is expected.

Any activities undertaken in Burdekin Park will be the subject of a Part 5 assessment as required under the *Environmental Planning and Assessment Act*.



## 6 Evaluation and Review

The Plan will have a scheduled review annually, which will include evaluation of management actions against measures shown in Section 4.2.

The following will trigger a reactive review of the Plan:

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

Results of each review will be included in reports to Council, and the NSW Office of Environment & Heritage.

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

## 7 Plan administration

This Camp Management Plan has been developed by Singleton Council. As the land manager and the organisation responsible for servicing the local community, the Plan will be solely managed by Singleton Council.

### 7.1 Monitoring of the camp

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

Additional monitoring and data collection will occur as opportunities arise.

### 7.2 Reporting

Quarterly reports (following publication of the CSIRO Census Count) will be developed by Singleton Council including details on management activities at the site, and the flying-fox population during the quarter.

### 7.3 Funding commitment

Singleton Council has the responsibility to ensure appropriate funding is available to undertake management actions included in this plan. The Plan will operate from 2017 – 2022 and therefore Council should ensure ongoing funding, and forward planning for management actions be included in its annual budget development.

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

## 8 References and additional resources

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