



Bellingen Island Flying-fox Camp Management Plan Final October 2017

BELLINGEN SHIRE COUNCIL



ecology / vegetation / wildlife / aquatic ecology / GIS

Acknowledgements

This project has been assisted by the NSW Government and supported by Local Government NSW through the Flying-fox Grants Program. Bellingen Shire Council and Ecosure would like to thank everyone who completed the community survey and contributed to the development of this plan. We also recognise input by the NSW Office of Environment and Heritage in developing the template on which this Camp Management Plan is based, and Dr Peggy Eby who provided advice which is included in the template.

Acronyms and abbreviations

ABLV	Australian bat lyssavirus
BC Act	Biodiversity Conservation Act 2016
BFF	Black flying-fox (Pteropus alecto)
BIL	Bellingen Island Landcare
BSC	Bellingen Shire Council
BULC	Bellingen Urban Landcare
the camp	Bellingen Island flying-fox camp
CE	Critically endangered
DoEE	Department of the Environment and Energy (Commonwealth)
DPI	Department of Primary Industries (NSW)
E	Endangered
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EPA	Environment Protection Authority (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
GHFF	Grey-headed flying-fox (Pteropus poliocephalus)
the Guideline	Referral guideline for management actions in grey-headed and spectacled flying-fox camps 2015 (Commonwealth)
HeV	Hendra virus
LGA	Local government area
LGNSW	Local Government NSW
LRFF	Little red flying-fox (Pteropus scapulatus)
MNES	Matters of national environmental significance
NFFMP	National flying-fox monitoring program
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NPWS	National Parks and Wildlife Service (NSW)
OEH	Office of Environment and Heritage (NSW)
PEPs	Protection of the environment policies

Q & A	Question and answer
the Plan	This Camp Management Plan
POEO Act	Protection of the Environment Operations Act 1997 (NSW)
the Policy	Flying-fox Camp Management Policy 2015 (NSW)
SEPPs	State Environmental Planning Policies
SIS	Species impact statement
TEC	Threatened ecological community
TSC Act	Threatened Species Conservation Act 1995 (NSW)
V	Vulnerable
WEBI	West End Bellingen Island

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1 Overview

The Bellingen Island flying-fox camp (the camp) is located on Bellingen Island, north of the town centre of Bellingen, New South Wales (NSW). The island is bounded by the Bellinger River to the south, open space parkland to the west and bordered by residential properties to the north.

Three species of flying-foxes occur in NSW:

- grey-headed flying-fox (GHFF; Pteropus poliocephalus)
- black flying-fox (BFF; *Pteropus alecto*)
- little red flying-fox (LRFF; *Pteropus scapulatus*).

All three species of flying-foxes and their habitats are protected under NSW legislation. The GHFF is also listed as vulnerable under both state and Commonwealth legislation, affording it additional protection.

The camp constitutes a nationally important GHFF roost and is deemed to be roosting habitat critical to the survival of this species, as specified in the GHFF Draft National Recovery Plan (DoEE 2017). The camp is primarily used by GHFFs, with a small number of BFFs being present during surveys (refer Section 3.2) and reports of LRFFs occasioning the camp (GeoLINK 2012).

This Camp Management Plan (the Plan) has been developed to provide Bellingen Shire Council (BSC) with a framework to manage current and potential issues associated with the camp, whilst ensuring the flying-foxes and their valuable ecological functions are conserved.

1.1 Objectives

The objectives of the Plan are to:

- minimise impacts to the community, whilst conserving flying-foxes and their habitat
- ensure public health and safety
- improve community understanding and appreciation of flying-foxes, including their critical ecological function
- clearly define roles and responsibilities
- ensure management actions align with flying-fox behaviours and requirements
- ensure camp management is consistent with broader conservation management strategies that may be developed to protect threatened species/communities
- ensure management activities are consistent with the NSW Flying-fox Camp Management Policy (OEH 2015b) and the GHFF Draft National Recovery Plan (DoEE 2017).

2 Context

2.1 Camp area and tenure

The camp is located on Bellingen Island (-30.447430, 152.896098), along the northern bank of the Bellinger River in the town of Bellingen, New South Wales (Figure 1 and Table 1). The camp extent and unconfirmed extents¹ as at June 2017 are shown in Figure 1.

The usual camp extent on the island covers approximately 3.5 ha. Flying-foxes generally concentrate towards the centre and eastern area of rainforest on the island. In summer, the camp extends into the area known as the former Bellingen Caravan Park, and behind houses along Dowle Street. Anecdotal reports of the camp overflowing into vegetation behind the Community Garden on Wheatley Street are noted, however will not be addressed within this management plan. This management plan will focus on the confirmed camp area of Bellingen Island and immediate surrounds.

Area	Tenure	Lot and DP
Bellingen Island	Crown Land Reserve Number: 30812 Notification Purpose: Preservation of Native Flora and Public Recreation Trust Manager: Bellingen Shire Council	Lot 165, 166 and 168 DP755557 Lot 595 DP728265 Lot 604 and portion of 606 DP1066291
Former Bellingen Caravan Park	Crown Land Reserve Number 84655 Notification Purpose: Public Recreation Trust Manager: Bellingen Shire Council	Lot 1 B DP5564 Lot 2 B DP5564 Lot 3 B DP5564 Lot 4 B DP5564 Lot 5 B DP5564
Former Bellingen Caravan Park	Freehold held in ownership by Bellingen Shire Council	Lot 6 B DP5564 Lot 7 B DP5564

Table 1 Bellingen Island and reserve tenure under the Local Government Act 1993 (Source: GeoLINK 2012)

¹ Based on anecdotal feedback from community





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SDA, USGS, AeroGRID, IGN, and the GIS User Col

2.2 History of the camp

Bellingen Island contains remnants of lowland rainforest as the island remained largely uncleared during European settlement (BSC n.d.). However, the site has undergone some changes over several decades as the Bellinger River's main tributary shifted from the northern side of the island to the southern side's chute overflow during the 1974 flood.

There are reports of low numbers of flying-foxes occasionally using the camp from the early 20th century, with permanent roosting reported from 1966. Regular quarterly monitoring began at all known camps in NSW in 2012 as part of the National Flying-fox Monitoring Program (NFFMP), including at the Bellingen Island camp.

The maximum total number of flying-foxes ever recorded at the camp was 42,932 in February 2013 (Figure 2). The camp is dominated by GHFFs, occasionally occupied by up to 1,000 BFFs. Despite reports of LRFFs using the camp (GeoLINK 2012), none have been recorded there since NFFMP monitoring began.



Figure 2 Bellingen Island camp historical flying-fox numbers

2.3 Reported impacts related to the camp

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

Reported negative impacts include:

- noise
- faecal drop on outdoor areas, cars and washing lines
- odour
- fear of disease
- health and/or wellbeing impacts (e.g. associated with lack of sleep, anxiety)
- reduced general amenity
- damage to vegetation
- weed proliferation
- increased need for bush regeneration and associated costs.

Several complaints about negative impacts of flying-foxes, and one letter describing concerns for the welfare of flying-foxes, have been received in the past ten years (6 complaints since 2007). Complainants mostly refer to noise and excrement issues from the presence of flying-foxes, however most people express some understanding of flying-fox ecology and are aware of the population fluctuations throughout the year.

Reported positive impacts stem from people who:

- recognise the landscape-scale benefits that flying-foxes provide through seed dispersal and pollination
- acknowledge the need to conserve flying-foxes as an important native species
- enjoy watching flying-foxes at the camp and/or flying out or in
- see the value of the camp as a tourism opportunity/attraction
- · appreciate the natural values of the camp and habitat

Refer to section 4.3.1 for more details about the proportion of positive and negative feedback).

2.4 Management response to date

Bellingen Island Landcare Group first began undertaking restoration work in the remnant lowland rainforest on Bellingen Island in 1984 (BIRMC 1999). Slashing around the rainforest also ceased and walking tracks were established. Cattle which often strayed into the rainforest from the privately owned western portion of the Island were permanently excluded in 1991 (Lunney and Moon 1996).

Tree loss from bank erosion during flooding continued to present a problem to restoration works and protection of the rainforest. In 2003, the first major engineering works (rock revetment) along the southern bank was undertaken to help address this problem (Flametree Ecological Consulting and BSC 2008). In 2007 the western portion of the island was incorporated into the Reserve.

Volunteer community groups and partnerships with BSC (including Bellingen Island Landcare Group, Bellingen Urban Landcare Group and Green Corps) have undertaken ongoing works throughout the Reserve. Current regeneration works include:

- ongoing weed management within the lowland floodplain rainforest remnant on Bellingen Island (Bellingen Island Landcare Group);
- weed management in the riparian rainforest at The Point; and
- extensive tree planting and weed management within the weedy shrubland / grassland vegetation in the western end of the Bellingen Island (Bellingen Urban Landcare Group since 2009) (GeoLink, 2012).

The site is particularly challenging for rehabilitation due to regular flooding and weed invasion. In 2011 and 2013, BSC implemented two significant riverbank stabilisation projects along the western end to address erosion which was threatening to undermine this important habitat and remnant rainforest.

Office of Environment and Heritage (OEH) officers seasonally monitor the camp as part of the NFFMP.

3 Legislation and policy

3.1 State

Note that at the time of Plan development a reform to conservation and land management legislation in NSW was underway (commencing 25 August 2017). This includes planned repeal of the *Threatened Species Conservation Act 1995* and *National Parks and Wildlife Act 1974*, which will be replaced by the consolidated *Biodiversity Conservation Act 2016*.

3.1.1 Flying-fox Camp Management Policy 2015

The Flying-fox Camp Management Policy 2015 (the Policy) has been developed 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. In particular, the Policy strongly encourages local councils and other land managers to prepare Camp Management Plans for sites where the local community is affected.

3.1.2 Threatened Species Conservation Act 1995

This Act was repealed on 24 August 2017, replaced by the Biodiversity Conservation Act 2016.

3.1.3 Biodiversity Conservation Act 2016

Transition to the new bioreforms will see minimal change to the way licences are issued for managing flying-foxes. Existing licences will remain valid under savings, transitional and other provisions (Schedule 9) of the new Act. New Biodiversity Conservation licences will be issued that will apply specific conditions. Section 95 licences under the old TSC Act will no longer be required. The GHFF will retain its vulnerable threat status under Schedule 1 of the new BC Act.

3.1.4 Local Government Act 1993

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

3.1.5 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (NPW Act) provides for the conservation of nature, objects, places or features of cultural value and the management of land reserved under this Act. All native animals and many species of native plants are protected under the NPW Act. All native fauna, including flying-foxes, are specifically protected under section 98.

Under this Act, licences can be issued for actions such as harming or obtaining any protected fauna for specified purposes, picking protected plants or damaging habitat of a threatened species, population or ecological community. Note that the definition of 'harm' includes to hunt, shoot, poison, net, snare, spear, pursue, capture, trap, injure or kill. The definition of 'pick' includes to gather, pluck, cut, pull up, destroy, poison, take, dig up, crush, trample, remove or injure the plant or any part of the plant.

3.1.6 Prevention of Cruelty to Animals Act 1979

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

3.1.7 Environmental Planning and Assessment Act 1979

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

The EP&A Act is administered by the NSW Department of Planning and Environment.

The best tool available in the EP&A Act 1979 to protect flying-fox camps is to zone them in a way that prevents their redevelopment, and restricts other forms of development from establishing within proximity to them. This option can be difficult to apply in existing developed areas, however can be used when considering new areas for development.

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

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

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

3.2 Commonwealth

3.2.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides protection for the environment, specifically matters of national environmental

significance (MNES). A referral to the Commonwealth DoE is required under the EPBC Act for any action that is likely to significantly impact on an MNES.

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

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

The GHFF is listed as a vulnerable species under the EPBC Act, meaning it is an MNES. It is also considered to have a single national population. DoE has developed the Referral guideline for management actions in GHFF and SFF² camps (DoE 2015) (the Guideline) to guide whether referral is required for actions pertaining to the GHFF.

The Guideline defines a nationally important GHFF camp as one that has either:

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

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

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

Mitigation standards

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

² spectacled flying-fox (*P. conspicillatus*)

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

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

⁵ Food stress events may be apparent if large numbers of low body weight animals are being reported by wildlife carers in the region.

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

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

4 Community engagement

4.1 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 2.

Tabla	2	Ctokoholdo	ro of t		lingen	امامهما	Comp
Iable	2	Slakenolue	15 01 1	ne bei	iingen	ISIAIIU	Camp

Stakeholder	Interest/reported impacts
Residents and business owners	Residents and business owners near Bellingen Island camp and other residents of Bellingen are primary stakeholders to the Plan. Both negative and positive impacts associated with the camp and identified by these stakeholders are discussed in detail in the Plan.
Indigenous community	Traditional owners have a general interest in flying-foxes, including the ecological services they provide and the potential for educational opportunities linked to the stories of the Gumbaynggirr tribe.
Schools	Opportunities may exist for educational presentations/resources for schools with regards to flying-fox ecology, management and impacts.
Hospitals	Any helicopter operator associated with Bellingen hospital should be made aware of flying-foxes in the area, and follow risk mitigation measures (especially during dusk or dawn operations).
Equine facilities and vets	Horse owners, equine facility managers and local vets should be aware that Hendra virus risk is associated with foraging flying-foxes (e.g. risk is present across the entire flying-fox range), and appropriate mitigation measures.
Orchardists and fruit growers	Fruit growers may be impacted by flying-foxes raiding orchards, and should have access to wildlife friendly netting and fencing information.
Landcare groups	Two landcare groups have been working on Bellingen Island for many years and have a direct interest in the flying-fox and their impacts on the ecology of the island – Bellingen Island Landcare (BIL) and Bellingen Urban Landcare (BULC). Bellinger Landcare Inc., the umbrella Landcare organisation, supports their interests. Landcare promotes and encourages wildlife friendly fencing.
Bellingen Shire Council	A Local Government organisation, Council is responsible for delivering services to ratepayers and the community and administering local laws, strategic plans and policies. Council is also responsible for managing assets including land held in trust e.g. Bellingen Island Reserve. Council is committed to engaging with residents to ensure they have a meaningful say in decisions that affect the current and future plans for the Shire. Council is working towards aspirational targets for environmental management under the '2027 Community Vision' Community Strategic Plan.
Local Government NSW (LGNSW)	LGNSW is an industry association that represents the interests of councils in NSW. LGNSW also administer funds under the NSW Flying-fox Grants Program.
NSW Office of Environment & Heritage (OEH)	OEH is responsible for administering legislation relating to (among other matters) the conservation and management of native plants and animals, including threatened species and ecological communities.



Stakeholder	Interest/reported impacts
Commonwealth Department of the Environment and Energy (DoEE)	DoEE is responsible for administering federal legislation relating to matters of national environmental significance, such as the GHFF and any other federally-listed values of the camp site.
Wildlife carers and conservation organisations including Bellingen Environment Centre	Wildlife carers and conservation organisations have an interest in flying-fox welfare and conservation of flying-foxes and their habitat.
Researchers/universities/CSIRO	Researchers have an interest in flying-fox behaviour, biology and conservation.

4.2 Engagement methods

Considered effort has been made to engage with the community regarding the flying-fox camp with the intention to:

- understand the impacts, positive and negative, directly and indirectly affecting the community
- raise awareness within the community about flying-foxes
- correct misinformation and allay fears
- share information and invite feedback about management responses to date
- seek ideas and feedback about possible future management options.

The stakeholder engagement plan guided the process which has a staged approach.

Stage	Key dates	Community consultation
1	31 May- 19 June 2017	Targeted consultation with key stakeholders (details below). Responses received during Stage 1 have been compiled, analysed and incorporated into this Draft Plan.
2	20 June - 2 August 2017	BSC community engagement portal "Create" remained open during this period and will be compiled and analysed to update the Final Plan (due after Stage 3). Hard copies of the survey were also available upon request.
3	2 August - 13 September 2017	Draft Plan on public exhibition – community welcome to make submissions to Council for consideration before the Plan is finalised.

Engagement targeted key stakeholders via letters to 95 residents/businesses/community groups within a 300 m radius of the site including the Bellingen Showground Trust, two landcare groups working on Bellingen Island (BIL and BULC) and the Bellingen Environment Centre. The letter informed recipients about the planning project and invited input through BSC's Community Engagement portal, the "Create" website. Three options for input were available on "Create":

1) Online survey

2) Question and Answer (Q & A), for the community to ask questions for BSC to respond to,

and

3) Ideas Brainstormer for the community to suggest ideas and/or vote for ideas they support.

Hard copy surveys were also available upon request and questions were welcome by email or letters addressed to BSC. All of these options were available for the wider community and remained open during Stage 2 until the draft plan was released for public exhibition. Stage 2 was promoted on Council's website and by a media release.

4.3 Community feedback

Results for all survey questions are provided in Appendix 1. A total of 95 survey responses were received (which included three hard copy responses), eight respondents asked 12 questions in the Q & A section, and 16 ideas were uploaded from six contributors in the Ideas Brainstormer section.

4.3.1 Survey responses

A total of 95 survey respondents answered all or some of the questions. Some questions were optional while others requested more details depending upon the response, e.g. if a respondent answered 'negative' to 'how do you feel about flying-foxes?' they were then prompted to respond to questions about how they have been impacted i.e. where and when the impacts occurred. There were also opportunities for respondents to provide additional information if their points of view were not included in the available options.

The majority of respondents were aware that flying-foxes are a protected native species (93, 97.9%) while the remaining didn't know or didn't care (Figure 3).



Figure 3 Knowledge of the status of flying-foxes in response to Question 1

These were similar results to the question regarding the species' role in long distance seed dispersal and pollination (94.7% answered yes, 4.2% responded no, 1.1% didn't care or understand the question). Survey responses also indicated that the majority are aware that disease can be prevented by not handling flying-foxes and through appropriate horse husbandry (93.7%), with the remaining answering no to that question (Figure 4). When asked if the respondents knew that the GHFF is threatened due to a population decline of more than 30%, 80% responded positively, while 18.9% didn't know, and 1.1% didn't care. In regard to awareness about where to find information on flying-foxes, 64.2% responded that they did know while 34.7% responded negatively and 1.1% didn't care.



Figure 4 Responses regarding disease from flying-foxes

Survey results indicated a majority of positive feeling towards the flying-foxes (83.2%), with 8.4% and 8.4% feeling either neutral or negative towards flying-foxes respectively (Figure 5).



Figure 5 The majority of respondents indicated a positive feeling towards flying-foxes

Respondents who indicated that they are negatively impacted (8), were being most impacted around the home. These eight respondents identified the majority of impacts relating to smell, excrement and noise (Figure 6). Three respondents (who selected 'other' in the survey) added flying-foxes eating their fruit and excrement on washing, car, and walls (with paint coming off car and walls if they were not washed immediately) being of concern.



Figure 6 Responses regarding main concerns about flying-foxes

Of the total responses, 16.8% (14) indicated that they had incurred financial expenses directly related to flying-foxes (Figure 7). There was an indication that subsidies for car covers and clothes line covers would be welcomed, in addition to financial assistance with electricity costs and purchase of clothes dryers.





Where respondents were invited to rank various statements in order of importance (optional questions, with 1 being the highest ranking), 90 people (94.7%) responded. Protecting flying-foxes and providing education/tourism opportunities gained the highest ranking across all answers (1.82 and 2.55 respectively) (Figure 8). The option of 'other' also gained a high rating (3.5). These options included revegetating and increasing habitat in the western section, plant out an area near the river to encourage bats away from properties, 'diseased bats should be killed to reduce risk of Hendra virus spreading', 'leave them alone as their numbers go up and down according to the weather cycles' and that they cause 'mess and destruction'.



Figure 8 Responses to ranking according to importance (averaged rankings, 1 being the highest importance)

In relation to costs associated with any management actions, the majority of respondents answered that is was moderately important that it was of low cost to BSC ratepayers (39) and residents living near the flying-fox camp (32) (Appendix 1). It was also extremely important and moderately important that management actions did not disrupt residents and businesses during implementation (27 and 29 respectively), while 16 responded that it was very important, with the remaining considering it slightly important (16) and not at all important (10) (Figure 9).



Figure 9 The majority of respondents placed importance on management not affecting residents and businesses

The majority of responses indicated that it was extremely important that management actions don't move the flying-fox camp to other areas that may also be near residents and businesses (55), while a total of 29 respondents felt it was very important and moderately important, with the remaining 10 responding it was not at all important, and one slightly important (Figure 10).



Figure 10 The majority of respondents did not want management actions to move the flying-fox camp to other businesses or residents



Figure 11 Responses in relation to educational options

With regards to educational options regarding flying-foxes, respondents (83 people responded to this question) were asked to rank their preferences (1 being most preferred). All options received similar ranking priority, with 'other' receiving the highest average ranking of 3.73 across all answers (Figure 11). Options included in the 'other' category were, hosting an annual bat night with support from local bat ecologists, researchers, and carers, a viewing platform in the old caravan park, getting rid of the bats, and sharing traditional Gumbaynggirr stories of flying-foxes.

Exclusive to the 'other' category, interpretive signage at river end of Church Street received the highest ranking of 3.51, detailed information on Council's website ranked closely behind with 3.49, and viewing platform along Hammond Street 3.33. The lowest ranking of 3.15 was the option for promotion of tourism opportunities.

The majority of respondents were Bellingen Shire residents near the camp and other residents (45 and 42 respectively), occasional and regular visitors to Bellingen Island (14 and 13 respectively), 9 were members of a club or group, while the remaining were business owners near Bellingen Island or 'other' (both 7). The majority of respondents live in the shire (84), 46 are ratepayers, and 15 own a business. Respondents ranged in age, with the majority (36%) being in the 35 – 49 age group, and the 50 – 59 age group (26%). The lowest number of respondents was in the 18 – 24 age bracket (less than 1%).

4.3.2 Q & A responses

The Q & A section on BSC's "Create" website was intended to encourage the community to enquire about the planning process and flying-foxes including management, ecology and impacts. However, as several responses were received as statements, for ease of collation, they have all been referred to as 'questions'. Twelve questions were received in total. Several questions related to the management of the flying-foxes including:

- 'What is Council's current position in respect to managing flying-foxes?'
- 'It scares me that a plan other than protecting the flying-foxes is being considered.'
- 'I get the feeling that the decision to move them has already been made.'

Two respondents were positive about flying-foxes and thought they should be left alone. Two respondents felt that the survey questions were loaded, while additional comments included:

- 'The bats are a health hazard and should be relocated.'
- 'Are you suggesting removal of the flying-foxes, as this is how it comes across?'
- · 'How does Council plan to stop them relocating?'
- 'Has the BSC been receiving complaints about the bats presence? If so, how many and how often?'

The majority of Q & A responses were from Bellingen residents, ratepayers, aged between 35 - 49, with equal representation male and female.

4.3.3 Ideas Brainstormer responses

Sixteen community ideas were uploaded to the Ideas Brainstormer section of the "Create" website. Two ideas had one vote by other respondents. The majority of these indicated a positive response to flying-foxes (e.g. they should be left where they are and not dispersed, they are an important part of the rainforest). Some of the management suggestions included:

- 'Noise dispersal options for residents and businesses and reducing faecal drop in these areas.'
- 'If bats are at risk or impacting residents, they need to be near water so upstream is the best option'
- 'A temporary pole structure with timber arms and shade cloth could help'
- 'Keep the channel on the north of the island as a demarcation between the camp and houses by limiting the height of vegetation in the channel'.

This initial feedback received from the community identified that flying-foxes are having an impact on some residents and businesses and that these impacts relate mainly to noise, excrement and smell. Although results indicated a positive response to flying-foxes and their protection, there were still concerns raised about these impacts and ways to manage them. Financial support to offset costs associated with flying-fox impacts was welcomed, and

management actions which do not incur high financial costs to ratepayers and/or businesses were identified. Various educational opportunities were also identified.

The overall feedback from the community received via engagement favoured flying-fox camp management measures that:

- protect the flying-foxes and enhance their habitat
- reduced the impact of noise, odour and excrement on nearby residents and businesses
- would not be too costly or disturbing to Council ratepayers or residents living near the camp
- provide flying-fox education opportunities.

5 Other ecological values of the site

State vegetation mapping (OEH 2013) indicates 'native remnant vegetation' and 'subtropical rainforest on coastal floodplains' exist on site (Figure 12), however a literature review of the Plan of Management (GeoLINK 2012) provides a detailed description of the ground-truthed vegetation primarily utilised by flying-foxes on Bellingen Island (Table 3).

Association	TSC Act	EPBC Act	Location	Flora species	Area (ha)
Lowland Floodplain Rainforest	Endangered Ecological Community (EEC) Lowland Rainforest on floodplain in the NSW North Coast Bioregion	Critically Endangered Ecological Community Lowland Rainforest of Subtropical Australia	Central to eastern portions of Bellingen Island	Fig (Ficus spp), White Booyong (<i>Heritiera</i> <i>trioliolata</i>), Giant Stinging Tree (<i>Dendrocnide excelsa</i>), Pepperberry (<i>Cryptocarya</i> <i>obovata</i>)	2.7 ha
Riparian rainforest	EEC Lowland Rainforest on floodplain in the NSW North Coast Bioregion	Critically Endangered Ecological Community Lowland Rainforest of Subtropical Australia.	Riparian zone along the Bellinger River channel in the west and along part of the old Bellinger River channel north of Bellingen Island	Weeping Lilly Pilly (<i>Waterhousea floribunda</i>), River Oak (<i>Casuarina</i> <i>cunninghamiana</i>), Figs (Ficus, spp.), Camphor Laurel (<i>Cinnamomum</i> <i>camphora</i>) and Red Cedar (<i>Toona ciliata</i>).	1.1 ha

Table 3 Vegetation on Bellingen Island (sourced from GeoLINK 2012).

A total of 64 threatened species are known to occur within 10 km (Appendix 2). This has been narrowed to a radius of 1 km for both Commonwealth Protected Matters Search Tool (PMST) (Appendix 3) (DoEEa 2017) and NSW BioNet. The likelihood of occurrence for threatened species, communities and other ecological values are summarised in Table 4 and Table 5. Shorebirds are excluded from analysis as no suitable roost or foraging habitat occurs within 10 km of the camp area. Aquatic species are also excluded as camp management, if required, will be done in a way that will not affect the aquatic environment.

Twelve threatened species were considered to be unlikely or very unlikely to occur, with the majority (18) possibly occurring. The GHFF is the only threatened species known to occur, with one other considered likely to occur (koala, Table 5).

Protection level	Source	Category	Values/significance	Details
Federal	NFFMP (DoEE 2016)	Nationally important camp	See definition Section 3.2.1	Camp meets criteria
	MNES	Threatened ecological communities	Lowland Rainforest of Subtropical Australia (Critically Endangered)	Known to occur

Table 4 Ecological values within 1 km of the camp

Protection level	Source	Category	Values/significance	Details
		Threatened species	8 threatened species are known to occur within area	19 threatened species may occur within area (detailed assessment provided in Table 5)
State	TSC Act	EEC	Lowland rainforest on floodplain in the NSW North Coast Bioregion	Known to occur
	Bionet	Threatened species	11 threatened species have been recorded within area	



Bellingen Shire Council Bellingen Island CMP

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Vegetation

Acacia pioneers

Brush Box - Tallowwood - Sydney Blue Gum shrubby wet open forest of coastal hills and escarpment ranges

Camphor laurel

Environmental plantings

Exotic vegetation

Flooded Gum moist open forest of sheltered lower slopes and gullies

Giant Water Gum - Rough-leaved Elm - Small-leaved Fig - Hard Quandong subtropical rainforest on coastal floodplains

Knotweed wet meadow forbland on alluvial soils of coastal floodplains

Native remnant vegetation

River Oak grassy open forest of creeks and rivers

River bed

Tall Spike Rush freshwater wetland of coastal floodplains and depressions in low hills

Tallowwood - Small-fruited Grey Gum - Forest Oak dry open forest

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Powerful Owl

Square-tailed Kite

Wompoo Fruit-Dove

Glossy Black-Cockatoo

Grey-headed Flying-fox

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Bellingen flying fox camp extent Unconfirmed flying fox camp extent

Revision: 0 Author: ALM Date: 28/06/2017



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Species name	Common name	Status (EPBC Act)	Status (TSC Act)	Habitat Description	Likelihood of occurrence
Fauna					
Anthochaera phrygia	Regent honeyeater	CE	CE	Box-Ironbark eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief.	Unlikely. Suitable habitat does not occur within the camp area for this species.
Botaurus poiciloptilus	Australasian bittern	E	E	This species inhabits terrestrial wetlands with tall, dense vegetation and occasionally estuarine habitats. Favours permanent shallow waters, edges of pools and waterways.	Possible occurrence in the vicinity, in still water off shoots from the river. However, the camp area is not within this habitat and so works within the camp area would not impact on habitat
Calyptorhynchus lathami	Glossy black-cockatoo	Not listed	V	Highly dependent on Allocasuarina species, Open forest and woodlands with stands of sheoak (especially <i>Allocasuarina littoralis</i> and <i>Allocasuarina torulosa</i>). They mostly roost in the canopy of live, leafy trees such as eucalypts but breed in a hollow stump or limb of living or dead trees as well as holes in trunks of tall trees	Unlikely. No habitat for this species occurs within the camp area. Foraging habitat occurs within the River Oak grassy open forests located on the other side of the river to the camp.
Chalinolobus dwyeri	Large-eared pied bat	V	V	Dry forests and woodlands, moist eucalypt forests, caves and mines	Unlikely. No roosting habitat occurs, and minimal foraging habitat.
Dasyurus maculatus	Spotted-tailed quoll	E	V	Wide range of habitats including temperate and subtropical rainforests, wet sclerophyll forest, lowland forests, eucalypt woodlands, riparian woodlands, sub-alpine woodlands, coastal heathlands and, occasionally, open country and grazing lands.	Unlikely. Although suitable habitat for this species occurs in and around the camp area, it is unlikely that this species would frequent this area due to the proximity of urban development.
Erythrotriorchis radiatus	Red goshawk	V	CE	Tropical grassy woodlands mostly in undulating stony lands	Very unlikely. Habitat unsuitable within the camp area and surrounds.

Table 5 Threatened species and ecological communities that may occur at or within 1 km of the site (DoEE 2017a, OEH 2017, OEH 2017a)

Species name	Common name	Status (EPBC Act)	Status (TSC Act)	Habitat Description	Likelihood of occurrence
Lathamus discolor	Swift parrot	CE	E	Dry sclerophyll eucalypt forests and woodlands. Occasionally wet sclerophyll forests. Feeds mostly on nectar, mainly from eucalypts, but also eats psyllid insects and lerps, seeds and fruit.	Possible infrequent visitor in the winter months but preferred habitat is to the east of the current camp area.
Litoria booroolongensis	Booroolong frog	E	E	Permanent streams with rock structures and banks. Fringe vegetation including ferns, sedges and grasses.	Very unlikely. Occurs on western side of Great Dividing Range. Suitable habitat not present within camp area or surrounds.
Lophoictinia isura	Square-tailed kite	Not listed	V	Inhabits a range of diverse habitats including woodland dominated by eucalypts, pandanus, gallery forest, heath.	Possible occasional visitor, however unlikely to be impacted by works within the camp area.
Mixophyes iteratus	Giant barred frog	E	E	Found along freshwater streams with permanent or semi-permanent water. Can also be found in moist riparian habitats such as rainforest or wet sclerophyll forest.	Known Breeding and foraging habitat mainly in the lowland rainforest and riparian areas
Ninox strenua	Powerful owl	Not listed	V	Open forests and woodlands, particularly in wet forests with dense understoreys and along watercourses	Possible, although proximity of urban development may reduce chances of this species occurring.
Pandion cristatus	Eastern osprey	Not listed	V	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes	Known Large trees in the island provide good vantage points for foraging
Petauroides volans	Greater glider	V	Not listed	Nest in hollows of tall trees, emerging at night to feed on eucalypt leaves and flower buds.	Unlikely. Suitable tracts of mature trees with hollows are not within the camp area or surrounds.
Petrogale penicillata	Brush-tailed rock-wallaby	V	E	Rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks.	Very unlikely. Habitat for this species does not occur within the camp area or surrounds.

Species name	Common name	Status (EPBC Act)	Status (TSC Act)	Habitat Description	Likelihood of occurrence
Phascogale tapoatafa	Brush-tailed phascogale	Not listed	V	Tall and open eucalypt forest. Arboreal, requires tree hollows.	Possible in the vicinity, but requires eucalypts, which are located to the east of the main camp area.
Phascolarctos cinereus	Koala	V	V	The koala occurs in a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalyptus trees. Koalas feed almost exclusively on a few preferred primary and secondary food tree species that may vary widely on a regional, local and possibly seasonal basis.	Likely. Has been recorded within the main camp area and throughout the township
Phyllodes imperialis smithersi	Pink underwing moth	E	E	Below the altitude of 600 m in undisturbed, subtropical rainforest with the vine <i>Carronia</i> <i>multisepalea</i> .	Possible. The remnant lowland floodplain rainforest is considered potential habitat due to presence of Carronia vine.
Potorous tridactylus tridactylus	Long-nosed potoroo	V	V	Coastal wet heath, dry and wet forests with thick ground cover. Occasional open areas are essential for habitat (OEH, 2014).	Unlikely. The proximity of urban areas means this species would be at risk from dogs, cars etc.
Pseudomys novaehollandiae	New Holland mouse	V	Not listed	This species inhabits open heath lands, open woodlands with a heathland understorey and vegetated sand dunes. It has a communal burrowing system and feeds on insects, leaves, flowers and fungi. It is known from the Pittwater LGA.	Unlikely. Marginal habitat only and very susceptible to disturbance from surrounding urban development.
Pteropus poliocephalus	Grey-headed flying-fox	V	V	Sub-tropical and temperate rainforest, tall open forest, swamps, heaths and urban areas. Roosting sites usually in dense forest adjacent to waterbodies. Forages within 50 km of camp in flowering trees or rainforests, eucalypts, paperbarks and banksias.	Occurs. This species is the focus of the Plan and therefore no further assessment is provided in this section of the report.
Ptilinopus magnificus	Wompoo fruit-dove	Not listed	V	Rainforest, moist Eucalypt forest and Brushbox forest.	Possible. Suitable habitat occurs in and around the

Species name	Common name	Status (EPBC Act)	Status (TSC Act)	Habitat Description	Likelihood of occurrence
					camp area.
Flora					
Arthraxon hispidus	Hairy-joint grass	V	V	Edges of rainforest, wet eucalypt forest near creeks or swamps, woodland, freshwater springs on coastal foreshore dunes, creek banks.	Possible. Although if it does occur would be on the edge of the camp area.
Cryptostylis hunteriana	Leafless tongue-orchid	V	V	Does not have a well-defined habitat preference – can be found in a range of communities including swamp-heath and woodland.	Possible, although most likely to occur outside of the main camp area.
Cynanchum elegans	White-flowered wax plant	E	E	Occurs on a variety of soil types, mainly between dry subtropical rainforest and sclerophyll forest or woodland.	Possible. Suitable habitat occurs on the periphery of the main camp area.
Hicksbeachia pinnatifolia	Red boppel nut	V	V	Subtropical rainforest, moist eucalypt forest and Brush Box forest.	Possible. Suitable habitat occurs within the main camp area and surrounds.
Macadamia integrifolia	Macadamia nut	V	Р	Remnant rainforest, including complex mixed notophyll forest, and prefers partially open areas such as rainforest edges	Possible. Suitable habitat occurs within the main camp area and surrounds.
Marsdenia longiloba	Clear milkvine	V	E	Found in subtropical and warm temperate rainforest, lowland moist or open eucalypt forest adjoining rainforest	Possible. Suitable habitat occurs within the main camp area and surrounds.
Niemeyera whitei	Rusty plum, plum boxwood	Not listed	V	Occurs in gully, warm temperate or littoral rainforests along the coast and adjacent habitats in northern NSW.	Possible. Suitable habitat occurs within the main camp area and surrounds.
Parsonia dorrigoensis	Milky silkpod	E	V	Sub-tropical and warm rainforest, Eucalypt forest. Also rainforest margins.	Possible. Suitable habitat occurs within the main camp area and surrounds.
Phaius australis	Lesser swamp-orchid	E	E	Found in swampy grassland or swampy forest including rainforest, eucalypt or paperback forest, mostly in coastal areas.	Possible. Suitable habitat occurs within the main camp area and surrounds.
Syzygium paniculatum	Magenta lilly pilly	V	E	Occurs on sands, silts, clays and gravels in riverine gallery rainforest and remnant littoral	Possible. Suitable habitat occurs within the main

Species name	Common name	Status (EPBC Act)	Status (TSC Act)	Habitat Description	Likelihood of occurrence
				rainforest.	camp area and surrounds.
Thesium australe	Austral toadflax	V	V	Shrubland, grassland or woodland, often on damp sites. Vegetation types include open grassy heath dominated by Swamp Myrtle (<i>Leptospermum myrtifolia</i>), Small-fruit Hakea (<i>Hakea microcarpa</i>), Alpine Bottlebrush (<i>Callistemon sieberi</i>), Woolly Grevillea (<i>Grevillea lanigera</i>), Coral Heath (<i>Epacris microphylla</i>) and Poa spp; Kangaroo Grass grassland surrounded by eucalyptus woodland; and grassland dominated by Barbed-wire Grass (<i>Cymbopogon refractus</i>).	Possible. Suitable habitat occurs within the main camp area and surrounds.
Threatened ecological of	communities				
Lowland Rainforest of Subtropical Australia		CE	E	A closed forest community recognised by its close proximity to the ocean (generally less than 2km). Rainforest species dominate, with scattered individuals sclerophyllous plants such as smooth-barked apple (<i>Angophora costata</i>), coastal banksia (<i>Banksia integrifolia</i>) and forest redgum (E. tereticornis)	Occurs. Ground-truthed in PoM (GeoLINK 2012)
6 Flying-fox ecology and behaviour in Australia

6.1 Ecological role

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).

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

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

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

6.2 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 manoeuvring in flight due to the open nature of the habitat or ease of navigation due to landmarks and lighting.

6.3 Under threat

Flying-foxes roosting and foraging in urban areas more frequently can give the impression that their populations are increasing; however, the GHFF 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 GHFF 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).



6.4 Camp characteristics

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

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

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

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

6.5 Species profiles

6.5.1 Black flying-fox (*Pteropus alecto*)



Figure 13 Black flying-fox indicative species distribution, adapted from OEH 2015a

The black flying-fox (BFF) (Figure 13) 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.

BFFs 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 km of the camp site (Markus & Hall 2004).

BFFs 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.



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

Figure 14 Grey-headed flying-fox indicative species distribution, adapted from OEH 2015a

The GHFF (Figure 14) is found throughout eastern Australia, generally within 200 kilometres of the coast, from Finch Hatton in Queensland to Melbourne, Victoria (OEH 2015d). This species now ranges into South Australia and has been observed in Tasmania (DoE 2016a). It requires foraging resources and camp sites within rainforests, open forests, closed and open woodlands (including melaleuca swamps and banksia woodlands). This species is also found throughout urban and agricultural areas where food trees exist and will raid orchards at times, especially when other food is scarce (OEH 2015a).

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

The GHFF population has a generally annual southerly movement in spring and summer, with their return to the coastal forests of north-east NSW and south-east Queensland in winter (Ratcliffe 1932; Eby 1991; Parry-Jones & Augee 1992; Roberts et al. 2012). This results in large fluctuations in the number of GHFF in NSW, ranging from as few as 20% of the total population in winter up to around 75% of the total population in summer (Eby 2000). They are widespread throughout their range during summer, but in spring and winter are uncommon in the south. In autumn they occupy primarily coastal lowland camps and are uncommon inland and on the south coast of NSW (DECCW 2009).

There is evidence the GHFF population declined by up to 30% between 1989 and 2000 (Birt 2000; Richards 2000 cited in OEH 2011a). There is a wide range of ongoing threats to the survival of the GHFF, including habitat loss and degradation, deliberate destruction associated with the commercial horticulture industry, conflict with humans, infrastructure-related mortality (e.g. entanglement in barbed wire fencing and fruit netting, power line electrocution, etc.) and competition and hybridisation with the BFF (DECCW 2009). For these reasons it is listed as vulnerable to extinction under NSW and federal legislation (see Section 3).



6.5.3 Little red flying-fox (*Pteropus scapulatus*)

Figure 15 Little red flying-fox indicative species distribution, adapted from OEH 2015a

The little red flying-fox (LRFF) (Figure 15) 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).

6.5.4 Reproduction

Black and grey-headed flying-foxes

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

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

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

Little red flying-fox

The LRFF breeds approximately six months out of phase with the other flying-foxes. Peak conception occurs around October to November, with young born between March and June (McGuckin & Blackshaw 1991; Churchill 2008) (Figure 16). Young are carried by their mother for approximately one month then left at the camp while she forages (Churchill 2008). Suckling occurs for several months while young are learning how to forage. LRFF generally birth and rear young in temperate areas (rarely in NSW).



	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
GHFF												
BFF												
LRFF												
	RFF Peak conception Final trimester Peak birthing Crèching (young left at roost) Lactation											

Figure 16 Indicative flying-fox reproductive cycle.

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

7 Human and animal health

Flying-foxes, like many 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. Specific information on these viruses is provided in Appendix 4.

Excluding those people whose occupations require contact with bats, such as wildlife carers and vets, human exposure to ABLV, HeV and Menangle virus, their transmission and frequency of infection is extremely rare. HeV infection in humans requires transfer from an infected intermediate equine host (i.e. a horse bite) and spread of the virus directly from bats to humans has not been reported. Therefore 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 also judged to be low (Qld Health 2016).

7.1 Disease and flying-fox management

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

The effects of stress are linked to increased susceptibility and expression of disease in both humans (AIHW 2012) and animals (Henry & Stephens-Larson 1985; Aich et. al. 2009), including reduced immunity to disease.

Therefore it can be assumed that management actions which may cause stress (e.g. dispersal), particularly over a prolonged period or at times where other stressors are increased (e.g. food shortages, habitat fragmentation, etc.), are likely to increase the susceptibility and prevalence of disease within the flying-fox population, and consequently the risk of transfer to humans.

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

- forcing flying-foxes into closer proximity to one another, increasing the probability of disease transfer between individuals and within the population
- resulting in abortions and/or dropped young if inappropriate management methods are used during critical periods of the breeding cycle. This will increase the likelihood of direct interaction between flying-foxes and the public, and potential for disease exposure

 adoption of inhumane methods with potential to cause injury which would increase the likelihood of the community coming into contact with injured/dying or deceased flying-foxes.

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

8 Camp management options

Below is an overview of management options commonly used throughout NSW and Australia which were considered in the development of the Plan. These are categorised as Level 1, 2 or 3 in accordance with the Policy.

8.1 Level 1 actions: routine camp management

8.1.1 Education and awareness programs

This management option involves undertaking a comprehensive and targeted flying-fox education and awareness program to provide accurate information to the local community about flying-foxes.

Such a program would include information about managing risk and alleviating concern about health and safety issues associated with flying-foxes, options available to reduce impacts from roosting and foraging flying-foxes, an up-to-date program of works being undertaken at the camp, and information about flying-fox numbers and flying-fox behaviour at the camp.

Residents should also be made aware that faecal drop and noise at night is mainly associated with plants that provide food, independent of camp location. Staged removal of foraging species such as fruit trees and palms from residential yards, or management of fruit (e.g. bagging, pruning) will greatly assist in mitigating this issue.

Collecting and providing information should always be the first response to community concerns in an attempt to alleviate issues without the need to actively manage flying-foxes or their habitat. Where it is determined that management is required, education should similarly be a key component of any approach. See also Section 3 and incorporate an education and awareness program into any community engagement plan.

The likelihood of improving community understanding of flying-fox issues is high. However, the extent to which that understanding will help alleviate conflict issues is probably less so. Extensive education for decision-makers, the media and the broader community may be required to overcome negative attitudes towards flying-foxes.

It should be stressed that a long-term solution to the issue resides with better understanding flying-fox ecology and applying that understanding to careful urban planning and development

An education program may include components shown in Figure 17.



Figure 17 Possible components of an education program

8.1.2 Property modification without subsidies

The managers of land on which a flying-fox camp is located would promote or encourage the adoption of certain actions on properties adjacent to or near the camp to minimise impacts from roosting and foraging flying-foxes (note that approval may be required for some activities, refer to Section 4 for further information):

- Create visual/sound/smell barriers with fencing or hedges. To avoid attracting flyingfoxes, species selected for hedging should not produce edible fruit or nectar-exuding flowers, should grow in dense formation between two and five metres (Roberts 2006) (or be maintained at less than 5 metres). Vegetation that produces fragrant flowers can assist in masking camp odour where this is of concern. Potential suitable native species which are unlikely to attract flying-foxes (SCC 2015) include:
 - Acacia leiocalyx (wattle)
 - Backhousia citriodora (lemon scented myrtle)
 - Hibbertia scandens (Guinea flower)
 - *Hibiscus heterophyllus* (native rosella)

- Homalanthus nutans (bleeding heart)
- Hovea acutifolia (pointed hovea)
- Hymenosporum flavum (native frangipani)
- Jasminum sp. (native jasmine)
- *Melastoma malabathricum* (blue tongue)
- Myrsine variabilis (muttonwood)
- Petalostigma pubescens (quinine)
- Pittosporum revolutum (rough-fruited Pittosporum).
- Manage foraging trees (i.e. plants that produce fruit/nectar-exuding flowers) within properties through pruning/covering with bags or wildlife friendly netting, early removal of fruit, or tree replacement.
- Cover vehicles, structures and clothes lines where faecal contamination is an issue, or remove washing from the line before dawn/dusk.
- Move or cover eating areas (e.g. BBQs and tables) within close proximity to a camp or foraging tree to avoid contamination by flying-foxes.
- Install double-glazed windows, insulation and use air-conditioners when needed to reduce noise disturbance and smell associated with a nearby camp.
- Follow horse husbandry and property management guidelines provided at the NSW Department of Primary Industries Hendra virus web page (DPI 2015a).
- Include suitable buffers and other provisions (e.g. covered car parks) in planning of new developments.
- Turn off lighting at night which may assist flying-fox navigation and increase fly-over impacts.
- Consider removable covers for swimming pools and ensure working filter and regular chlorine treatment.
- Appropriately manage rainwater tanks, including installing first-flush systems.
- Avoid disturbing flying-foxes during the day as this will increase camp noise.

The cost would be borne by the person or organisation who modifies the property; however, opportunities for funding assistance (e.g. environment grants) may be available for management activities that reduce the need to actively manage a camp.

8.1.3 Property modification subsidies

Fully funding or providing subsidies to property owners for property modifications may be considered to manage the impacts of the flying-foxes. Providing subsidies to install infrastructure may improve the value of the property, which may also offset concerns regarding perceived or actual property value or rental return losses.

The level and type of subsidy would need to be agreed to by the entity responsible for managing the flying-fox camp.

8.1.4 Service subsidies

This management option involves providing property owners with a subsidy to help manage impacts on the property and lifestyle of residents. The types of services that could be subsidised include clothes washing, cleaning outside areas and property, car washing or power bills. Rate reductions could also be considered.

Critical thresholds of flying-fox numbers at a camp and distance to a camp may be used to determine when subsidies would apply.

8.1.5 Routine camp maintenance and operational activities

Examples of routine camp management actions are provided in the Policy. 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 understorey vegetation
- 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.

Protocols should be developed for carrying out operations that may disturb flying-foxes, which can result in excess camp noise. Such protocols could include limiting the use of disturbing activities to certain days or certain times of day in the areas adjacent to the camp, and advising adjacent residents of activity days. Such activities could include lawn-mowing, using chainsaws, whipper-snippers, using generators and testing alarms or sirens.

8.1.6 Revegetation and land management to create alternative habitat

This management option involves revegetating and managing land to create alternative flyingfox roosting habitat through improving and extending existing low-conflict camps or developing new roosting habitat in areas away from human settlement.

Selecting new sites and attempting to attract flying-foxes to them has had limited success in the past, and ideally habitat at known camp sites would be dedicated as a flying-fox reserve.

However, if a staged and long-term approach is used to make unsuitable current camps less attractive, whilst concurrently improving appropriate sites, it is a viable option (particularly for the transient and less selective LRFF). Supporting further research into flying-fox camp preferences may improve the potential to create new flying-fox habitat.

When improving a site for a designated flying-fox camp, preferred habitat characteristics detailed in Section 6.4 should be considered.

Foraging trees planted amongst and surrounding roost trees (excluding in/near horse paddocks) may help to attract flying-foxes to a desired site. They will also assist with reducing foraging impacts in residential areas. Consideration should be given to tree species that will provide year-round food, increasing the attractiveness of the designated site. Depending on the site, the potential negative impacts to a natural area will need to be considered if introducing non-indigenous plant species.

The presence of a water source is likely to increase the attractiveness of an alternative camp location. Supply of an artificial water source should be considered if unavailable naturally, however this may be cost-prohibitive.

Potential habitat mapping using camp preferences (see Section 6.4) and suitable land tenure can assist in initial alternative site selection. A feasibility study would then be required prior to site designation to assess likelihood of success and determine the warranted level of resource allocated to habitat improvement.

8.1.7 Provision of artificial roosting habitat

This management option involves constructing artificial structures to augment roosting habitat in current camp sites or to provide new roosting habitat. Trials using suspended ropes have been of limited success as flying-foxes only used the structures that were very close to the available natural roosting habitat. It is thought that the structure of the vegetation below and around the ropes is important.

8.1.8 Protocols to manage incidents

This management option involves implementing protocols for managing incidents or situations specific to particular camps. Such protocols may include monitoring at sites within the vicinity of aged care or child care facilities, management of compatible uses such as dog walking or sites susceptible to heat stress incidents (when the camp is subjected to extremely high temperatures leading to flying-foxes changing their behaviour and/or dying).

8.1.9 Participation in research

This management option involves participating in research to improve knowledge of flying-fox ecology to address the large gaps in our knowledge about flying-fox habits and behaviours and why they choose certain sites for roosting. Further research and knowledge sharing at local, regional and national levels will enhance our understanding and management of flying-fox camps.

8.1.10 Appropriate land-use planning

Land-use planning instruments may be able to be used to ensure adequate distances are maintained between future residential developments and existing or historical flying-fox camps. While this management option will not assist in the resolution of existing land-use conflict, it may prevent issues for future residents.

8.1.11 Property acquisition

Property acquisition may be considered if negative impacts cannot be sufficiently mitigated using other measures. This option will clearly be extremely expensive, however is likely to be more effective than dispersal and in the long-term may be less costly.

8.1.12 Do nothing

The management option to 'do nothing' involves not undertaking any management actions in relation to the flying-fox camp and leaving the situation and site in its current state.

8.2 Level 2 actions: in-situ management

8.2.1 Buffers

Buffers can be created through vegetation removal and/or the installation of permanent/semipermanent deterrents.

Creating buffers may involve planting low-growing or spiky plants between residents or other conflict areas and the flying-fox camp. Such plantings can create a visual buffer between the camp and residences or make areas of the camp inaccessible to humans.

Buffers greater than 300 metres are likely to be required to fully mitigate amenity impacts (SEQ Catchments 2012). The usefulness of a buffer to mitigate odour and noise impacts generally declines if the camp is within 50 metres of human habitation (SEQ Catchments 2012), however any buffer will assist and should be as wide as the site allows.

Buffers through vegetation removal

Vegetation removal aims to alter the area of the buffer habitat sufficiently so that it is no longer suitable as a camp. The amount required to be removed varies between sites and camps, ranging from some weed removal to removal of most of the canopy vegetation.

Any vegetation removal should be done using a staged approach, with the aim of removing as little native vegetation as possible. This is of particular importance at sites with other values (e.g. ecological or amenity), and in some instances the removal of any native vegetation will not be appropriate. Thorough site assessment will inform whether vegetation management is suitable (e.g. can impacts to other wildlife and/or the community be avoided?).

Removing vegetation can also increase visibility into the camp and noise issues for neighbouring residents which may create further conflict.

Suitable experts (Appendix 5) should be consulted to assist selective vegetation trimming/removal to minimise vegetation loss and associated impacts.

The importance of under- and mid-storey vegetation in the buffer area for flying-foxes during heat stress events also requires consideration.

Buffers without vegetation removal

Permanent or semi-permanent deterrents can be used to make buffer areas unattractive to flying-foxes for roosting, without the need for vegetation removal. This is often an attractive option where vegetation has high ecological or amenity value.

While many deterrents have been trialled in the past with limited success, there are some options worthy of further investigation:

Visual deterrents – Visual deterrents such as plastic bags, fluoro vests (GeoLINK 2012) and balloons (Ecosure, pers. comm.) in roost trees have shown to have localised effects, with flying-foxes deterred from roosting within 1–10 metres of the deterrents. The type and placement of visual deterrents would need to be varied regularly to avoid habituation. Potential for litter pollution should be considered and managed when selecting the type and placement of visual deterrents. In the absence of effective maintenance, this option could potentially lead to an increase in rubbish in the natural environment.

- Noise emitters on timers Noise needs to be random, varied and unexpected to avoid flying-foxes habituating. As such these emitters would need to be portable, on varying timers and a diverse array of noises would be required. It is likely to require some level of additional disturbance to maintain its effectiveness, and ways to avoid disturbing flying-foxes from desirable areas would need to be identified. This is also likely to be disruptive to nearby residents.
- Smell deterrents For example, bagged python excrement hung in trees has previously had a localised effect (GeoLINK 2012). The smell of certain deterrents may also impact nearby residents, and there is potential for flying-foxes to habituate.
- Canopy-mounted water sprinklers This method has been effective in deterring flying-foxes during dispersals (Ecosure personal experience), and current trials in Queensland are showing promise for keeping flying-foxes out of designated buffer zones. This option can be logistically difficult (installation and water sourcing) and may be cost-prohibitive. Design and use of sprinklers need to be considerate of animal welfare and features of the site. For example, misting may increase humidity and exacerbate heat stress events, and overuse may impact other environmental values of the site.

Note that any deterrent with a high risk of causing inadvertent dispersal may be considered a Level 3 action.

8.2.2 Noise attenuation fencing

Noise attenuation fencing could be installed in areas where the camp is particularly close to residents. This may also assist with odour reduction, and perspex fencing could be investigated to assist fence amenity. Although expensive to install, this option could negate the need for habitat modification, maintaining the ecological values of the site, and may be more cost-effective than ongoing management.

8.3 Level 3 actions: disturbance or dispersal

8.3.1 Nudging

Noise and other low intensity active disturbance restricted to certain areas of the camp can be used to encourage flying-foxes away from high conflict areas. This technique aims to actively 'nudge' flying-foxes from one area to another, while allowing them to remain at the camp site.

Unless the area of the camp is very large, nudging should not be done early in the morning as this may lead to inadvertent dispersal of flying-foxes from the entire camp site. Disturbance during the day should be limited in frequency and duration (e.g. up to four times per day for up to 10 minutes each) to avoid welfare impacts. As with dispersal, it is also critical to avoid periods when dependent young are present (as identified by a flying-fox expert).

8.3.2 Dispersal

Dispersal aims to encourage a camp to move to another location, through either disturbance or habitat modification.

There is a range of potential risks, costs and legal implications that are greatly increased with dispersal (compared with in-situ management as above). See Appendix 6 for more details. These include:

- impact on animal welfare and flying-fox conservation
- splintering the camp into other locations that are equally or more problematic
- shifting the issue to another area
- impact on habitat value
- effects on the flying-fox population, including disease status and associated public health risk
- impacts to nearby residents associated with ongoing dispersal attempts
- excessive initial and/or ongoing capacity and financial investment
- negative public perception and backlash
- increased aircraft strike risk associated with changed flying-fox movement patterns

 unsuccessful management requiring multiple attempts, which may exacerbate all of the above.

Despite these risks, there are some situations where camp dispersal may be considered. Dispersal can broadly be categorised as 'passive' or 'active' as detailed below.

Passive dispersal

Removing vegetation in a staged manner can be used to passively disperse a camp, by gradually making the habitat unattractive so that flying-foxes will disperse of their own accord over time with little stress (rather than being more forcefully moved with noise, smoke, etc.). This is less stressful to flying-foxes, and greatly reduces the risk of splinter colonies forming in other locations (as flying-foxes are more likely to move to other known sites within their camp network when not being forced to move immediately, as in active dispersal).

Generally, a significant proportion of vegetation needs to be removed in order to achieve dispersal of flying-foxes from a camp or to prevent camp re-establishment. For example, flying-foxes abandoned a camp in Bundall, Queensland once 70% of the canopy/mid-storey and 90% of the understorey had been removed (Ecosure 2011). Ongoing maintenance of the site is required to prevent vegetation structure returning to levels favourable for colonisation by flying-foxes. Importantly, at nationally important camps (defined in Section 3.2.1) sufficient vegetation must be retained to accommodate the maximum number of flying-foxes recorded at the site.

This option may be preferable in situations where the vegetation is of relatively low ecological and amenity value, and alternative known permanent camps are located nearby with capacity to absorb the additional flying-foxes. While the likelihood of splinter colonies forming is lower than with active dispersal, if they do form following vegetation modification there will no longer be an option to encourage flying-foxes back to the original site. This must be carefully considered before modifying habitat.

There is also potential to make a camp site unattractive by removing access to water sources. However, at the time of writing this method had not been trialled so the likelihood of this causing a camp to be abandoned is unknown. It would also likely only be effective where there are no alternative water sources in the vicinity of the camp.

Active dispersal through disturbance

Dispersal is more effective when a wide range of tools are used on a randomised schedule with animals less likely to habituate (Ecosure pers. obs. 1997–2015). Each dispersal team member should have at least one visual and one aural tool that can be used at different locations on different days (and preferably swapped regularly for alternate tools). Exact location of these and positioning of personnel will need to be determined on a daily basis in response to flying-fox movement and behaviour, as well as prevailing weather conditions (e.g. wind direction for smoke drums).

Active dispersal will be disruptive for nearby residents given the timing and nature of activities, and this needs to be considered during planning and community consultation.

This method does not explicitly use habitat modification as a means to disperse the camp, however if dispersal is successful, some level of habitat modification should be considered. This will reduce the likelihood of flying-foxes attempting to re-establish the camp and the need for follow-up dispersal as a result. Ecological and aesthetic values will need to be considered for the site, with options for modifying habitat the same as those detailed for buffers above.

Early dispersal before a camp is established at a new location

This management option involves monitoring local vegetation for signs of flying-foxes roosting in the daylight hours and then undertaking active or passive dispersal options to discourage the animals from establishing a new camp. Even though there may only be a few animals initially using the site, this option is still treated as a dispersal activity, however it may be simpler to achieve dispersal at these new sites than it would in an established camp. It may also avoid considerable issues and management effort required should the camp be allowed to establish in an inappropriate location.

It is important that flying-foxes feeding overnight in vegetation are not mistaken for animals establishing a camp.

Maintenance dispersal

Maintenance dispersal refers to active disturbance following a successful dispersal to prevent the camp from re-establishing. It differs from initial dispersal by aiming to discourage occasional over-flying individuals from returning, rather than attempting to actively disperse animals that have been recently roosting at the site. As such, maintenance dispersal may have fewer timing restrictions than initial dispersal, provided that appropriate mitigation measures are in place (see Section 10).

8.4 Unlawful activities

8.4.1 Culling

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



8.5 Camp management options analysis

Table 6 provides an analysis of the camp management options described in Section 8 and their suitability for implementation at Bellingen Island Camp. An appraisal is provided for the options to be either adopted, investigated further or disregarded within this plan.

Management options	Relevant impacts	Cost \$-\$\$\$ Low-high	Advantages	Disadvantages	Suitability for site
Level 1 options					
Education and awareness programs	Fear of disease Noise Smell Faecal drop	\$	Low cost, increasing awareness will help the community coexist with flying-foxes, providing options for landholders to reduce impacts is an effective long-term solution and can be undertaken quickly.	Education and advice itself will not mitigate all issues, and on its own would not be acceptable to the community.	Preliminary consultation indicates the community is in favour of a range of educational tools and methods, and this option can be implemented immediately. Appraisal: Adopt
Property modification / service subsidies	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	\$\$\$	Property modification is one of the most effective ways to reduce amenity impacts of a camp without dispersal (and associated risks), relatively low cost, promotes conservation of FFs, can be undertaken quickly, will not impact on the site and may add value to the property. Property modification, such as glazing windows or installing noise attenuating insulation, will greatly assist with noise impacts inside residences and businesses. External noise-attenuating fencing at property boundaries could be considered to reduce noise in outdoor areas if this is of concern. Council could provide car covers, clothesline covers, free hire of pressure cleaners or consider rate reductions to assist with faecal drop impacts.	May be cost-prohibitive for private landholders, however subsidies would assist.	In consultation with affected landowners and residents, Council may investigate options for residents between James Eather Way, Dowle Street, River Place, Red Ledge Lane and several homes along Hammond Street. Appraisal: Investigate further

Table 6 Analysis of management options



Management options	Relevant impacts	Cost \$-\$\$\$ Low-high	Advantages	Disadvantages	Suitability for site
Odour reducing / masking plants	Noise Smell Health/wellbeing Property devaluation	\$	Planting dense screens and fragrant plants to assist with odour and noise and trim tall trees to less than 5 meters high and/or use wildlife friendly netting to prevent occupation by flying-foxes.	May take time for plants to provide the desired effect	Residents ought to be encouraged to modify properties by planting dense screens and fragrant plants Appraisal: Adopt
Alternative habitat creation	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	\$\$-\$\$\$	If successful in attracting FFs away from high conflict areas, dedicated habitat in low conflict areas will mitigate all impacts and helps FF conservation. Rehabilitation of degraded habitat that is likely to be suitable for FF use could be a more practical and faster approach than habitat creation. Improving potential alternative camp habitat on the island could be part of a medium- long term plan.	Generally costly, long-term approach so cannot be undertaken quickly, previous attempts to attract FFs to a new site have not been known to succeed.	Landcare groups working on Bellingen Island to continue to include habitat creation within their restoration plans and funding proposals trees to increase roosting area on Bellingen Island. This will also aim to replace vegetation which may potentially be removed in buffers (if buffers are created). Appraisal: Adopt
Provision of artificial roosting habitat	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	\$-\$\$	Artificial roosting habitat not necessary as although the vegetation on site is affected by flying-foxes, it is considered to be manageable.	No guarantee that flying-foxes would use artificial habitat, but collaborating with a researcher on varying design options would increase the likelihood of success.	This option was suggested by one respondent through community consultation. Council and/or community groups could explore options for research and design ideas dependent on resources and strategic priorities. Appraisal: Investigate further
Protocols to manage incidents	Health/wellbeing Fear of disease	\$	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. Protocols should be developed for staff and volunteers working in the rainforest, and health information included on	Will not mitigate amenity impacts, but will reduce fear of disease.	Council could develop safe work methods for staff working in the rainforest and under the camp. Council could then share this with contractors and landcare groups (BIL and BULC) working in



Management options	Relevant impacts	Cost \$-\$\$\$ Low-high	Advantages	Disadvantages	Suitability for site
			interpretative signage.		rainforest and under camp to ensure they are aware of their responsibilities.
					Appraisal: Adopt
Research	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	\$	Support research that improve understanding and more effectively mitigates impacts	Generally cannot be undertaken quickly, management trials may require cost input.	Not considered an urgent action at this site. Council will endeavour to stay up to date with contemporary research as it arises. Appraisal: Investigate further
Appropriate land- use planning	Noise Smell Faecal drop Health/wellbeing Property devaluation Lost rental return	\$	Suitable planning for future development will reduce potential for future conflict. Identification of degraded sites that may be suitable for long-term rehabilitation for FFs could reduce impacts.	Will not generally mitigate current impacts.	The core EEC on Bellingen Island already has an E2 (Environmental Conservation) zoning and is buffered by an E3 (Environmental Management) zoning. Council may consider including additional management buffer zones within their codes in future planning scheme updates if properly documented and justified Appraisal: Investigate further
Property acquisition	All for specific property owners Nil for broader community	\$\$\$			Not feasible for this location. Appraisal: Disregard
Do nothing	Nil	Nil	No resource expenditure.	Will not mitigate impacts and would not be considered	Not suitable for this site.



Management options	Relevant impacts	Cost \$-\$\$\$ Low-high	Advantages	Disadvantages	Suitability for site
				acceptable by impacted members of the community.	Appraisal: Disregard
Level 2 options					
Buffers through vegetation removal	Noise Smell Health/wellbeing	\$-\$\$	Any vegetation removal should be done using a staged approach, with the aim of removing as little native vegetation as possible and only in vegetation directly behind affected residents.	Removing vegetation can also increase visibility into the camp and noise issues for neighbouring residents which may create further conflict.	Suitable for properties that border camp along River Place, Dowle Street, Red Ledge Lane and Hammond Street. No clearing works will be permitted within TEC or EEC communities Appraisal: Investigate further
Buffers without vegetation removal – visual deterrents, canopy mounted sprinklers	Noise Smell Health/wellbeing Damage to vegetation	\$\$	Canopy-mounted water sprinklers – This method has been effective in deterring flying-foxes from designated buffer zones in Queensland (Ecosure pers comm.). Visual deterrents – Visual deterrents such as plastic bags, fluoro vests (GeoLINK 2012) and balloons (Ecosure 2016, pers. comm.) in roost trees have shown to have localised effects, with flying-foxes deterred from roosting within 1–10 metres of the deterrents.	This option can be logistically difficult (installation and water sourcing) and may be cost- prohibitive. Misting may increase humidity and exacerbate heat stress events, and overuse may impact other environmental values of the site. The type and placement of visual deterrents would need to be varied regularly to avoid habituation. Potentially lead to increase in rubbish in the natural environment.	Canopy sprinklers may be suitable for properties that border camp along River Place, Dowle Street, Red Ledge Lane and Hammond Street with trees that residents want to retain (for shade etc). Appraisal: Investigate further
Noise attenuation fencing	Noise Smell Health/wellbeing Property devaluation Lost rental	\$\$	Standard noise attenuation fencing could be investigated by Council. Advice from an acoustic consultant may provide site-specific alternatives (see Section 9).	Noise attenuation fencing is costly and can be considered unsightly for property fencing.	Due to the sites regular inundation and flooding, this option is not considered suitable immediately around Bellingen Island, however, it could be considered for private properties.



Management options	Relevant impacts	Cost \$-\$\$\$ Low-high	Advantages	Disadvantages	Suitability for site
	return/income				Appraisal: Investigate further
Level 3 options					
Nudging	All	\$\$-\$\$\$	Can encourage flying-foxes to shift away from high conflict areas next to residential areas.	May lead to inadvertent dispersal if not done at the correct time, frequency or duration.	Level 2 techniques including canopy mounted sprinklers can achieve the same outcome as actively 'nudging' the flying-foxes away without the use of light, noise and smoke deterrents. Appraisal: Disregard
Active dispersal	All at that site but not generally appropriate for amenity impacts only (see Section 8)	\$\$\$	If successful can mitigate all impacts at that site.	As detailed in Section 8.3.2, dispersal is rarely successful without significant vegetation removal (not appropriate at this location) or ongoing effort and excessive expenditure (e.g. several years and \$1M for Sydney Botanic Gardens). Flying-foxes will almost always continue to roost in the area (generally within 600m), and often splinter into several locations nearby (including many remaining at the original site) (e.g. a single camp permanently splintered to numerous sites as a result of dispersal in Maclean, including remaining at the original site).	This option is not considered appropriate at this site. Appraisal: Disregard

9 Planned management

The proposed management approach considers the community responses received during the consultation and exhibition periods. Level 1 management actions recommended for adoption or investigation for Bellingen Island are described below (Table 7). Conservation of flying-foxes within the Shire is a key objective of the Plan, and should ultimately underpin all management decisions. The following should be read with referral to Section 10.



Table 7	Camp	management plan
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Management option (Table 6)	Management level	Appraisal	Action(s)	Priority	Measure
Education and awareness programs	Level 1	Adopt	Increase community understanding and improve perceptions of flying-foxes (Section 9.1). These should also have a conservation focus - for example, encouraging the replacement of barbed wire fences with plain wire and removal of non-native foraging trees that negatively impact on flying-foxes and the environment (e.g. Cocos palms).	High	Education program commenced
Education and awareness programs	Level 1	Adopt	Develop and conduct relevant training for all staff/community involved in any flying-fox management action and those who will be dealing with complaints/inquiries.	High	Training opportunities identified. Training provided to Council staff and contractors prior to implementation of key management actions.
Education and awareness programs	Level 1	Adopt	Promote ecotourism opportunities. For example, since 1984 Batty Boat Cruises have been run regularly for tourists to watch flying-foxes leave their camps from the Brisbane River; one of the top-rated attractions in Texas is to watch 1.5 million Mexican free-tail bats fly-out from their roost - the Radisson Hotel offers special bat packages from viewing bedrooms (Kerr and Thiret 2016).	High	Potential ecotourism opportunities explored and regularly promoted.

Management option (Table 6)	Management level	Appraisal	Action(s)	Priority	Measure
Alternative habitat creation	Level 1	Adopt	Ensure vegetation management at any camp is sympathetic to flying-fox habitat requirements. Landcare groups working on Bellingen Island to continue to include within restoration plans and funding proposals trees to increase roosting area on Bellingen Island. This will also aim to replace vegetation which may be removed in buffers (if buffers are created). Avoid planting low-growing foraging species (e.g. grevillea) in centre medians and road edges. Replace with tall foraging species (e.g. eucalypts) or non-foraging species N.B. Road safety and asset management requirements considerations apply.	On-going	Training provided for volunteers to increase knowledge and awareness of flying-fox welfare. Restoration activities sympathetic to flying-fox habitat, with the aim of creating additional habitat in low conflict locations. Minimal vehicle-related mortality associated with Council plantings.
Protocols to manage incidents	Level 1	Adopt	Consider temporary/permanent exclusion measures if flying-foxes are being disturbed by public access (especially during birthing and rearing).	High	Signs or education material alerting community as required and acceptable behaviour or activities.
Protocols to manage incidents	Level 1	Adopt	Collaborate with wildlife rescue and care organisations to monitor heat stress events, and complete the online data form for input into the national database (located at http://www.animalecologylab.org/heat-stress-data- form.html).	High	Heat stress event data entered into the national database.
Protocols to manage incidents	Level 1	Adopt	Council could develop safe work methods for staff working in rainforest and under camp. Council could then share this with contractors and landcare groups (BIL and BULC) working in the rainforest and under camp to ensure they are aware of their responsibilities.	High	Council safe work methods developed and provided to relevant volunteers.
Odour reducing / masking plants	Level 1	Adopt	Use hedges and aromatics to create visual/sound/smell barrier between properties and roost site.	High	Provide plant list (e.g. section 8.1.2) to community to replace flying-fox attracting plants with alternative aromatics.
Provision of artificial roosting habitat	Level 1	Investigate further	Council will seek a research partner to trial different artificial roost options to encourage flying-foxes away from nearby residents.	Low	Feasibility of constructing artificial roost evaluated.

Management option (Table 6)	Management level	Appraisal	Action(s)	Priority	Measure
Property modification / service subsidies	Level 1	Investigate further	In consultation with affected landowners and residents, Council may investigate options for residents between James Eather Way, Dowle Street, River Place, Red Ledge Lane and several homes along Hammond Street	Medium	Residents consulted and feasibility of subsidies program evaluated.
Support research	Level 1	Adopt	Support and encourage flying-fox research, and make information readily available to the community and other land managers.	Medium	Council attends flying-fox forums, has a network of researchers and shares relevant information to appropriate platforms.
Support flying-fox rescuers and carers	Level 1	Adopt	Maintain two-way communication between Council and wildlife groups.	On-going	Data and information regularly shared between Council and wildlife groups.
Monitoring	Level 1	Adopt	Liaise with OEH officers who undertake seasonal counts for the NFFMP.	On-going	Council up-to-date with flying-fox numbers and seasonal influxes.
Appropriate land-use planning	Level 1	Investigate further	Include suitable buffers and requirements for appropriate building design in future developments (e.g. glazed windows, covered car areas and clothes lines, outdoor areas facing away from the camp, etc.).	Long-term	Feasibility of including relevant provisions in Council's development assessment process evaluated.
Buffers (through vegetation removal and/or canopy- mounted sprinklers)	Level 2	Investigate further	Consult with landowners to determine those interested in collaborating with Council to create buffers through vegetation removal and/or the installation of canopy sprinklers. N.B. Should buffers be considered necessary, a licence application to OEH will be required prior to implementation.	Medium	Consultation with residents underway.
Noise attenuation fencing	Level 2	Investigate further	Provide support and advice regarding suitable noise attenuation fencing options for residents.	Medium	Consultation with residents underway.

9.1 Level 1 actions

Preliminary consultation has indicated the community has a preference for implementing a range of education techniques and tourism opportunities including:

- interpretive signs (locations may include Church Street, Hammond Street, Jarrett Park)
- information on Council's website
- viewing platform (location may include Hammond Street, the old caravan park)
- education tours, nocturnal tours, walking tours
- school visits, public presentations or annual bat night by flying-fox experts, wildlife carers or Gumbaynggirr elders.

Affected residents will also be encouraged to modify properties (e.g. planting dense screens and fragrant plants) to assist with odour and noise and trim tall trees to less than 5 meters high and/or use wildlife friendly netting to prevent occupation by flying-foxes. The option of a subsidy program could be investigated by Council as consultation suggests car and clothesline covers would be helpful to overcome issues relating to faecal drop.

Ongoing works by landcare groups (BIL and BULC) will continue to maintain and improve the health of the rainforest on the island. It will also expand potential roosting habitat further away from houses, and compensate for buffers (if buffers are required).

Rehabilitation of the western end of Bellingen Island (known as 'WEBI') could extend up to 'the Point' as far as possible whilst maintaining an adequate buffer from residents. Council's support and maintenance of bush regeneration along the old river channel adjacent to Hammond Street should continue and restoration of the riparian zone behind residents along the Bellinger River upstream of 'the Point' should be encouraged.

9.2 Level 2 actions

Council will investigate the feasibility of creating buffers between affected dwellings adjacent to core camp habitat on Dowle Street, River Place and James Eather Way. This may be done through vegetation management and/or the installation of deterrents (as detailed in Section 8.2). Further detail on canopy-mounted sprinklers, which are considered one of the most effective deterrents based on current trials, is provided in Section 9.2.1. Should Council, in consultation with the community, determine buffers are feasible and necessary, a licence application will be submitted to OEH prior to implementation. Measures to avoid impacts, as detailed in Section 10, will be complied with at all times.

The old river channel on the northern embankment of the island could be investigated to act as a natural buffer through the removal of exotics and trimming of natives, however it is likely that the flying-foxes will 'leap-frog' this natural gap in the vegetation and occupy tall trees within surrounding residential lots unless residents modify their properties as outlined in Section 9.1.

9.2.1 Canopy-mounted sprinklers

Canopy sprinklers have been used successfully elsewhere to deter flying-foxes from areas of conflict. It is not the intention to disperse flying-foxes away from the camp, but maintain an adequate buffer between residents and the flying-fox camp.

Canopy sprinklers were installed at Emerald Woods Park on the Sunshine Coast (Queensland), with residents adjacent to the camp given the option to activate sprinklers for short periods during the day if flying-foxes enter the buffer zone. By moving flying-foxes out of the buffer zone (the high conflict areas), there was also less disturbance of the camp, which provided the secondary benefit of reduced noise, smell and daytime fly-overs (and faecal drop). Residents report a sense of regained control, which combined with the increased distance to roosting flying-foxes achieved with the sprinklers, has greatly assisted in reducing conflict with the camp. It is recommended, should sprinklers be used in a buffer zone at the Bellingen Island camp, residents should be able to activate them when necessary (with consideration to guidelines below).

Installation

- Placement Exact placement will be dependent on finding suitable trees which can be accessed with an Elevated Work Platform, or alternatively if safe for installation by tree climbers. Note that it is anticipated that at least one additional visit will be required to adjust sprinklers during the trial.
- Water pressure Water pressure must be firm so it is sufficient to deter flying-foxes, however must not risk injuring flying-foxes (or other fauna) or knocking an animal from the tree. Water mist should be minimised if possible (see also Section 9.3.2).
- Noise Sprinklers should release a jet of air prior to water, as an additional deterrent and to cue animals to move prior to water being released. The intention of the sprinklers is to make the buffer unattractive, and effectively 'train' individuals to stay out of the buffer area.
- Potential for additional sprinklers Infrastructure installed for the initial three sprinklers should accommodate additional sprinklers if possible should they be required in the future.
- Residents involved in a similar approved trial elsewhere also reported noise impacts associated with the water hammer, which should be minimised through design as much as possible.
- Tree health Sprinklers and hosing must be attached to trees in a way that does not impact tree health or growth.
- Access for maintenance/adjustments Sprinklers should be designed and attached in a way that allows the easiest possible access for future maintenance, replacement and sprinkler head adjustments.
- Mounting poles may be installed in some areas if a suitable tree is not available and/or to allow easier access to sprinkler heads for maintenance. These will be

designed to withstand high wind and vegetation debris fall, and will be highly visible to flying-foxes to avoid collisions.

- Sprinkler control The system control station should allow independent programming
 of each individual sprinkler. The number of times per day each sprinkler is activated,
 duration of each activation and sequence of sprinkler activation needs to be fully
 adjustable (minutes and seconds programming required). The operational time of day
 also needs to be adjustable. Ideally water pressure to individual sprinklers could also
 be adjusted.
- Discrete installation As much as practicable, sprinklers and hoses should be hidden from public view for amenity value and to limit potential for vandalism.

Operation

- Sprinklers will operate on a random schedule, and in a staggered manner (i.e. not all sprinklers operating at the same time, to avoid excessive disturbance). Each activation will be for approximately 20 seconds per sprinkler. It is anticipated each sprinkler will be activated up to four times per hour between 0600 and 1700, totalling approximately 15 minutes run time per sprinkler per day. Sprinklers will not operate during fly-in or fly-out periods to avoid inadvertent dispersal.
- Sprinkler settings will need to be changed regularly to avoid flying-foxes habituating, and to account for seasonal changes (e.g. not in the heat of the day during summer when they may be an attractant). Individual sprinklers may also need to be temporarily turned off depending on location of creching young, or if it appears likely that animals will be displaced to undesirable locations.
- Flying-fox heat stroke generally occurs when the temperature reaches 42°C, however can occur at lower temperatures in more humid conditions (Bishop 2015). Given that humidity is most likely to be increased with water mist, if sprinkler design cannot limit mist, sprinklers may need to be turned off in higher temperatures (e.g. >30°C) to avoid exacerbating heat stress. Conversely, if temperatures exceed 38°C sprinklers may assist in reducing heat related mortality.

Cost-sharing

In other programs using canopy-mounted sprinklers, Council has paid for installation and residents have paid operational costs (water and power). Cost sharing will be discussed with residents during consultation and considered in the feasibility assessment.

9.3 Level 3 actions

Dispersal is rarely successful without significant vegetation removal (not appropriate at this location) or ongoing effort and excessive expenditure (e.g. several years and \$1M for Sydney Botanic Gardens). Flying-foxes will almost always continue to roost in the area (generally within 600 m), and often splinter into several locations nearby (including many remaining at the original site). As such dispersal is not considered feasible or appropriate at this site.

10 Assessment of impacts to flying-foxes

As detailed in Section 5, 64 threatened species and one EEC were assessed for potential occurrence/impacts as a result of camp management. None of these are considered likely to be negatively impacted by the flying-fox management approach advocated for in this plan. Positive benefits for threatened species and the threatened community are in fact likely, arising from ongoing vegetation restoration at the camp.

Works that will be considered during the life of this Plan are confined to minor trimming (see Section 9). Otherwise, active works within the camp are focussed on restoring the rainforest.

The site will be assessed by a suitably qualified ecologist for any potentially significant habitat features (nests, hollows, etc.). These will be retained where possible, and specific mitigation measures will be detailed in relevant licence applications (required for any tree trimming/removal, as identified in Section 9).

Given the intent of works is to retain and restore the rainforest, no negative impacts on the ecological community or on potentially occurring threatened species are expected.

Implementation of the measures detailed in Section 10.1 will ensure the:

- safety of staff and volunteers working in the camp
- welfare of flying-foxes during minor works in the camp.

10.1 Standard measures to avoid impacts

The following mitigation measures will be complied with at all times during implementation of any activities within or immediately adjacent the camp.

- All personnel will be appropriately experienced, trained and inducted. Induction will include each person's responsibilities under this Plan.
- All personnel will be briefed prior to the action commencing each day, and debriefed at the end of the day.
- Works will cease and OEH consulted in accordance with the 'stop work triggers' section of the Plan.
- Large crews will be avoided where possible.
- The use of loud machinery and equipment that produces sudden impacts/noise will be limited. Where loud equipment (e.g. chainsaws) is required they will be started away from the camp and allowed to run for a short time to allow flying-foxes to adjust.
- Activities that may disturb flying-foxes at any time during the year will begin as far from the camp as possible, working towards the camp gradually to allow flying-foxes to habituate.

- Any activity likely to disturb flying-foxes so that they take flight will be avoided during the day during the sensitive GHFF/BFF birthing period (i.e. when females are in final trimester or the majority are carrying pups, generally August – December) and avoided altogether during crèching (generally November/December to February). Where works cannot be done at night after fly-out during these periods, it is preferable they are undertaken in the late afternoon close to or at fly-out. If this is also not possible, a person experienced in flying-fox behaviour will monitor the camp for at least the first two scheduled actions (or as otherwise deemed to be required by that person) to ensure impacts are not excessive and advise on the most appropriate methods (e.g. required buffer distances, approach, etc.).
- OEH will be immediately contacted if LRFF are present between March and October, or are identified as being in final trimester / with dependent young.
- Non-critical maintenance activities will ideally be scheduled when the camp is naturally empty. Where this is not possible (e.g. at permanently occupied camps) they will be scheduled for the best period for that camp (e.g. when the camp is seasonally lower in numbers and breeding will not be interrupted, or during the nonbreeding season, generally May to July).
- Works will not take place in periods of adverse weather including strong winds, sustained heavy rains, in very cold temperatures or during periods of likely population stress (e.g. food bottlenecks). Wildlife carers will be consulted to determine whether the population appears to be under stress.
- Works will be postponed on days predicted to exceed 35°C (or ideally 30°C), and for one day following a day that reached ≥35°C. If an actual heat stress event has been recorded at the camp or at nearby camps, a rest period of several weeks will be scheduled to allow affected flying-foxes to fully recover. See the OEH fact sheet on Responding to heat stress in flying-fox camps.
- Any proposed variations to works detailed in the Plan will be approved, in writing, by OEH before any new works occur.
- OEH may require changes to methods or cessation of management activities at any time.
- Ensure Level 2 management actions and results are recorded to inform future planning. See the OEH fact sheet on Monitoring, evaluating and reporting.
- 10.1.1 Vegetation trimming/removal (if required)
 - Dead wood and hollows will be retained on site where possible as habitat.
 - Vegetation chipping/mulching is to be undertaken as far away from roosting flyingfoxes as possible (at least 100 m).

10.1.2 Canopy vegetation trimming/removal (if required)

Prior to works

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

During works

- Any tree lopping, trimming or removal is undertaken under the supervision of a suitably qualified arborist (minimum qualification of Certificate III in Horticulture (Arboriculture) who is a member of an appropriate professional body such as the National Arborists Association).
- Trimming will be in accordance with relevant Australian Standards (e.g. AS4373 Pruning of Amenity Trees), and best practice techniques used to remove vegetation in a way that avoids impacting other fauna and remaining habitat.
- No tree in which a flying-fox is roosting will be trimmed or removed. Works may
 continue in trees adjacent to roost trees only where a person experienced in flyingfox behaviour assesses that no flying-foxes are at risk of being harmed. A person
 experienced in flying-fox behaviour is to remain on site to monitor, when canopy
 trimming/removal is required within 50 metres of roosting flying-foxes.
- While most females are likely to be carrying young (generally September January) vegetation removal within 50 metres of the camp will only be done in the evening after fly-out, unless otherwise advised by a flying-fox expert.
- Tree removal as part of management will be offset at a ratio of at least 2:1. Where threatened vegetation removal is required, the land manager will prepare an Offset Strategy to outline a program of restoration works in other locations (in addition to existing programs). The strategy will be submitted to OEH for approval at least two months prior to commencing works.

10.1.3 Bush regeneration

- All works will be carried out by suitably qualified and experienced bush regenerators (i.e. Landcare groups), with at least one supervisor knowledgeable about flying-fox habitat requirements (and how to retain them for Level 1 and 2 actions) with knowledge regarding working under a camp
- Vegetation modification, including weed removal, will not alter the conditions of the site such that it becomes unsuitable flying-fox habitat for Level 1 and 2 actions.
- Weed removal should follow a mosaic pattern, maintaining refuges in the mid- and lower storeys at all times.
- Weed control in the core habitat area will be undertaken using hand tools only (or in the evening after fly-out while crèching young are not present).

• Species selected for revegetation will be consistent with the habitat on site, and in buffer areas or conflict areas should be restricted to small shrubs/understorey species to reduce the need for further roost tree management in the future.

10.1.4 Stop work triggers

Management activities in or near Bellingen Island will cease and will not recommence or without consulting OEH if:

- any of the animal welfare triggers occur on more than two days during the program, such as unacceptable levels of stress (see Table 5)
- there is a flying-fox injury or death
- a new camp/camps appear to be establishing
- impacts are created or exacerbated at other locations
- there appears to be potential for conservation impacts (e.g. reduction in breeding success identified through independent monitoring)
- standard measures to avoid impacts (detailed in Section 10.3) cannot be met.

Management may also be terminated at any time if:

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

Table 8 Planned action for potential impacts during any works under or near the camp. A person with experience in flying-fox behaviour (as per Appendix 5) will monitor for welfare triggers and direct works in accordance with the criteria below.

Welfare trigger	Signs	Action
Unacceptable levels of stress	If any individual is observed: · panting · saliva spreading · located on or within 2 m of the ground	Works to cease for the day.
Fatigue	 In-situ management more than 30% of the camp takes flight individuals are in flight for more than 5 minutes flying-foxes appear to be leaving the camp 	In-situ management Works to cease and recommence only when flying-foxes have settled* / move to alternative locations at least 50 m from roosting animals.



Welfare trigger	Signs	Action
Injury/death	 A flying-fox appears to have been injured/killed on site (including aborted foetuses) dependent/crèching young present and adults likely to take flight or abandoned camp 	Works to cease immediately and OEH notified AND rescheduled OR adapted sufficiently so that significant impacts (e.g. death/injury) are highly unlikely to occur, as confirmed by an independent expert (see Appendix 5) OR stopped indefinitely and alternative management options investigated.
11 Assessment of impacts to other threatened species or communities

The main camp area covers an area of the EEC Lowland Rainforest of Subtropical Australia, which is listed under both the EPBC and TSC Acts. The periphery includes vegetation mapped as native remnant vegetation, the constituency of which has not been ground-truthed. The surrounding vegetation and unconfirmed camp extent to the east contains fragments of tallowwood/small-fruited grey gum – forest oak dry open forest as well as areas of the introduced tree, camphor laurel forest (*Cinnamomum camphora*).

Vegetation management in the camphor laurel forest would not require impact assessment or approval from OEH (further to endorsement of this Plan), however any works within the Lowland Rainforest TEC would require further impact assessment ("seven part test" under the TSC Act and assessment against the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* for the community as listed under the EPBC Act). The specifics of this vegetation management would need to be determined prior to assessment being undertaken (i.e. does the management involve clearing, or lopping of which species?). Management in the Lowland Rainforest TEC currently extends only to assisted regeneration (mainly weeding) from the local landcare group, therefore is likely to improve or maintain the condition of the TEC and further assessment/approval is not required.

Vegetation management in the "native remnant vegetation" would require a flora survey to ground-truth this community and then further recommendations on impact assessment requirements could be made.

Sixty-four threatened species were recorded or likely to occur from database searches. Thirtytwo of these species were assessed in detail in Table 5 (Section 5), with 20 of these species occurring, likely to occur or possibly occurring. If vegetation removal was required, the impacts to these species may require further assessment, however present work by landcare groups is unlikely to have a negative impact on any threatened flora or fauna species and as such further assessment is not required at this stage.

12 Evaluation and review

This Plan will be in operation for five years with annual review of management actions set out in Section 9.

The following will trigger a reactive internal review of the Plan:

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

Monitoring and reporting requirements are detailed in Section 13.

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 prior to being re-submitted to OEH.

13 Plan administration

13.1 Monitoring of the camp

Reports for Level 1 actions that comply with this Plan are not required to be submitted to OEH. It is recommended that BSC keep internal records to allow the effectiveness of each management action to be evaluated.

Reports for Level 2 actions will be submitted to OEH one month after commencement of works and then quarterly in periods where works have occurred. Each report is to include:

- results of pre- and post-work population monitoring
- any information on new camps that have formed in the area
- further management actions planned including a schedule of works
- an assessment of how the community responded to the works, including details on the number and nature of complaints before and after the works
- detail on any compensatory planting
- expenditure and contributors
- outcomes from evaluation and review (Section 12).

13.2 Responsibilities

BSC is responsible for implementation of the Plan once it has been endorsed by OEH, licences have been obtained where necessary and resources have been allocated for implementation. BSC will seek advice from OEH and other flying-fox experts as required during implementation.

All BSC personnel, contractors and volunteers working on Bellingen Island are responsible for complying with mitigation measures detailed in Section 10.1. BSC will ensure non-Council staff and volunteers are aware of this responsibility, and will provide assistance if required. All on-ground works towards implementation of this Plan, will be performed in accordance with a Safe Work Method Statement that includes risks and mitigation measures for working in a flying-fox camp.

If there is a sudden influx of flying-foxes to the camp, other councils and agencies should be consulted to determine if it is related to a dispersal. If this is the case, assistance will be sought from the council dispersing to manage any issues that arise.

13.3 Funding commitment

BSC will commit available funds on an annual basis over the life of the Plan to implement actions in Table 7. Allocation of Council funding will be dependent on resources available and annual priorities. BSC will also seek opportunities for funding through relevant grant programs, such as the NSW Flying-fox Grants Program, and will seek contribution from other stakeholders where appropriate.

References and additional resources

Aich, P, Potter, AA and Griebel, PJ 2009, 'Modern approaches to understanding stress and disease susceptibility: A review with special emphasis on respiratory disease', *International Journal of General Medicine*, vol. 2, pp. 19–32.

AIHW 2012, *Risk factors contributing to chronic disease*, Cat no. PHE 157, Australian Institute of Health and Welfare, viewed 06 June 2017, www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737421546.

Atlas of Living Australia 2015, viewed 06 June 2017, www.ala.org.au.

Australasian Bat Society 2013, viewed 06 June 2017, ausbats.org.au/.

Australian Museum 2010, *Little Red Flying-fox*, viewed 06 June 2017, australianmuseum.net.au/little-red-flying-fox.

AVA 2015, *Hendra virus*, Australian Veterinary Association, viewed 06 June 2017, www.ava.com.au/hendra-virus.

Birt, P 2000, 'Summary information on the status of the Grey-headed (*Pteropus poliocephalus*) and Black (*P. alecto*) Flying-Fox in New South Wales,' Proceedings of workshop to assess the status of the grey-headed flying-fox in New South Wales. University of Sydney, Sydney, New South Wales, Australia, pp. 78-86.

BSC (Bellingen Shire Council) n.d. *Bellingen Island History*, available: http://www.bellingen.nsw.gov.au/sites/bellingen/files/public/images/documents/bellingen/mig/2756-Bellingen_Island_History.pdf 6 June 2017.

CDC 2014, *Hendra virus disease (HeV): Transmission,* Centers for Disease Control and Prevention, updated 17 March 2014, viewed 06 June 2017, www.cdc.gov/vhf/hendra/transmission/index.html.

Churchill, S 2008, Australian Bats, Allen & Unwin, Crows Nest, NSW.

DAF 2012, Zoonoses are diseases that can spread from animals to people, Queensland Department of Agriculture and Fisheries, updated 31 January 2012, viewed 06 June 2017, www.daf.qld.gov.au/animal-industries/animal-health-and-diseases/zoonoses.

DECC 2007, *Threatened species assessment guidelines: the assessment of significance*, Department of Environment and Climate Change NSW, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf.

DECC 2008, *Best practice guidelines for the grey-headed flying-fox*, Department of Environment and Climate Change NSW, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/threatenedspecies/08540tsdsflyingfoxbpg.pdf.

DECCW 2009, *Draft National Recovery Plan for the Grey-headed Flying-fox* Pteropus poliocephalus, prepared by Dr Peggy Eby for Department of Environment, Climate Change and Water NSW, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/threatenedspecies/08214dnrpflyingfox.pdf.

DoE 2013, *Matters of National Environmental Significance: Significant Impact Guidelines 1.1*, Environment Protection and Biodiversity Conservation Act 1999, Australian Government Department of the Environment, www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf.

DoE 2014, *How can flying-foxes be managed in accordance with national environmental law?* Australian Government Department of the Environment, Canberra, viewed 06 June 2017, www.environment.gov.au/biodiversity/threatened/species/flying-fox-law.

DoE 2015, Referral guideline for management actions in grey-headed and spectacled flying-fox camps, Australian Government Department of the Environment, Canberra, viewed 06 June 2017, www.environment.gov.au/system/files/resources/6d4f8ebc-f6a0-49e6-a6b6-82e9c8d55768/files/referral-guideline-flying-fox-camps.pdf.

DoE 2016a, *Pteropus poliocephalus in Species Profile and Threats Database*, Australian Government Department of the Environment, Canberra, viewed 06 June 2017, www.environment.gov.au/cgibin/sprat/public/publicspecies.pl?taxon_id=186.

DoE 2016b, *Monitoring Flying-fox Populations*, Australian Government Department of the Environment, Canberra, viewed 06 June 2017, www.environment.gov.au/biodiversity/threatened/species/flying-fox-monitoring.

DoEE 2017, Draft Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus, Commonwealth of Australia, Canberra, http://www.environment.gov.au/system/files/resources/78d5e396-7475-4fc0-8a64-48c86a1cb2b6/files/draft-recovery-plan-grey-headed-flying-fox.pdf viewed 6 June 2017

DoEEa 2017, EPBC Act Protected Matters Report, Australian Government

DPI 2013, *Australian bat lyssavirus*, June 2013 Primefact 1291 2nd edition, Department of Primary Industries, NSW, viewed 06 June 2017, www.dpi.nsw.gov.au/ data/assets/pdf file/0011/461873/Australian-Bat-lyssavirus.pdf.

DPI 2014, *Hendra virus*, June 2014 Primefact 970 9th edition, Department of Primary Industries, NSW, viewed 06 June 2017,

www.dpi.nsw.gov.au/__data/assets/pdf_file/0019/310492/hendra_virus_primefact_970.pdf.

DPI 2015a, *Hendra virus*, Department of Primary Industries, NSW, viewed 06 June 2017, www.dpi.nsw.gov.au/agriculture/livestock/horses/health/general/hendra-virus.

DPI 2015b, *Lyssavirus and other bat health risks*, Department of Primary Industries, Primary Industry Biosecurity, NSW, viewed 06 June 2017, www.dpi.nsw.gov.au/biosecurity/animal/humans/bat-health-risks.

DSDIP 2014, *Queensland State Planning Policy July 2014*, Department of State Development, Infrastructure and Planning, Brisbane.

Eby, P 1991, 'Seasonal movements of Grey-headed Flying-foxes, *Pteropus poliocephalus* (Chiroptera: Pteropodidae) from two maternity roosts in northern New South Wales', *Wildlife Research*, vol. 18, pp. 547–59.

Eby, P 1995, *The biology and management of flying-foxes in NSW*, Species management report number 18, Llewellyn, L. (ed.), National Parks and Wildlife Service, Hurstville.

Eby, P 2000, 'The results of four synchronous assessments of relative distribution and abundance of Grey-headed Flying-fox *Pteropus poliocephalus*', Proceedings from workshop to assess the status of the Grey-headed Flying-fox in New South Wales, pp. 66–77.

Eby, P 2006, 'Site Management Plan for the Grey-headed Flying-fox camp at the Sydney Desalination Plant Site', report to Sydney Water Corporation, Sydney.

Eby, P and Lunney, D 2002, *Managing the Grey-headed Flying–fox as a threatened species in NSW*, Royal Society of New South Wales, Darlington, NSW.

Ecosure 2011, 'Hendra Virus Risk Assessment for the Gold Coast Equine Precinct: Residual Risk Report', unpublished report to City of Gold Coast.

Ecosure 2014, *Cannes Reserve flying-fox management strategy*, Ecosure Pty Ltd, report to Pittwater Council, Sydney.

Ecosure 2014, 'Outcomes of a new flying-fox management framework: Review of management actions 2013–2014', unpublished data collected in collaboration with Griffith University (Industry Affiliates Program).

Edson, D, Field, H, McMichael, L, Jordan, D, Kung, N, Mayer, D and Smith, C 2015, 'Flying-fox Roost Disturbance and Hendra Virus Spillover Risk', *PLoS ONE*, vol. 10, no. 5, viewed 06 June 2017, www.ncbi.nlm.nih.gov/pmc/articles/PMC4446312/pdf/pone.0125881.pdf.

EHP 2012, *Living with Wildlife – Flying-foxes*, Department of Environment and Heritage Protection, Queensland, updated 14 May 2012, viewed 06 June 2017, www.ehp.qld.gov.au/wildlife/livingwith/flyingfoxes/importance.html.

ELW&P 2015, Flying-foxes, Department of Environment, Land, Water and Planning, State of Victoria.

EPA 2013, Noise Guide for Local Government, Environment Protection Authority, Sydney.

Fujita, MS 1991, 'Flying-fox (*Chiroptera: Pteropodidae*) pollination, seed dispersal, and economic importance: a tabular summary of current knowledge', *Resource Publication No. 2*, Bat Conservation International.

GeoLINK 2012, *Plan of Management – Bellingen Island Integrated Reserves*, report prepared for Bellingen Shire Council.

Hall, L and Richards, G 2000, Flying foxes: fruit and blossom bats of Australia, UNSW Press, Sydney.

Henry, JP and Stephens-Larson, P 1985, 'Specific effects of stress on disease processes' in Moberg, GP (ed.), *Animal Stress*, American Physiological Society, pp.161–175.

IUCN 2015, *Little red flying-fox*, International Union for the Conservation of Nature, www.iucnredlist.org.

Kerr, M and Thiret, D 2016, *Ecotourism as a Contributor to Bat Conservation in Urban Environments*, Presentation at the Wildlife Tourism Australia Conference, Adelaide 2016.

Markus, N and Hall, L 2004, 'Foraging behaviour of the black flying-fox (*Pteropus alecto*) in the urban landscape of Brisbane, Queensland', *Wildlife Research*, vol. 31, no. 3, pp. 345-355.

McCall, BJ, Field, H, Smith, GA, Storie, GJ and Harrower, BJ 2005, 'Defining the risk of human exposure to Australian bat lyssavirus through potential non-bat animal infection', *CDI*, vol. 29, no. 2, pp. 200–203, www.health.gov.au/internet/main/publishing.nsf/content/cda-cdi2902-pdf-cnt.htm/\$FILE/cdi2902k.pdf.

McConkey, KR, Prasad, S, Corlett, RT, Campos-Arceiz, A, Brodie, JF, Rogers, H and Santamaria, L 2012, 'Seed dispersal in changing landscapes', *Biological Conservation*, vol. 146, pp. 1–13, doi:10.1016/j.biocon.2011.09.018.

McGuckin, MA and Blackshaw, AW 1991, 'Seasonal changes in testicular size, plasma testosterone concentration and body weight in captive flying-foxes (*Pteropus poliocephalus* and *P. scapulatus*)', *Journal of Reproduction and Fertility*, vol. 92, pp. 339–346.

McIlwee, AP and Martin, IL 2002, 'On the intrinsic capacity for increase of Australian flying-foxes', *Australian Zoologist*, vol. 32, no. 1.

Milne, DJ and Pavey, CR 2011, 'The status and conservation of bats in the Northern Territory', in Law, B, Eby, P, Lunney, D and Lumsden, L (eds), *The Biology and Conservation of Australasian Bats*, Royal Zoological Society of NSW, Mosman, NSW, pp. 208–225.

NSW Health 2012, *Flying foxes and health*, NSW Health, North Sydney, viewed 06 June 2017, www.health.nsw.gov.au/environment/factsheets/Pages/flying-foxes.aspx.

NSW Health 2013, *Rabies and Australian Bat Lyssavirus Infection*, NSW Health, North Sydney, viewed 06 June 2017, www.health.nsw.gov.au/Infectious/factsheets/Pages/Rabies-Australian-Bat-Lyssavirus-Infection.aspx.

OEH 2011a, Grey-headed Flying-fox vulnerable species listing: NSW Scientific Committee final determination, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/determinations/GreyheadedFlyingFoxVulSpListing.htm.

OEH 2011b, *NSW Code of Practice for Injured, Sick and Orphaned Protected Fauna*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/wildlifelicences/110004FaunaRehab.pdf.

OEH 2012, *NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/wildlifelicences/120026flyingfoxcode.pdf.

OEH 2013, 'Vegetation map of the Bellingen Local Government Area', File name: BellingenLGA_2013_E_4188, Office of Environment and Heritage New South Wales and Bellingen Shire Council

OEH 2014, *BioBanking Assessment Methodology 2014*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/biobanking/140661BBAM.pdf.

OEH 2015a, *Flying-foxes* (including fact sheets), Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/animals/flyingfoxes.htm.

OEH 2015b, *Flying-fox Camp Management Policy 2015*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/threatenedspecies/150070-flyingfoxcamp-policy.pdf.

OEH 2015c, *Flying-fox Camp Management Plan Template 2015*, Office of Environment & Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/threatenedspecies/150102-flyingfoxcamp-template.pdf.

OEH 2015d, *GHFF threatened species profile*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10697

OEH 2015e, *Policy and procedural guidelines for the mitigation of commercial crop damage by flying-foxes*, Office of Environment and Heritage, Sydney, viewed 06 June 2017, www.environment.nsw.gov.au/resources/wildlifelicences/140480FlyfoxPol.pdf

OEH 2015f, *Why the Grey-headed flying-fox is listed as a threatened species*, Office of Environment and Heritage, Sydney, viewed 11 July 2017, http://www.environment.nsw.gov.au/animals/flying-fox-grey-headed.htm

OEH 2017, *NSW Bionet: the website for the Atlas of NSW Wildlife*, Office of Environment and Heritage, viewed 06 June 2017, available: http://www.bionet.nsw.gov.au/

OEH 2017a, *Threatened species*, Office of Environment and Heritage, viewed 06 June 2017, available: http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species

Parry-Jones, KA and Augee, ML 1992, 'Movements of the Grey-headed Flying Foxes (*Pteropus poliocephalus*) to and from a colony site on the central coast of New South Wales', *Wildlife Research*, vol. 19, pp. 331–40.

Parry-Jones, K and Augee, M 2001 'Factors affecting the occupation of a colony site in Sydney, New South Wales by the Grey-headed Flying-fox *Pteropus poliocephalus* (Pteropodidae)', *Austral Ecology*, vol. 26, pp. 47–55.

Pierson, ED and Rainey, WE 1992, 'The biology of flying foxes of the genus Pteropus: A Review', in: Wilson, DE and GL Graham (eds), *Pacific Island Flying Foxes: Proceedings of an International Conservation Conference*, US Department of the Interior – Biological Report no. 90, pp. 1–17.

Qld Health 2016, *Bats and Human Health*, Queensland Health, viewed 06 June 2017, www.health.qld.gov.au/communicablediseases/hendra.asp

Ratcliffe, F 1932, 'Notes on the Fruit Bats (Pteropus spp.) of Australia', *Journal of Animal Ecology*, vol. 1, no. 1, pp. 32–57.

Roberts, B 2005, 'Habitat characteristics of flying-fox camps in south-east Queensland', BSc. Honours Thesis, Griffith University, Brisbane.

Roberts, BJ 2006, *Management of Urban Flying-fox Roosts: Issues of Relevance to Roosts in the Lower Clarence, NSW*, Valley Watch Inc, Maclean.

Roberts, B and Eby, P 2013, Review of past flying-fox dispersal actions between 1990–2013, publisher unknown, viewed 06 June 2017, www.environment.nsw.gov.au/resources/animals/flying-fox-2014-subs/flyingfoxsub-jenny-beatson-part2.pdf.

Roberts, BJ, Catterall, CP, Eby, P and Kanowski, J 2012, 'Long-Distance and Frequent Movements of the Flying-Fox *Pteropus poliocephalus*: Implications for Management', *PLoS ONE*, vol. 7, no. 8, e42532.

Roberts, BJ, Eby, P, Catterall, CP, Kanowski, J and Bennett, G 2011, 'The outcomes and costs of relocating flying-fox camps: insights from the case of Maclean, Australia', in Law, B, Eby, P, Lunney, D and Lumsden, L (eds), *The Biology and Conservation of Australasian Bats*, Royal Zoological Society of NSW, Mosman, NSW, viewed 06 June 2017, www.griffith.edu.au/__data/assets/pdf_file/0006/358440/Roberts-et-al.pdf.

Roberts, B, Kanowski, J and Catterall, C 2006, *Ecology and Management of Flying-fox Camps in an Urbanising Region*, Rainforest CRC Tropical Forest Landscapes, Issue 5, viewed 06 June 2017, www.rainforest-crc.jcu.edu.au/issues/ITFL_flyingfox.pdf.

SEQ Catchments 2012, *Management and Restoration of flying-fox Roosts: Guidelines and Recommendations*, SEQ Catchments Ltd funded by the Australian Government's Caring for Our Country, viewed 06 June 2017, www.environment.nsw.gov.au/resources/animals/flying-fox-2014-subs/flyingfoxsub-jenny-beatson-part3.pdf.

Shinwari, MW, Annand, EJ, Driver, L, Warrilow, D, Harrower, B, Allcock, RJN, Pukallus, D, Harper J, Bingham, J, Kung, N and Diallo, IS 2014, 'Australian bat lyssavirus infection in two horses', *Veterinary Microbiology*, vol. 173, pp. 224–231.

Southerton, SG, Birt, P, Porter, J and Ford, HA 2004, 'Review of gene movement by bats and birds and its potential significance for eucalypt plantation forestry', *Australian Forestry*, vol. 67, no. 1, pp. 45–54.

Stanvic, S, McDonald, V and Collins, L 2013, *Managing heat stress in flying-foxes colonies*, viewed 06 June 2017, www.fourthcrossingwildlife.com/HeatStress-StanvicMcDonaldCollins.pdf.

Tait, J, Perotto-Baldivieso, HL, McKeown, A and Westcott, DA 2014, 'Are Flying-Foxes Coming to Town? Urbanisation of the Spectacled Flying-Fox (*Pteropus conspicillatus*) in Australia', *PLoS ONE*, vol. 9, no. 10, e109810, doi:10.1371/journal.pone.0109810.

Tidemann, C, Eby, P, Parry-Jones, K and Vardon, M 1999, *The Action Plan for Australian Bats: Greyheaded Flying-fox*, Environment Australia, www.environment.gov.au/node/14622.

Vardon, MJ and Tidemann, CR 1999, 'Flying-foxes (*Pteropus alecto* and *P. scapulatus*) in the Darwin region, north Australia: patterns in camp size and structure', *Australian Journal of Zoology*, vol. 47, pp. 411–423.

Vardon, MJ, Brocklehurst, PS, Woinarski, JCZ, Cunningham, RB, Donnelly, CF and Tidemann, CR 2001, 'Seasonal habitat use by flying-foxes, *Pteropus alecto* and *P. Scapulatus* (Megachiroptera), in monsoonal Australia', *Journal of Zoology* London, vol. 253, pp. 523–535.

Webb, N and Tidemann, C 1995, 'Hybridisation between black (*Pteropus alecto*) and grey-headed (*P. poliocephalus*) flying-foxes (Megachiroptera: Pteropodidae)', *Australian Mammalogy*, vol. 18, pp. 19–26.

Webb, NJ and Tidemann, CR 1996, 'Mobility of Australian flying-foxes, *Pteropus* spp. (Megachiroptera): evidence from genetic variation', *Proceedings of the Royal Society London Series B*, vol. 263, pp. 497–502.

Westcott, DA, Dennis, AJ, Bradford, MG, McKeown, A and Harrington, GN 2008, 'Seed dispersal processes in Australia's Wet Tropics rainforests', in Stork, N and Turton, S, *Living in a dynamic tropical forest landscape*, Blackwells Publishing, Malden, pp. 210–223.

Westcott, DA, McKeown, A, Murphy, HT and Fletcher, CS 2011, *A monitoring method for the Greyheaded Flying-fox,* Pteropus poliocephalus, CSIRO, Queensland, viewed 06 June 2017, www.environment.gov.au/biodiversity/threatened/species/pubs/310112-monitoring-methodology.pdf.

Zurbuchen, A, Landert, L, Klaiber, J, Muller, A, Hein, S and Dorn, S 2010, 'Maximum foraging ranges in solitary bees: only few individuals have the capability to cover long-foraging distances', *Biological Conservation*, vol. 142, no. 3, pp. 669–676.

Appendix 1 Online survey results

Project Report July 2017 - 18 September 2017 Create Bellingen Island Flying-fox Camp Management Plan				
engagement ho by Bong the Table				
Visitors Summary	Highlights			
	TOTAL MAX VISITORS PER VISITS DAY			
300	468 56 NEW			
200	65			
100	ENGAGED INFORMED AWARE VISITORS VISITORS VISITORS			
1 Jul '171 Sep '1794223338PageviewsVisitorsVisits94338New Registrations				
Aware Participants 338 Engaged	94			

Aware Participants	338	Engaged		94	
Aware Actions Performed	Participants	Engaged Actions	tions Registered Unverified An		Anonymous
Visited a Project or Tool Page	338	Performed	5		,
Informed Participants	223	Contributed on Forums	0	0	0
Informed Actions Performed	Participants	Participated in Surveys	93	0	0
Viewed a video	0	Contributed to Newsfeeds	0	0	0
Viewed a photo	0	Participated in Quick Polls	0	0	0
Downloaded a document	20	Posted on Guestbooks	0	0	0
Visited the Key Dates page	10	Contributed to Stories	0	0	0
Visited an FAQ list Page	0	Asked Questions	8	0	0
Visited Instagram Page	0	Placed Pins on Maps	0	0	0
Visited Multiple Project Pages	143	Contributed to Brainstormers	4	0	0
Contributed to a tool (engaged)	94				

ENGAGEMENT TOOLS SUMMARY



Tool Type	Engagement Tool Name	Tool Status	Visitors	Contributors		
				Registered	Unverified	Anonymous
Qanda	Q&A	Published	75	8	0	0
Survey Tool	Survey - Bellingen Island Flying-fox Camp Management	Archived	187	93	0	0

INFORMATION WIDGET SUMMARY



Widget Type	Engagement Tool Name	Visitors	Views/Downloads
Document	Draft Bellingen Island Flying-fox Camp Management Plan	18	24
Document	Bellingen Island Integrated Reserves Plan of Management 2012	2	4
Key Dates	Key Date	10	10

Q&A

А



Mylestom

31 May 17

How come you list them as Threatened when EPA lists as "Listed as Vulnerable " http://www.environment.gov.au/ cgi-bin/sprat/public/publicspecies.pl?taxon_id=186 One hopes that this is not Misinformation

Publicly Answered

Flying-fox, as native fauna, are protected in NSW under the National Parks and Wildlife Act 1974. There are mor e than one species of Flying-fox in NSW. The Grey-headed Flying-fox, which is the main species that uses Bellin gen Island camp site, is listed as vulnerable under the NSW Threatened Species Conservation Act 1995 and the Environment Protection and Biodiversity Act 1999 (Commonwealth). The term 'Threatened species' refers to spe cies listed under either/both of these Acts. It is an umbrella term, which is appropriate regardless of the extinction risk category determined for the species e.g. vulnerable, endangered, critically endangered , extinct in the wild etc



Α

Mylestom

Question Who designed the survey and why were the questions loaded. Requiring Answers when people should have a choice. Numbered to ensure you rated some of your (Councils) preferred answers in the top 75%. Should have option to rate 1 or more, not the full 10

Publicly Answered

The survey was developed by Ecosure (environmental consultants) for Council to use as a tool for community inv olvement in this project. The questions were intended to gather information about our community's knowledge, e xperiences and opinions to inform the development of a draft Flying-fox Camp Management Plan for Bellingen Isl and. The project is currently in its earliest stage of development and Council has not yet been presented with an y options for consideration. This will occur when the draft Plan is submitted to Council, which will then be recommended for public exhibition before being finalized. All of the options for answering mandatory questions include either: \cdot a range of answers from one extreme of the spectrum to another or \cdot the option to select 'other' and spe cify details or leave this space blank. The two questions which include rankings do not require all of the answers t o be numbered. If you do not like any of the answers provided you can put a '1' next to 'other' and either specify details or leave this area blank.

Q&A



Mylestom

They are a health hazard and for too long the residents and the Business of the Shire have been ignored. They s hould be relocated to area away from Community.



Publicly Answered

These opinions have been noted and will be included in the information provided to Ecosure (environmental cons ultants) for compiling the draft Plan. However, please refer to the information provided in survey questions 3 & 11 in relation to these two topics.



Mylestom

The survey questions are loaded and requires answers to all questions. Secondly to number answers when some one is not comfortable with any of the answers in the survey. It is not a valid survey as the questions as usual are not designed for Community Consultation, but for a predetermined result. Bellingen Shire Council at it very best.



Publicly Answered

Please refer to the answers provided to previous questions. In response to your feedback, the survey has been e dited so the question asking for educational options to be ranked is no longer mandatory. If you would like to re-s ubmit your survey, please contact Council by phoning 6655 7300 or emailing council@bellingen.nsw.gov.au so thi s can be arranged.

Q&A

Home owner near bat island

So, are you guys suggesting removal of the flying foxes? It kinda comes across that way in the questions in the s urvey ...

Α

Publicly Answered

As explained in the project description on the 'Create' website, the goal is to find the balance between protecting Flying-foxes and supporting communities to live with urban wildlife. The Australian Government's 'Referral guideli ne for management actions in Grey-headed and Spectacled flying-fox camps' urges proponents to consider dispe rsal of flying-foxes from camps as a last resort management option only. Please also refer to the information provi ded in survey question 11 as follows: 'options that move flying-foxes away from a camp often result in flying-foxes establishing a new camp(s) close to the old site. A review of 17 flying-fox dispersal attempts in Australia found th at in 85% of cases new camp(s) were established nearby, generally less than 600 metres from the original site'. The survey was developed by Ecosure (environmental consultants engaged by Council to develop the Camp Man agement Plan) for Council to use as a tool for community involvement in this project. The questions were intende d to gather information about our community's knowledge, experiences and opinions to inform the development of a draft Flying-fox Camp Management Plan for Bellingen Island. The project is currently in its earliest stage of de velopment and Council has not yet been presented with a plan for consideration. This will occur when the draft Pl an is submitted to Council, which will then be recommended for public exhibition before being finalized.

Q&A

Nicky G

Why has the need to "manage" the flying foxes come up? Is their presence being questioned by new residents w ho are not as comfortable living closer to nature? Or by business owners whose financial priorities weigh more th an their value of the natural environment? I'm curious about why this needs to be debated at all. The bats are co mpletely fine and beautiful as they are, in my opinion. But I'd like to hear from those who take issue with them.

Α

Publicly Answered

These opinions have been noted and will be included in the information provided to Ecosure (environmental cons ultants engaged by Council) to compile the draft Plan. The NSW Office of Environment & Heritage (OEH) and Lo cal Government NSW (LGNSW) are assisting councils to manage Flying-fox camps in their areas, consistent with the Flying-fox Camp Management Policy 2015. The goal is to find the balance between protecting Flying-foxes a nd supporting communities to live with urban wildlife. Bellingen Shire Council received funding for this project thr ough the OEH and LGNSW Flying-fox grants program. The purpose of the survey and the other options available on the 'Create' website, is to gather information about our community's knowledge, experiences and opinions to i nform the development of a draft Flying-fox Camp Management Plan for Bellingen Island.

Q&A

) lockie

I'm a very concerned resident of Bellingen who lives close to bat island. It scares me that a plan other than protec ting the flying foxes and their home could be considered. Is it really a possibility that a plan other than this is on th e cards? Can't residents and businesses owners who don't like the flying foxes just leave? Surely humans have e nough of the planet, isn't it time to make sacrifices for the animals and trees?

Α

Publicly Answered

These opinions have been noted and will be included in the information provided to Ecosure (environmental cons ultants engaged by Council) to compile the draft Plan. As explained in the project description on the 'Create' web site, the goal is to find the balance between protecting Flying-foxes and supporting communities to live with urban wildlife. The project is currently in its earliest stage of development and Council has not yet been presented with a plan for consideration. This will occur when the draft Plan is submitted to Council, which will then be recommen ded for public exhibition before being finalized. The survey was developed by Ecosure and includes a wide range of management options, which have been considered for Flying-fox camps throughout NSW. The camps and ho w they are perceived by people in surrounding communities varies significantly in different places. Through this p lanning process, management options can be considered and determined to best suit the local situation.

Q&A

Panda

How does Council plan to stop them relocating to nearby gardens and orchards, just as they have done each tim e they were 'successfully' moved on from Sydney's Royal Botanic Gardens? They moved from the Botanic Garde ns to Centennial Park — a few kilometres. But given that it's a very large colony, they probably couldn't find enou gh roosts closer ... and they keep returning. It's a costly, ongoing, noisy and disruptive process. How does Counc il plan to do this quietly, without disruption to surrounding families? What is the budget?

Α

Publicly Answered

The Bellingen Island Flying-fox Camp Management Plan is currently in its earliest stage of development. Bellinge n Shire Council received \$15,000 funding for this project through the NSW Office of Environment & Heritage and Local Government NSW Flying-fox grants program. Councils throughout NSW, including Bellingen Shire's neighb ours, Coffs Harbour City Council and Nambucca Valley Council, are implementing similar projects. Bellingen Shir e Council has engaged Ecosure, environmental consultants, to develop the Camp Management Plan. The surve y was developed by Ecosure for Council to use as a tool for community involvement in this project. The survey in cludes a wide range of management options, which can be considered for Flying-fox camps throughout NSW. Alt hough the survey includes references to dispersal and moving the Flying-foxes to other areas, the Australian Gov ernment's 'Referral guideline for management actions in Grey-headed and Spectacled flying-fox camps' urges pr oponents to consider dispersal of flying-foxes from camps as a last resort management option only. Please also r efer to the information provided in survey question 11 as follows: 'options that move flying-foxes away from a cam p often result in flying-foxes establishing a new camp(s) close to the old site. A review of 17 flying-fox dispersal a ttempts in Australia found that in 85% of cases new camp(s) were established nearby, generally less than 600 m etres from the original site'. Ecosure is currently compiling the draft Camp Management Plan based on the NSW Flying-fox Camp Management Policy 2015 and survey data received up to 19 June 2017, which provides importa nt information about the local context - our community's knowledge, experiences and opinions. After the draft Pla n is submitted to Council for consideration, it will then be recommended for public exhibition before being finalized . The public exhibition period (42 days) is our community's opportunity to read the draft Plan and make submissi ons for consideration before the Plan is finalized. Dates will be confirmed when Council recommends the draft Pl an for public exhibition. This opportunity will be promoted on Council's 'Create' website, advertised in the Bellinge n Courier Sun and at other local information points e.g. Council libraries.

Q&A



jennie fenton

Are there complaints about the bats presence? If so, how many and how often and how many concerns are allay ed with education/ information? Are the Council receiving feedback about how many locals and tourists alike appr eciate the spectacle of the bats doing their dusk tour of the river before heading off to feed and do other things?

Α

Publicly Answered

The planning process for this project, which is currently in its earliest stage, will gather and compile answers to th ese questions and more. From now until the public exhibition period for the draft Plan, our community has the op portunity to have input to the development of the Bellingen Island Flying-fox Camp Management Plan. Dates for the public exhibition period (42 days) will be confirmed when Council recommends the draft Plan for public exhibitit on. Between now and then, there are three options available for input via Council's 'Create' website: 1) Online s urvey 2) Q&A 3) Ideas Ecosure, environmental consultants engaged by Council, are currently compiling the draft Camp Management Plan based on the NSW Flying-fox Camp Management Policy 2015 and survey data rec eived up to 19 June 2017, which provides important information about the local context - our community's knowle dge, experiences and opinions. The surveys received to date include a range of community perspectives includi ng complaints as well as appreciation and conservation interests. These will be presented in the draft Plan, whic h will soon be submitted to Council for consideration and recommendation for public exhibition. The public exhibit ion period (42 days) is our community's opportunity to read the draft Plan and make submissions for consideration n before the Plan is finalized. This opportunity will be promoted on Council's 'Create' website, advertised in the B ellingen Courier Sun and at other local information points e.g. Council libraries.

Q&A

Α

Margaret

I get the feeling the decision to move them has already been made? I really don't feel that I can trust this council after what happened with the shade trees in Church St.

Publicly Answered

As explained in the project description on the 'Create' website, the goal is to find the balance between protecting Flying-foxes and supporting communities to live with urban wildlife. The Australian Government's 'Referral guideli ne for management actions in Grey-headed and Spectacled flying-fox camps' urges proponents to consider dispe rsal of flying-foxes from camps as a last resort management option only. Please also refer to the information provi ded in survey question 11 as follows: 'options that move flying-foxes away from a camp often result in flying-foxes establishing a new camp(s) close to the old site. A review of 17 flying-fox dispersal attempts in Australia found th at in 85% of cases new camp(s) were established nearby, generally less than 600 metres from the original site'. The survey was developed by Ecosure (environmental consultants engaged by Council to develop the Camp Man agement Plan) for Council to use as a tool for community involvement in this project. The questions were intende d to gather information about our community's knowledge, experiences and opinions to inform the development of a draft Flying-fox Camp Management Plan for Bellingen Island. The project is currently in its earliest stage of de velopment and Council has not yet been presented with a plan for consideration. This will occur when the Plan is submitted to Council, which will then be recommended for public exhibition before being finalized. The public exhi bition period (42 days) is our community's opportunity to read the draft Plan and make submissions for considerat ion before the Plan is finalized. Dates will be confirmed when Council recommends the draft Plan for public exhibi tion. This opportunity will be promoted on Council's 'Create' website, advertised in the Bellingen Courier Sun and at other local information points e.g. Council libraries.

Q&A

Turbogrub

What is Council's current position with respect to the management of FF on Bellingen Island? It is not clear what t he outcome Council is seeking from the development of the plan in accordance with the template. The template is focussed on giving background and justification for licensing under the TSC Act and/or applying for funding from LGNSW. Plans can be developed outside the template that are just as useful and most likely more appropriate fo r the Island (have a look at LAke Macquarie CC for Blackall Park).

Α

Publicly Answered

Currently, management of the Flying-fox camp on Bellingen Island is included in the Bellingen Island Integrated R eserves Plan of Management, 2012. The action plan includes: Flying-fox monitoring (for biodiversity) Identifying i f Flying-fox electrocution (powerlines) is an issue adjacent to the Reserve and if so, undertaking actions to reduc e the risk Reducing human/Flying-fox conflicts for adjacent residence through vegetation management Identifying opportunities to undertake building modifications to reduce human/flying-fox conflicts Investigating opportunities fo r artificial Flying-fox roosting structures Developing a Flying-fox viewing platform and interpretive area Community information and education For more details, the Plan of Management is available in the 'Document Library' for thi s project on Council's 'Create' website and also on the Bellingen Shire Council website (search for Bellingen Islan d). Unfortunately, this Plan of Management was not eligible for funding under the LGNSW Flying-fox grants progr am so Council took up the opportunity to apply for funding to develop the required Plan. With the funding receive d, the most efficient way to develop the draft plan is to use the template provided by the State government for this purpose. If, following the public exhibition period, Council identifies any significant shortcomings in the template, t hese will be considered and addressed if possible within the scope of the project and resources allocated. Thank you for your suggestion – Council's River & Biodiversity Projects Officer will refer to the Blackall Park Camp Mana gement Plan by Lake Macquarie City Council for consideration before the draft Plan is finalised.

Q&A



Home owner near bat island

Has the BSC been receiving complaints about the bats presence? If so, how many and how often?



Publicly Answered

The planning process, which is currently underway will gather this information. It will be included in the draft Plan, which will be submitted to Council in July for consideration and recommendation for public exhibition. The draft P lan will be available for review and submissions for six weeks during public exhibition. Dates will be confirmed foll owing Council's recommendation and will be promoted on the 'Create' website, advertised in local papers and at other local information points e.g. Council Branch Libraries and the Providore Supermarket in North Bellingen.

ENGAGEMENT TOOL: SURVEY TOOL

Survey - Bellingen Island Flying-fox Camp Management



Do you know flying-foxes are critical to long-distance seed dispersal and pollination, and therefore the long-term persistence of our natural areas?

Optional question (responses | skipped)



Do you know that diseases from flying-foxes can be prevented by not handling animals, and appropriate horse husbandry?

(responses | skipped)



Do you know that the grey-headed flying-fox (the main species of flying-fox that uses the Bellingen Island camp site) is a threatened species due to population decline of more than 30%?

Optional question (responses | skipped)



Do you know where to find information about flying-foxes (e.g. ecology, human/animal health, management options for private properties, etc.)?

Optional question (responses | skipped)





How do you feel about flying-foxes?

(responses | skipped)

Where are you being impacted (e.g. home, work, recreational area, etc.)? (Select all that apply)

Optional question (responses / skipped)





What are your main concerns?

(responses | skipped)



Would you be interested in options for your property if funding assistance was provided in some way? e.g. subsidies for double glazing, car covers, clothes line covers, driveway cleaning, rebate for...

Optional question (responses | skipped)



If subsidies/rebates were available, which option(s) would be most helpful for you?

Optional question (responses | skipped)





Have you incurred any financial expenses directly related to flying-foxes?

(responses | skipped)

Please rank the following statements in order of importance (1 being the most important. Leave blank any that are not important to you):



Optional question (responses | skipped)

How important is it to you that potential management has a low financial cost to Council ratepayers?




How important is it to you that potential management has a low financial cost to residents living near the flying-fox camp?



(responses | skipped)

How important is it to you that management does not disrupt residents and businesses during implementation?

Optional question (responses | skipped)



How important is it to you that management does not move the flying-fox camp to other areas that may also be near residents or businesses?



(responses | skipped)

What, if any, educational options regarding flying-foxes would you like to see? Rank according to order of preference (1 being most preferred). Leave blank any options you would not like to see.

Optional question (responses | skipped)



(responses | skipped) 50 **Question options** 45 (Click items to hide) 45 Bellingen Shire resident 42 near Bellingen Island Other Bellingen Shire resident 40 Business owner near Bellingen Island Regular visitor to 35 Bellingen Island Occasional visitor to **Bellingen Island** Member of a club or 30 group? Other 25 20 14 15 13 10 9 7 7 5

Which of the following best describes you?

Appendix 2 Threatened species within 10 km of the camp (EBPC)

Australian Government



Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about <u>Environment Assessments</u> and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/06/17 14:18:23

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information Caveat Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the <u>Administrative Guidelines on Significance</u>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	64
Listed Migratory Species:	37

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A <u>permit</u> may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	48
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	8
Regional Forest Agreements:	1
Invasive Species:	38
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Atrichornis rufescens		
Rufous Scrub-bird [655]	Endangered	Species or species habitat may occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus		
Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis		
Antipodoan Albatross [61158]	Vulnerable	Spacios or spacios habitat

Antiputean Aibanoss [07700]

likely to occur within area

Species or species habitat

likely to occur within area

Diomedea antipodensis gibsoni Gibson's Albatross [82270]

Diomedea epomophora Southern Royal Albatross [89221]

Diomedea exulans Wandering Albatross [89223]

Diomedea sanfordi Northern Royal Albatross [64456] Vulnerable

Vulnerable

Vulnerable

Endangered

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica		
Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei		
Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta		
Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta_steadi		
White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area

Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
<u>Thalassarche impavida</u> Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
Turnix melanogaster		
Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Insects		
Phyllodes imperialis smithersi		
Pink Underwing Moth [86084]	Endangered	Breeding may occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland populati	on)	
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld.	NSW and the ACT)	
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat

Pseudomys oralis Hastings River Mouse, Koontoo [98]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
<u>Cryptostylis hunteriana</u> Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
<u>Euphrasia arguta</u> [4325]	Critically Endangered	Species or species habitat may occur within area
<u>Haloragis exalata subsp. velutina</u> Tall Velvet Sea-berry [16839]	Vulnerable	Species or species

Name	Status	Type of Presence
		area
Hicksbeachia pinnatifolia Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak [21189] Macadamia integrifolia	Vulnerable	Species or species habitat likely to occur within area
Macadamia Nut, Queensland Nut Tree, Smooth- shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat known to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough- shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Parsonsia dorrigoensis Milky Silkpod [64684]	Endangered	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Sarcochilus fitzgeraldii Ravine Orchid [19131]	Vulnerable	Species or species habitat likely to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
<u>Triplarina imbricata</u> [64543]	Endangered	Species or species habitat likely to occur within area
<u>Tylophora woollsii</u> [20503]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
<u>Chelonia mydas</u> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Wollumbinia georgesi Georges' Snapping Turtle, Bellinger River Snapping Turtle, Georges Helmeted Turtle [86072]	Critically Endangered	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.			
Name	Threatened	Type of Presence	
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	
Calonectris leucomelas			
Streaked Shearwater [1077]		Species or species habitat may occur within area	
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area	
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area	
Fregata ariel			
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	
Fregata minor			
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	
Macronectes halli			
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	
Thalassarche bulleri			
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	
Thalassarche cauta			
Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat	

may	occur	within	area

Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
<u>Chelonia mydas</u> Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
<u>Eretmochelys imbricata</u> Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
<u>Lamna nasus</u> Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area

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Name	Threatened	Type of Presence
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta		Species or species habitat
Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta		Species or species habitat
Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		On a single strength in the life of
Rutous Fantali [592]		Species or species habitat known to occur within area

Actitis hypoleucos Common Sandpiper [59309]

Calidris acuminata Sharp-tailed Sandpiper [874]

Calidris canutus Red Knot, Knot [855]

Calidris ferruginea Curlew Sandpiper [856]

Calidris melanotos Pectoral Sandpiper [858]

Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]

Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847] Species or species habitat known to occur within area

Species or species habitat known to occur within area

Endangered

Species or species habitat may occur within area

Critically Endangered

Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat may occur within area

Critically Endangered

Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land - Telstra Corporation Limited

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific na	me on the EPBC Act - Threat	ened Species list.
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus		
Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus		

Species or species habitat likely to occur within area

[Resource Information]

Fork-tailed Swift [678]

Ardea alba Great Egret, White Egret [59541]

Ardea ibis Cattle Egret [59542]

Calidris acuminata Sharp-tailed Sandpiper [874]

Calidris canutus Red Knot, Knot [855]

Calidris ferruginea Curlew Sandpiper [856]

<u>Calidris melanotos</u> Pectoral Sandpiper [858] Breeding known to occur within area

Breeding likely to occur within area

Species or species habitat known to occur within area

Endangered

Species or species habitat may occur within area

Critically Endangered Spe

Species or species habitat may occur within area

Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calonectris leucomelas		
Streaked Shearwater [1077]		Species or species habitat may occur within area
Cuculus saturatus		
Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora		
Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans		
Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Species or species habitat likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Fregata ariel		
Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor		
Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		

White-throated Needletail [682]

Species or species habitat

Lathamus discolor Swift Parrot [744]

Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]

Macronectes halli Northern Giant Petrel [1061]

Merops ornatus Rainbow Bee-eater [670]

Monarcha melanopsis Black-faced Monarch [609]

Monarcha trivirgatus Spectacled Monarch [610] known to occur within area

Critically Endangered Species or species habitat likely to occur within area

Endangered

Vulnerable

Species or species habitat may occur within area

Species or species habitat

may occur within area

Species or species habitat may occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
<u>Myiagra cyanoleuca</u>		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur		
Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta		
Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat

<u>Thalassarche salvini</u> Salvin's Albatross [64463]	Vulnerable	Species or species habitat likely to occur within area
<u>Thalassarche sp. nov.</u> Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
<u>Tringa nebularia</u> Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Reptiles		
<u>Caretta caretta</u> Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
<u>Chelonia mydas</u> Green Turtle [1765]	Vulnerable	Species or species habitat

Name	Threatened	Type of Presence
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Bindarri	NSW
Bongil Bongil	NSW
Dorrigo	NSW
FMAs in URUNGA	NSW
Ganay	NSW
Jaaningga	NSW
LNE Special Management Zone No1	NSW
UNE_LNE_OldGrowth	NSW
Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State

North East NSW RFA

New South Wales

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Feral deer Feral deer species in Australia [85733]

Species or species habitat likely to occur within area

Lepus capensis Brown Hare [127]

Mus musculus House Mouse [120]

Oryctolagus cuniculus Rabbit, European Rabbit [128]

Rattus norvegicus Brown Rat, Norway Rat [83]

Rattus rattus Black Rat, Ship Rat [84]

Vulpes vulpes Red Fox, Fox [18]

Plants

Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species

Name	Status	Type of Presence
Anredera, Gulf Madeiravine, Heartleaf Madeiravine,		habitat likely to occur within
Potato Vine [2643]		area
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern,		Species or species habitat
Sprengi's Fern, Bushy Asparagus, Emerald Asparagus		likely to occur within area
[62425] Asparadus plumosus		
Asparagus plumosus Climbing Asparagus forn [48002]		Spaciae or spaciae habitat
Climbing Asparagus-lem [40995]		likely to occur within area
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass,		Species or species habitat
Washington Grass, Watershield, Carolina Fanwort,		likely to occur within area
Common Cabomba [5171]		
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat
		likely to occur within area
Chrysanthemoides monilifera subsp. rotundata		
Bitou Bush [16332]		Species or species habitat
		likely to occur within area
Cytisus scoparius		
Broom, English Broom, Scotch Broom, Common		Species or species habitat
Broom, Scottish Broom, Spanish Broom [5934]		likely to occur within area
Elchnornia crassipes		Opening or opening hebitat
water Hyacinth, water Orchid, Nile Lily [13466]		Species of species nabitat
		intery to occur within area
Genista sp. X Genista monspessulana		
Broom [67538]		Species or species habitat
		may occur within area
Lantana camara		_
Lantana, Common Lantana, Kamara Lantana, Large-		Species or species habitat
leaf Lantana, Pink Flowered Lantana, Red Flowered		likely to occur within area
Lamana, Reu-Flowereu Sage, While Sage, While Sage		
Pinus radiata		
Radiata Pine Monterev Pine. Insignis Pine. Wilding		Species or species habitat
Pine [20780]		may occur within area
		-
Protasparagus densiflorus		
Asparagus Fern, Plume Asparagus [5015]		Species or species habitat

Species or species habitat likely to occur within area

Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]

Rubus fruticosus aggregate Blackberry, European Blackberry [68406]

Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]

Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]

Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-30.44743 152.896098

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales -Department of Environment and Primary Industries, Victoria -Department of Primary Industries, Parks, Water and Environment, Tasmania -Department of Environment, Water and Natural Resources, South Australia -Department of Land and Resource Management, Northern Territory -Department of Environmental and Heritage Protection, Queensland -Department of Parks and Wildlife, Western Australia -Environment and Planning Directorate, ACT -Birdlife Australia -Australian Bird and Bat Banding Scheme -Australian National Wildlife Collection -Natural history museums of Australia -Museum Victoria -Australian Museum -South Australian Museum -Queensland Museum -Online Zoological Collections of Australian Museums -Queensland Herbarium -National Herbarium of NSW -Royal Botanic Gardens and National Herbarium of Victoria -Tasmanian Herbarium -State Herbarium of South Australia -Northern Territory Herbarium -Western Australian Herbarium -Australian National Herbarium, Canberra -University of New England -Ocean Biogeographic Information System -Australian Government, Department of Defence Forestry Corporation, NSW -Geoscience Australia -CSIRO -Australian Tropical Herbarium, Cairns -eBird Australia -Australian Government – Australian Antarctic Data Centre -Museum and Art Gallery of the Northern Territory -Australian Government National Environmental Science Program

-Australian Institute of Marine Science

-Reef Life Survey Australia

-American Museum of Natural History

-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania

-Tasmanian Museum and Art Gallery, Hobart, Tasmania

-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

© Commonwealth of Australia Department of the Environment GPO Box 787 Canberra ACT 2601 Australia +61 2 6274 1111 Appendix 3 Threatened species within 1 km of the camp

Australian Government

Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 16/06/17 14:18:38

<u>Summary</u> **Details** Matters of NES Other Matters Protected by the EPBC Act **Extra Information** Caveat **Acknowledgements**



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the <u>Administrative Guidelines on Significance</u>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	29
Listed Migratory Species:	15

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A <u>permit</u> may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	34
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor		
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat

		••••		

Endangered

Species or species habitat may occur within area

Frogs		
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Insects		
Phyllodes imperialis smithersi		
Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area

Name	Status	Type of Presence
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population	<u>on)</u>	
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld. N	SW and the ACT)	
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Arthraxon hispidus	. <i>.</i>	a
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tonque-orchid [19533]	Vulnerable	Species or species habitat
		may occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area

Hielehaachia ninnatifalia

Vulnerable	Species or species habitat likely to occur within area
Vulnerable	Species or species habitat known to occur within area
Vulnerable	Species or species habitat likely to occur within area
Endangered	Species or species habitat likely to occur within area
Endangered	Species or species habitat may occur within area
Vulnerable	Species or species habitat likely to occur within area
Vulnerable	Species or species habitat likely to occur within area
	Vulnerable Vulnerable Endangered Vulnerable Vulnerable

	Otativa	
Name	Status	Type of Presence
Reptiles		
Wollumbinia georgesi Georges' Snapping Turtle, Bellinger River Snapping Turtle, Georges Helmeted Turtle [86072]	Critically Endangered	Species or species habitat known to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the	he EPBC Act - Threatened	Species list
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myjagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area

Migratory Wetlands Species Actitis hypoleucos

Common Sandpiper [59309]

Calidris acuminata Sharp-tailed Sandpiper [874]

Calidris ferruginea Curlew Sandpiper [856]

<u>Calidris melanotos</u> Pectoral Sandpiper [858]

Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]

Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]

Pandion haliaetus Osprey [952] Species or species habitat may occur within area

Species or species habitat may occur within area

Critically Endangered Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat may occur within area

Critically Endangered

Species or species habitat may occur within area

Breeding known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land		[Resource Information]
The Commonwealth area listed below may indicate the unreliability of the data source, all proposals s Commonwealth area, before making a definitive of department for further information.	te the presence of Commonwe hould be checked as to whethe lecision. Contact the State or T	alth land in this vicinity. Due to er it impacts on a erritory government land
Name		
Commonwealth Land - Telstra Corporation Limite	d	
Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name	e on the EPBC Act - Threatene	d Species list.
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
<u>Cuculus saturatus</u>		
Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat

may occur within area

Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]

Haliaeetus leucogaster White-bellied Sea-Eagle [943]

Hirundapus caudacutus White-throated Needletail [682]

Lathamus discolor Swift Parrot [744]

Merops ornatus Rainbow Bee-eater [670]

Monarcha melanopsis Black-faced Monarch [609] Species or species habitat may occur within area

Species or species habitat known to occur within area

Species or species habitat known to occur within area

Critically Endangered Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included.	
Name	State
North East NSW RFA	New South Wales
Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species

Name	Status	Type of Presence
Name	οιαίο	habitat likely to occur within area
Pycnonotus jocosus		
Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula		
Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina		
Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat

Lepus capensis Brown Hare [127]

Mus musculus

Species or species habitat likely to occur within area

likely to occur within area

Species or species habitat

likely to occur within area

House Mouse [120]

Oryctolagus cuniculus Rabbit, European Rabbit [128]

Rattus norvegicus Brown Rat, Norway Rat [83]

Rattus rattus Black Rat, Ship Rat [84]

Vulpes vulpes Red Fox, Fox [18]

Plants

Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643] Asparagus plumosus Climbing Asparagus-fern [48993] Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Name	Status	Type of Presence
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] Chrysanthemoides monilifera		Species or species habitat likely to occur within area
Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large- leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] Pinus radiata		Species or species habitat likely to occur within area
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]	reichardtii	Species or species habitat likely to occur within area

Salvinia molesta

Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]

Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-30.44743 152.896098

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales -Department of Environment and Primary Industries, Victoria -Department of Primary Industries, Parks, Water and Environment, Tasmania -Department of Environment, Water and Natural Resources, South Australia -Department of Land and Resource Management, Northern Territory -Department of Environmental and Heritage Protection, Queensland -Department of Parks and Wildlife, Western Australia -Environment and Planning Directorate, ACT -Birdlife Australia -Australian Bird and Bat Banding Scheme -Australian National Wildlife Collection -Natural history museums of Australia -Museum Victoria -Australian Museum -South Australian Museum -Queensland Museum -Online Zoological Collections of Australian Museums -Queensland Herbarium -National Herbarium of NSW -Royal Botanic Gardens and National Herbarium of Victoria -Tasmanian Herbarium -State Herbarium of South Australia -Northern Territory Herbarium -Western Australian Herbarium -Australian National Herbarium, Canberra -University of New England -Ocean Biogeographic Information System -Australian Government, Department of Defence Forestry Corporation, NSW -Geoscience Australia -CSIRO -Australian Tropical Herbarium, Cairns -eBird Australia -Australian Government – Australian Antarctic Data Centre -Museum and Art Gallery of the Northern Territory -Australian Government National Environmental Science Program

-Australian Institute of Marine Science

-Reef Life Survey Australia

-American Museum of Natural History

-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania

-Tasmanian Museum and Art Gallery, Hobart, Tasmania

-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix 4 Additional human and animal health information

Australian bat lyssavirus

ABLV is a rabies-like virus that may be found in all flying-fox species on mainland Australia. It has also been found in an insectivorous microbat and it is assumed it may be carried by any bat species. The probability of human infection with ABLV is very low with less than 1% of the flying-fox population being affected (DPI 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).

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

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

The incubation period in humans is assumed similar to rabies and variable between two weeks and several years. Similarly the disease in humans presents essentially the same clinical picture as classical rabies. Once clinical signs have developed the infection is invariably fatal. However, infection can easily be prevented by avoiding direct contact with bats (i.e. handling). Pre-exposure vaccination provides reliable protection from the disease for people who are likely to have direct contact with bats, and it is generally a mandatory workplace health and safety requirement that all persons working with bats receive pre-vaccination and have their level of protection regularly assessed. Like classical rabies, ABLV infection in humans also appears to be effectively treated using post-exposure vaccination and so any person who suspects they have been exposed should seek immediate medical treatment. Post-exposure vaccination is usually ineffective once clinical manifestations of the disease have commenced.

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 flyingfoxes 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. Horses are thought to contract the disease after ingesting forage or water contaminated primarily with flying-fox urine (CDC 2014).

Humans may contract the disease after close contact with an infected horse. HeV infection in humans presents as a serious and often fatal respiratory and/or neurological disease and there is currently no effective post-exposure treatment or vaccine available for people. The mortality rate in horses is greater than 70% (DPI 2014). Since 1994, 81 horses have died and four of the seven people infected with HeV have lost their lives (DPI 2014).

Previous studies have shown that HeV spillover events have been associated with foraging flying-foxes rather than camp locations. Therefore risk is considered similar at any location within the range of flying-fox species and all horse owners should be vigilant. Vaccination of horses can protect horses and subsequently humans from infection (DPI 2014), as can appropriate horse husbandry (e.g. covering food and water troughs, fencing flying-fox foraging trees in paddocks, etc.).

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

Menangle virus

Menangle virus (also known as bat paramyxovirus no. 2) was first isolated from stillborn piglets from a NSW piggery in 1997. Little is known about the epidemiology of this virus, except that it has been recorded in flying-foxes, pigs and humans (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

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

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

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

Appendix 5 Expert assessment requirements

The Plan template identifies where expert input is required. The following are the minimum required skills and experience which must be demonstrated by each expert.

Flying-fox expert

Essential

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

Desirable

- It is strongly recommended that the expert is independent of the Plan owner to ensure transparency and objectivity. OEH may be able to provide assistance with flying-fox experts.
- ABLV-vaccinated (N.B. This is often an essential requirement during management implementation as detailed within the template).
- Trained in flying-fox rescue (Appendix 8) (N.B. This is often an essential requirement during management implementation as detailed within the template).
- Local knowledge and experience.

Ecologist

Essential

- At least five years demonstrated experience in ecological surveys, including identifying fauna and flora to species level, fauna habitat and ecological communities.
- The ability to identify flora and fauna, including ground-truthing of vegetation mapping.
- Formal training in ecology or similar, specifically flora and fauna identification.

Desirable

- Tertiary qualification in ecology or similar.
- Local knowledge and experience.
- Accredited Biobanking Assessor
- Practising member of the Ecological Consultants Association of NSW.

Depending on the site, for example when vegetation management is proposed for an endangered ecological community or an area with a high likelihood of containing other threatened flora and fauna species, a specialist in that field (e.g. specialist botanist) may be required.

Appendix 6 Dispersal results summary

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

- 1. In all cases, dispersed animals did not abandon the local area⁶.
- 2. In 16 of the 17 cases, dispersals did not reduce the number of flying-foxes in the local area.
- Dispersed animals did not move far (in approx. 63% of cases the animals only moved <600 m from the original site, contingent on the distribution of available vegetation). In 85% of cases, new camps were established nearby.
- 4. In all cases, it was not possible to predict where replacement camps would form.
- 5. Conflict was often not resolved. In 71% of cases conflict was still being reported either at the original site or within the local area years after the initial dispersal actions.
- 6. Repeat dispersal actions were generally required (all cases except where extensive vegetation removal occurred).
- 7. The financial costs of all dispersal attempts were high, ranging from tens of thousands of dollars for vegetation removal to hundreds of thousands for active dispersals (e.g. using noise, smoke, etc.).

Ecosure, in collaboration with a Griffith University Industry Affiliates Program student, researched outcomes of management in Queensland between November 2013 and November 2014 (the first year since the current Queensland state flying-fox management framework was adopted on 29 November 2013). An overview of findings⁷ is summarised below.

- There were attempts to disperse 25 separate roosts in Queensland (compared with nine roosts between 1990 and June 2013 analysed in Roberts and Eby (2013)).
 Compared with the historical average (less than 0.4 roosts/year) the number of roosts dispersed in the year since the Code was introduced has increased by 6250%.
- Dispersal methods included fog⁸, birdfrite, lights, noise, physical deterrents, smoke, extensive vegetation modification, water (including cannons), paintball guns and helicopters.
- The most common dispersal methods were extensive vegetation modification alone and extensive vegetation modification combined with other methods.

⁶ Local area is defined as the area within a 20 km radius of the original site = typical feeding area of a flying-fox.

⁷ This was based on responses to questionnaires sent to councils; some did not respond and some omitted responses to some questions.

⁸ Fog refers to artificial smoke or vapours generated by smoke/fog machines. Many chemical substances used to generate smoke/fog in these machines are considered toxic.

- In nine of the 24 roosts dispersed, dispersal actions did not reduce the number of flying-foxes in the LGA.
- In all cases it was not possible to predict where new roosts would form.
- When flying-foxes were dispersed, they did not move further than 6 km away.
- As at November 2014 repeat actions had already been required in 18 cases.
- Conflict for the council and community was resolved in 60% of cases, but with many councils stating that they feel this resolution is only temporary.
- The financial costs of all dispersal attempts, regardless of methods used were considerable, ranging from \$7500 to more than \$400,000 (with costs ongoing).

Appendix 7 Summary of other key legislation likely to apply at some camps

Local government legislation

Local government is required to prepare planning schemes (including Environmental Planning Instruments and Development Control Plans) consistent with provisions under the *Environmental Planning and Assessment Act 1979* (EP&A Act; see Section 4.1.5 of the template).

Local Environment Plans are environmental planning instruments that are legal documents and that relate to a local government area. Other environmental planning instruments, such as State Environmental Planning Policies (SEPPs), may relate to the whole or part of the state. A development control plan provides detailed planning and design guidelines to support the planning controls in a Local Environment Plan, but do not have the same legal weight as an LEP or SEPP.

Planning schemes enable a local government authority to manage growth and change in their local government area (LGA) through land use and administrative definitions, zones, overlays, infrastructure planning provisions, assessment codes and other administrative provisions. A planning scheme identifies the kind of development requiring approval, development that is prohibited and development that can occur without any form of approval. They also zone all areas within the LGA based on the environmental values and development requirements of that land. Planning schemes could potentially include a flying-fox habitat overlay, nominate a highly restrictive land use zoning (such as E2 – Environmental Conservation) and may designate some habitat as flying-fox conservation areas.

State legislation

Rural Fires Act 1997

The objects of this Act are to prevent, mitigate and suppress bushfires and coordinate bush firefighting, while protecting persons from injury or death, and reduce property damage from fire. A permit is generally required from the Rural Fire Service for any fires in the open that are lit during the local Bush Fire Danger Period as determined each year. This may be relevant for fires used to disperse flying-foxes, or for any burning associated with vegetation management.

Protection of the Environment Operations Act 1997

The main object of the *Protection of the Environment Operations Act 1997* (POEO Act) is to set out explicit protection of the environment polices (PEPs) and adopt more innovative approaches to reducing pollution.

The use of smoke as a dispersal mechanism may constitute 'chemical production' under

Schedule 1, clause 8 of the POEO Act, so this type of dispersal activity may require a licence under Chapter 3 of the Act.

The POEO Act also regulates noise including 'offensive noise'. The Protection of the Environment Operations (Noise Control) Regulation 2008 (Part 4, Division 2) provides information on the types of noise that can be 'offensive' and for which the Environment Protection Authority (EPA) can issue fines. This may include noise generated as a part of dispersal activities. It is best to discuss the types of noise makers and the sound levels and times these will be generated, along with identified noise receptors, with Council prior to any dispersal. Detailed advice and guidance on noise regulation can be found in the EPA's *Noise guide for local government* (EPA 2013).

Crown Lands Act 1989

The principles of Crown land management include the observance of environmental protection principles and the conservation of its natural resources, including water, soil, flora, fauna and scenic quality. Any works on land that is held or reserved under the Crown Lands Act 1989 (including vegetation management and dispersal activities) are an offence under the Act without prior authorisation obtained through the Department of Primary Industries (Lands).

Plans of Management may be required for Crown land that contains Flying Fox camps, and this can provide a good opportunity for the adoption of management measures to address potential conflicts.

Local Government Act 1993

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

The LG Act also embeds the requirement for local government to develop Community Strategic Plans, from which Resourcing Plans, Delivery Plans & Operational Plans are developed. Recognising the importance of Flying Fox Camp management at a Community Strategic Plan level can provide the resourcing necessary to implement strategic actions that require funding.

State Environmental Planning Policies

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

SEPP 14 – Coastal Wetlands

This policy provides additional protection for coastal wetlands by requiring development consent to be obtained before any clearing, draining, filling or construction of levees can occur on a mapped wetland. Camps are unlikely to fall within the bounds of a SEPP 14 wetland, but significant additional restrictions for vegetation management in these areas would apply if they do.

SEPP 26 – Littoral Rainforests

SEPP 26 aims to protect coastal rainforests (littoral rainforests) by requiring development consent for activities within or adjacent to mapped coastal rainforest. It is unlikely that vegetation works e.g. tree trimming for flying-fox management would be considered significant enough to trigger this SEPP but this should be confirmed if the site is within a mapped SEPP 26 area. Any removal of native flora in a SEPP 26 area is classified as designated development, requiring the preparation of an Environmental Impact Statement. This is the most onerous pathway for obtaining development consent within the planning system.

The Coastal Management SEPP, when endorsed, will consolidate and improve current coastal-related SEPPs. It will replace SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection).

SEPP (Exempt & Complying Development Codes) 2008

This SEPP allows for certain small scale developments to occur without any form of approval. Whether or not the exemption is allowed depends upon the degree to which the land, or the adjoining land, has been identified as having a degree of environmental sensitivity and subsequently excluded. Where the land is not excluded, development can proceed without any form of development approval.

SEPP (Infrastructure) 2007

This SEPP allows for many activities undertaken by government agencies to take place as either exempt development, or as development permissible without consent (requiring a Part 5 determination before proceeding). Whether or not the exemption is allowed depends upon the degree to which the land, or the adjoining land, has been identified as having a degree of environmental sensitivity and subsequently excluded.

Appendix 8 Example flying-fox rescue protocol

Reference documents:

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

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

Purpose

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

This work instruction provides rescuers with information regarding capture and first aid until a flying-fox is in the specialist care of a veterinarian or person qualified in wildlife rehabilitation.

Requirements

FSC and wildlife rescue personnel involved in flying-fox rescue must:

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

Human first aid

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

Equipment

- lidded plastic carry basket or 'pet-pack' with bedding (juveniles) / transport container with hanging perch, tall enough for bat to hang without hitting its head (in accordance with Section 5.1 of the NSW Code of Practice for Injured, Sick and Orphaned Flyingfoxes (OEH 2012))
- warm water bottle / cold brick
- wraps /towels
- teats for small bottle
- extension pole or broom
- bat first aid kit juice drink/glucose powder, syringes, cloths for wounds, Betadine/saline, dummy for baby bats. FFs only to be offered liquids under advice from a licensed wildlife carer.

Work instructions

Case assessment

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



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

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

Rescue instructions

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

- i. The objective is to rescue a flying-fox while minimising further stress and injury to the animal.
- ii. Before a rescue attempt, rescuers must assess the risks to the flying-fox from environmental hazards and from capture.

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

Example scenarios

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

Animal first aid

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

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

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

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

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

Transport to veterinarian / wildlife carer

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

Objective

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

Standards

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

Guidelines

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



Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	30/06/2017	Bellingen Island Camp Management Plan - draft	Emily Hatfield Ecologist Mandy Todd Ecologist	Jess Bracks Principal Wildlife Biologist	Beth Kramer SEQ/NSW Manager
01	12/07/2017	Bellingen Island Camp Management Plan – draft R1	Emily Hatfield Ecologist Trudy Thompson Senior Environmental Scientist	Jess Bracks Principal Wildlife	e Biologist
02	13/07/2017	Bellingen Island Camp Management Plan – draft R2	Trudy Thompson Senior Environmental Scientist	Jess Bracks Principal Wildlife Biologist	
03	21/09/2017	Bellingen Island Camp Management Plan – final	Emily Hatfield Ecologist	Trudy Thompson Senior Environmental Scientist	

Revision History

Distribution List

Copy #	Date	Туре	Issued to	Name	
1	13/07/2017	Electronic	Bellingen Shire Council	Jane Eales	
				Carmen Muldoon	
2	13/07/2017	Electronic	Ecosure	Administration	
3	21/09/2017	Electronic	Bellingen Shire Council	Jane Eales	
				Carmen Muldoon	
4	21/09/2017	Electronic	Ecosure	Administration	

Citation: Ecosure (2017), Bellingen Island Camp Management Plan - final, Report to Bellingen Shire Council, Publication Location – Burleigh Heads

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PR2496-RE.Bellingen Island Camp Management Plan.FI

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