Batemans Bay Flying-fox Camp

Draft Dispersal Plan

Prepared for
Eurobodalla Shire Council

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Abbreviations

Abbreviation	Description
DoE	Commonwealth Department of the Environment
ELA	Eco Logical Australia
EPBC	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GHFF	Grey-headed Flying-fox
LGA	Local Government Area
NPW	NSW *National Parks and Wildlife Act 1974*
OEH	NSW Office of Environment and Heritage
POCTA	NSW *Prevention of Cruelty to Animals Act 1979*
SIS	Species Impact Statement
TSC	NSW *Threatened Species Conservation Act 1995*
WIRES	Wildlife Information, Rescue and Education Service

Executive summary

This Draft Dispersal Plan for the Batemans Bay Flying-fox camp has been prepared in response to the significant increase in adverse impacts to the community associated with roosting and foraging flying-foxes over the last two months. These impacts include noise, odour and faecal drop from roosting and foraging flying-foxes. The substantial influx of flying-foxes to Batemans Bay is linked to a heavy flowering of native trees in the region that are a seasonal source of nectar (food). Recent weekly monitoring indicates that the camp size at Batemans Bay has peaked and is starting to decline in line with the flowering season.

Dispersal is being considered with the long-term aim to reduce conflict between people and flying-foxes at Batemans Bay. However, the dispersal process is likely to result in an increase in adverse impacts and risks for people and flying-foxes in the short-term. Natural dispersal is currently underway with the decrease of flying-fox numbers being evidenced, and this will continue to occur with reduction of food sources and cooler temperatures.

It is important that the community is well informed of the potential risks and factors affecting the likelihood of success when considering if dispersal should proceed. Dispersal is a high risk and expensive strategy, especially for the large and geographically challenging camps that currently exist at Batemans Bay. The logistical challenge of recruiting the large number of vaccinated and non-vaccinated personnel required for a dispersal action and generally preparing to implement the plan make it highly unlikely that a successful attempt of dispersal could be achieved at this time.

It is expected that the risks and costs would be substantially lower if dispersal is attempted at a time when the camp is much smaller in size and outside of sensitive periods in the flying-fox life-cycle. Early February would be a more suitable time to commence a trial dispersal as the camp size is typically much smaller at this time and juvenile flying-foxes are likely to be independent.

1 Introduction

This Draft Dispersal Plan has been prepared on behalf of Eurobodalla Shire Council. The plan relates to the flying-fox camp at Batemans Bay on the south coast of NSW. The current camp location and extent is depicted in **Figure 1**.

1.1 Purpose of this plan

This plan is intended to raise awareness of the reasons why urgent dispersal of flying-foxes is being considered at Batemans Bay, what the 'best practice' approach to this dispersal would involve based on factors leading to 'successful' dispersal of other camps, and what the likely risks and costs would be. It sets out the proposed dispersal methods, including timing and success criteria. This plan also identifies some alternative approaches and these are summarised in the final chapter.

Council and others will consider this plan in making decisions about action to be taken to address community concerns.

1.2 Previous plans and actions

The Water Gardens Camp Management Plan (ELA 2015) was endorsed by Council following extensive community consultation. The community expressed a range of views which were discussed in the plan. The 2015 Camp Management Plan recommended targeted, relatively low cost and low risk actions that aimed to mitigate impacts to people most affected by the Water Gardens camp. These actions included establishment of cleared buffers between the camp and adjacent properties, and access to subsidised services for eligible residents and businesses (e.g. car and washing line covers).

The Level 1 and Level 2 actions proposed in the Camp Management Plan were supported by OEH. Federal Government approval was not needed for these actions to be implemented.

On 15 January 2016, Council invited eligible members of the community (i.e. those living within 250 m of the camp) to submit an expression of interest for subsidised services such as those identified in the Camp Management Plan. A copy of the letter that invited expressions of interest is presented in **Appendix A**. This invitation was supported by a media release[1]. Council subsequently expanded the offer of subsidised services to areas within Catalina on 26 April 2016.

To date (3 May 2016) Council has received 101 expressions of interest. These comprised:

- 82 eligible requests for assistance
- 65 related to the Water Gardens
- 17 related to Catalina.

[1] http://www.esc.nsw.gov.au/home/news-and-events/media-releases/media-releases/practical-help-for-residents-affected-by-bay-flying-foxes

Figure 1: Batemans Bay camp approximate extent in April 2016 (surveyed by OEH and ELA)

Table 1 indicates the types, numbers and costs for actions that have been delivered or proposed in accordance with the Water Gardens Camp Management Plan.

Table 1: Level 1 and Level 2 actions

Actions	Delivery	Approx. cost
Level 1 actions		
Subsidised services	28 washing line covers 23 gurney hires 23 car covers 1 caravan / trailer cover 3 deodorisers	$10,000 to date
Remove Cocos palm trees in surrounding areas	12 trees	$2000 to date
Level 2 actions		
Create a buffer between the camp and adjacent homes and businesses	Vegetation between the Water Gardens camp and adjacent homes was cleared in August 2015	$10,000 to date
Maintain the buffer	Slashing or mowing ground cover to minimise weed infestation and prevent growth of saplings in the buffer – quarterly Prune overhanging branches – in July every second year when flying-fox numbers in the camp are low and prior to the breeding season	$5000 pa

1.3 Need for further action

In recent months the south coast of NSW has experienced heavy flowering of native trees that are an important seasonal food source (nectar) for the *Pteropus poliocephalus* (Grey-headed Flying-fox (GHFF)). These tree species include *Corymbia maculata* (Spotted Gum), *C. gummifera* (Red Bloodwood) and *Eucalyptus pilularis* (Blackbutt). As the amount of nectar became more available, GHFF camps further north (e.g. Sydney) were evacuated or substantially reduced as the GHFF migrated south in search of food.

Flowering of Bloodwoods was linked to the changing size of the Pambula flying-fox camp (see **Figure 2** for camp locations on the south coast). The Pambula camp usually has about 2500 to 4000 flying-foxes, but during the peak Bloodwood flowering this year the camp reached about 20,000 flying-foxes. The abandonment of the Pambula camp when the Bloodwood flowering largely ended in that area coincided with the influx of flying-foxes and more available food at and around Batemans Bay.

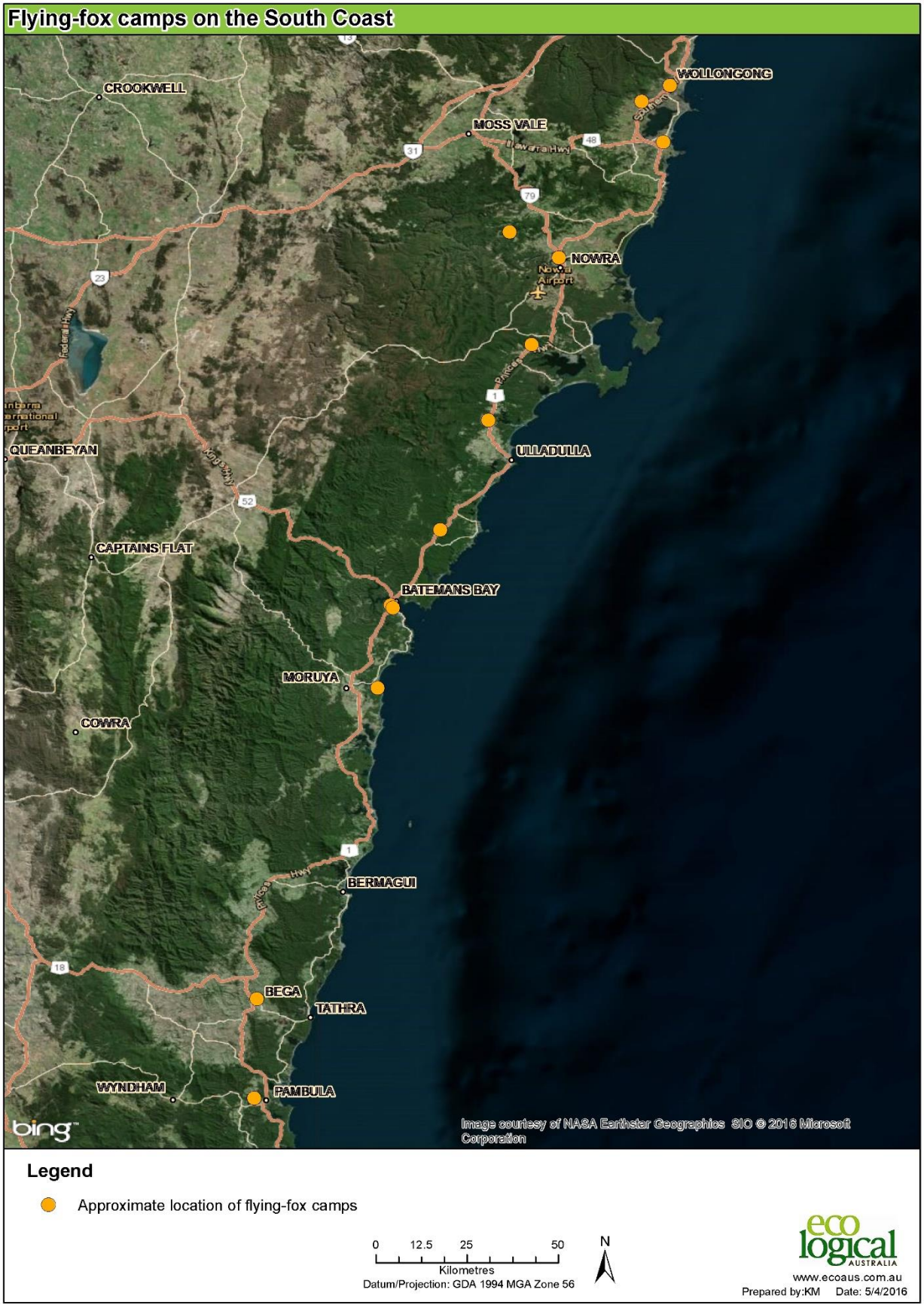

Figure 2: Existing camps on the NSW south coast

The current Batemans Bay camp size encompasses the Water Gardens and habitat around Catalina (**Figure 1**), and is estimated to comprise substantially more than 100,000 GHFF (detailed counts would be needed to confirm the population size and species mix more accurately). Recent frequent monitoring of the camp extent by OEH suggests that the GHFF population camped at Batemans Bay has peaked and is starting to decline in line with the flowering season. Maps showing the current extent of the camp compared to the much smaller extent in May and November 2015, and February 2016 are provided in **Appendix B**.

The influx of GHFF to the Batemans Bay camp has resulted in adverse impacts for many people in the community. The main adverse impacts and risks associated with flying-foxes at this camp include:

- day-time noise associated with roosting GHFF within the camp, noting that the noise levels significantly increase if the animals are disturbed e.g. by nearby mowing (an example of roosting habitat in the Water Gardens is provided in **Figure 3**)
- night-time noise associated with foraging GHFF (**Figure 4** shows the likely minimum area where GHFF camped at Batemans Bay would forage i.e. approximately 20 km from the camp, although flying-foxes have been recorded travelling up to 40 km for a camp to forage at night (Eby and Law 2008))
- risk of disease (e.g. Australian Bat Lyssavirus, Hendra virus) for people, pets and livestock, noting that this risk is extremely small; to minimise the risk disease that could be associated with being bitten or scratched, untrained people should not handle sick, injured or dead bats[2]
- noise and faecal drop during the fly-in (dawn) and fly-out (dusk) periods; faecal drop can be unsightly and stain (e.g. painted surfaces)
- odour from the camp caused by the scent of the male flying-foxes used to mark territory
- power failure if flying-foxes are electrocuted in wires - Essential Energy has advised that customers in the areas between Batemans Bay and Narooma including Tomakin, Rosedale, Malua Bay and Surf Beach have experienced a number of power supply interruptions during April caused by flying foxes contacting the local electricity network. Essential Energy has implemented a number of operational changes in an attempt to mitigate the frequency of power outages caused by the flying fox activity near the network. This includes:
    - re-configuring a section of the local electricity network that has been susceptible to outages to supply power from an alternative direction to try to minimise the number of customers affected
    - crews patrolling the affected powerlines several times a day as well as carrying out night time patrols to identify any network issues caused by the flying fox activity and complete repairs as necessary
    - altering Essential Energy's local on-call roster arrangements to increase the geographic area covered by its local fault and emergency teams to improve response times to power outages caused by the flying foxes
    - Essential Energy will continue to monitor the situation, respond to any unplanned power outages and implement measures to mitigate the frequency of outages where possible.

[2] The Primefact Bats and Health Risks http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/367255/bats-and-health-risks.pdf is a good summary of the issues, including what to do if a pet is bitten or scratched by a bat, and how to reduce the risk of exposure in horses

- Telstra and Optus have recently improved back up supply in response to lack of telephone services during power failure.

There has been a substantial increase in the number of complaints and requests by the community to Council since 1 March 2016. These include:

- over 150 calls, of which about 30% relate to requests for services by eligible residents and 70% were complaints about odour, faecal drop, health, loss of power etc
- 80 letters, many of which are general complaints from residents who are not eligible for services and have not yet been targeted by education campaigns
- comments on social media platforms, community meeting conducted on the 27 April 2016 and complaints to Councillors.

Comments made to ELA by visitors to the Water Gardens suggest that the large numbers of flying-foxes at Batemans Bay have also become an eco-tourism attraction for some people.

1.4 Council resolution

In response to substantial community concern, on 26 April 2016 Council resolved to prepare a draft dispersal plan for consideration.

Figure 3: Roosting habitat is where flying-foxes camp during the day to rest and socialise

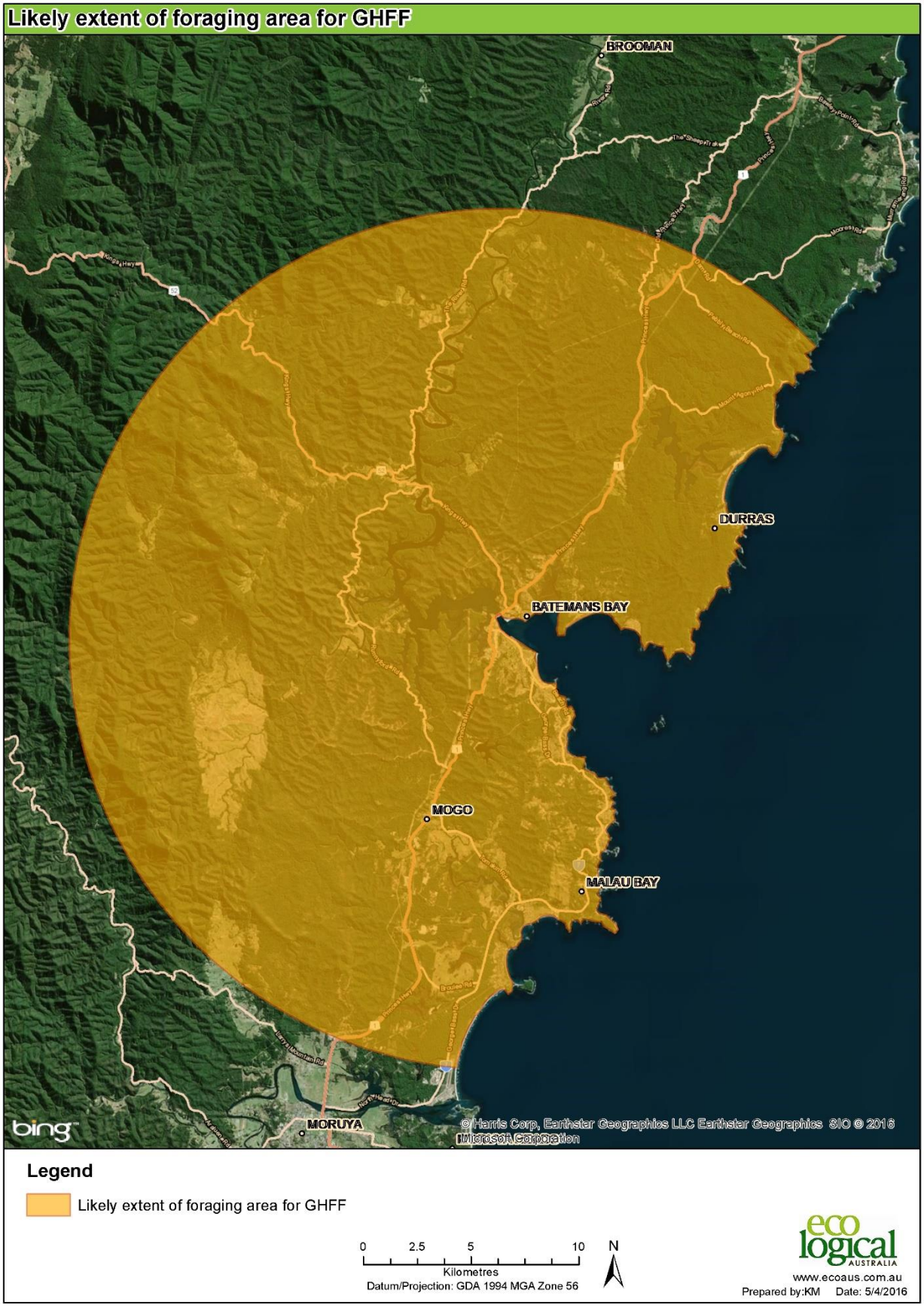

Figure 4: Foraging habitat for flying-foxes camped at Batemans Bay (~20 km from camp)

2 Licences and approvals

This chapter outlines the approvals required before any dispersal action can be taken. To expedite this process, Eurobodalla Shire Council has commenced consultation with NSW Office of Environment and Heritage (OEH) and the Commonwealth Department of Environment (DoE) regarding the potential dispersal action of the Batemans Bay camp.

2.1 GHFF status and ecological values

The GHFF is currently protected under the NSW *National Parks and Wildlife Act 1974*, and listed as vulnerable to extinction under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The GHFF is also listed as vulnerable on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species.

Its threatened status reflects the significant and ongoing decline of the national population size and threats to its habitat.

Flying-foxes are an important 'keystone species' with a vital role in maintaining the health of forests through pollination and seed dispersal. As such, they support essential ecosystem services and forestry-related industries. Widespread vegetation clearance across Australia has led to a dramatic decline in available roosting and foraging habitat and the overall population of GHFF.

The high mobility of flying-foxes means that all camps are considered to be part of the same dynamic national population. A large number of flying-foxes at one camp at one time, for example, needs to be taken in the context that another camp at the same time may have no or few flying-foxes. As seasons and food sources change, the populations at different camps will change. This is demonstrated by maps showing the fluctuating extent of the camp at the Water Gardens over the past year (refer to **Appendix B**).

A report by the CSIRO (Westacott et al 2015) states that the national GHFF population comprises approximately 680,000 (±164,500) individuals. Flying-fox camps in the Sydney region have been monitored over a number of years as part of the conditions of approval related to the dispersal of camps from the Royal Botanic Gardens Sydney and Kareela, as well as other monitoring. Results of monitoring in 2016 indicate that many of the Sydney camps have been entirely or partly evacuated as the flying-foxes have travelled to the south coast to take the opportunity of the heavy flowering.

Longer term trends related to climate change are expected to influence flying-fox foraging and migration patterns. In particular, there is expected to be an increasing number of days where camps will experience 'heat stress' (i.e. air temperature >38°C). Similarly droughts, cyclones and bushfire can substantially reduce available habitat and therefore result in mass fatalities and harm to flying-foxes.

2.2 Commonwealth legislation

The EPBC Act aims to protect the environment, in particular Matters of National Environmental Significance (MNES). The GHFF is listed as a threatened species under the EPBC Act and is therefore a MNES. Under the Act, any action which 'has, will have, or is likely to have a significant impact' on a MNES is defined as a 'controlled action'. An action includes a project, development, undertaking, activity or series of activities that may affect a MNES. Actions that may have a significant impact on one or more MNES need referral to the Department of the Environment.

Under the *Draft EPBC Act Policy Statement - Camp Management Guidelines for the Grey-headed and Spectacled flying fox* (DoE 2014), the Batemans Bay camp is recognised as being 'nationally important' because it contained more than 10,000 GHFF in more than one year in the last ten years. The Policy Statement indicates that Federal Government approvals under the EPBC Act may be needed if more than 'routine maintenance' (i.e. Level 1 action) is proposed.

Any action that is likely to have a significant impact on GHFF must not commence until the Minister gives approval. In making a decision the Minister will consider if the proposed action will be conducted in accordance with 'best practice mitigation standards' (listed in **Section 3.3**).

The *Referral Guideline for Management Actions in Grey-headed and Spectacled Flying-fox Camps* (DoE 2015) states that an EPBC Act referral will be required if dispersal is proposed to take place during a time of significant population stress. Events that may place significant stress on the national population include heat stress events, cyclone or bushfire (resulting in either significant mortality or severe food shortages) in the year prior to the proposed date of dispersal.

The referral guidelines identify criteria that will be considered by the DoE in relation to potential approval. Preliminary responses to these criteria are set out in **Table 2** (next page). Further detail with respect to the need for dispersal, proposed dispersal methods, and likely impacts, would need to be provided if Council decides to proceed with the dispersal action.

2.3 NSW legislation

2.3.1 Threatened Species Conservation (TSC) Act

A section 91 licence application will be required under the TSC Act because the dispersal may result in harm to the GHFF and damage to its habitat. In considering the s91 licence application, OEH could:

- determine that the proposed action is not likely to significantly affect threatened species, populations or ecological communities, and could issue a certificate to this effect under section 95 of the TSC Act, with or without conditions that need to be met
- grant a licence under section 91 of the TSC Act, if the proposed action is likely to have a significant effect on threatened species populations or ecological communities, in which case a species impact statement will be requested when making a licence application determination
- refuse the application.

2.3.2 Prevention of Cruelty to Animals (POCTA) Act

The NSW *Prevention of Cruelty to Animals Act 1979* (POCTA Act) is the core legislation in protecting the general welfare of animals. The objectives of the Act are to:

- prevent cruelty to animals
- promote the welfare of animals by requiring a person in charge of an animal to:
  - provide care for the animal
  - treat the animal in a humane manner
  - ensure the welfare of the animal.

Section 91 licence conditions will take into account the welfare of flying-foxes so there is no approval requirement under the POCTA Act.

The Department of Primary Industries (DPI) is responsible for administering the Act, but officers from the DPI do not have enforcement powers. Therefore, complaints associated with acts of animal cruelty are directed to the Royal Society for the Prevention of Cruelty to Animals (RSPCA) or the NSW police.

Table 2: EPBC Act referral criteria and initial responses

Criteria	Initial response
Objectives of avoiding a long-term decline in the national population of the species or disruption to its breeding cycle	The proposed dispersal methods set out in this plan aim to comply with best practice. Designated staff would have authority to stop work if the dispersal activities are causing unacceptable levels of stress, injury or fatality to the flying-foxes
A strategy to achieve the objectives	The approach is outlined in this plan and would be further refined in consultation with relevant agencies
An assessment of potential relocation sites, other nationally important flying-fox camps, and flying-fox activity in the region	Information presented in this plan regarding potential relocation sites in the region would be investigated in further detail as part of the first stage of a dispersal activity
A dispersal methodology, including measures to minimise stress on flying-foxes in the camp and nearby camps, stop work triggers, responsibilities of participants	Included in this plan
A contingency plan in the event that animals relocate to an unacceptable location	Council understands that it would be responsible for managing flying-foxes that relocate from the current camp to an unsuitable location during the dispersal This plan sets out the framework for monitoring and management responses. Further consideration would be required depending on where the animals relocate to
Awareness and assessment of potential impacts on other MNES resulting from any sequential dispersals	Council understands that an additional EPBC Act referral could be required if a re-dispersal is likely to impact other MNES
Post-dispersal monitoring program	Included in this plan
Public communication program	Council has been communicating with the public on matters relevant to the Batemans Bay camp for a number of years A comprehensive communication program would be developed and implemented to support further action

3 Proposed dispersal methods and costs

The proposed dispersal methods have been developed based on best practice policies and guidelines. The proposed methods also reflect practical experience of 'successful' camp dispersals.

3.1 Resources and responsibilities

Eurobodalla Shire Council will be responsible for all matters associated with the dispersal, including the long term commitment to monitoring and management. Council is in discussion with the NSW and Australian Governments to share responsibility and costs given the unprecedented event and impacts of the GHFF on the affected community. A governance structure would need to be defined that clearly identifies roles and responsibilities in relation to dispersal activities. Council does not have adequate in-house resources or expertise in dispersal management, so would need to engage additional personnel to assist. Given the scale of the proposed dispersal, resources would probably need to be drawn from a number of sources including government agencies and specialist contractors.

Field supervisors and at least half of the field team personnel will need to have been fully vaccinated for Lyssavirus as they will be working within the camp rather than on the edges and are more likely to come into direct contact with the GHFF. The vaccination program usually takes about six weeks.

It has been suggested that community volunteers could assist with the dispersal to reduce costs. Some of the risks and mitigation strategies that would be associated with this are outlined in **Chapter 4**.

3.2 Timeframes

The proposed timeframes have been based on attempting to attend to the current community concerns with the GHFF, while aiming to be realistic about what can be achieved. The timeframes for each stage of the proposed dispersal are as follows:

- Stage 1 – Approvals, preparation, recruitment and baseline detailed monitoring in May-June 2016
- Stage 2 – Initial dispersal and monitoring of the existing camp, other camps and other potential habitat areas in July-August 2016
- Stage 3 – Prevention of flying-foxes returning from September 2016, including ongoing monitoring and management (at least three years)

The optimum time for any dispersal is when the GHFF numbers are at their lowest (outside of sensitive periods of their life-cycle), and this would also greatly reduce the resourcing requirement. As discussed in **Chapter 4**, there is a strong risk that the Stage 1 timeframe will not be met due to difficulties in recruiting adequate numbers of suitable personnel to manage the existing large dispersal area (approximately 36 ha). An alternative approach (outlined in **Chapter 6**) would be to reschedule the initial dispersal to February when the camp is likely to be much smaller (before the seasonal influx) and fewer personnel would need to be mobilised. It is recommended that further consideration be given to this option.

3.3 Mitigation standards

To ensure best practice, the dispersal would be implemented in a manner consistent with the mitigation standards required under the EPBC Act Policy, as follows:

- The action must not occur if the camp contains females that are in the late stages of pregnancy or have dependant young that cannot fly on their own. (This is the most sensitive period in the flying-fox life cycle and is typically during September and October).
- The action must not occur during or immediately after climatic extremes, or during a period of significant food stress.
- Disturbance must be carried out using non-lethal means, such as acoustic or visual disturbance or use of smoke.
- Disturbance activities must be limited to a maximum of 2.5 hours in any 12 hour period, preferably at or before sunrise.
- 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. Sufficient vegetation must be retained to support the maximum number of flying-foxes ever recorded in the camp.

It is expected that these mitigation standards would be included in a condition of approval by the DoE.

3.4 Steps, success criteria and costs

Ultimately, the dispersal will be deemed 'successful' if there are no ongoing conflicts between the flying-foxes and residents of Batemans Bay, the flying-foxes have relocated to areas of suitable habitat, and no flying-foxes have been killed or harmed as a result of the dispersal. More detailed success criteria are defined in **Table 3**.

Table 3 identifies the steps to be undertaken for each stage of the proposed dispersal. The success of each stage would be evaluated prior to proceeding to the next stage. If the success criteria are not satisfied, then the dispersal is deemed to have failed and alternative approaches, such as those in the Water Gardens Management Plan and final chapter of this document, should be considered.

The costs presented in **Table 3** are estimates only and would need further review / refinement during detailed planning. The following assumptions have been made for the purposes of costing:

- Management team (responsible for approvals, coordination, communication) ~ $5000/day
- On-ground dispersal team at a similar proportion to that involved in the Kareela dispersal. We have assumed that each day of dispersal there will be :
    - one Dispersal Manager who will coordinate and be responsible for all on-ground operations
    - four Dispersal Supervisors (vaccinated); the current camp comprises roughly four areas of habitat
    - 64 people reporting to dispersal supervisors; at least half of these people need to be vaccinated
    - community volunteers would provide additional assistance at no cost, but due to the high risks as discussed in **Chapter 4** we have not relied on their involvement

    - total cost for dispersal team - $57,800/day (this is an estimate and it assumes people will be paid for a full day even though the required dispersal time will be less than this. This is also based on the assumption that personnel will need to be recruited from outside the Batemans Bay area)
- Monitoring by specialist ecologist - $1500/day

The approximate costs for each stage are as follows, with a detailed breakdown in **Table 3**:

- Stage 1 – $135,300
- Stage 2 – $3,420,800
- Stage 3 – $2,658,000 (excluding contingency)

Proceeding with the steps outlined in **Table 3** will require an upfront commitment to long term funding for all stages of the dispersal, including an allowance for contingency (suggested at $1M).

3.5 Potential habitat in the area

Dispersal actions have never resulted in flying-foxes moving to sites that are identified as a preferred 'target'. Therefore this dispersal plan does not attempt to identify a target site for relocation. However, careful consideration needs to be given to where the displaced flying-foxes may re-establish a camp or camps. An initial assessment is presented here, and this would need to be refined by further field investigation.

Figure 5 indicates areas within about 5 km of the existing camp that have potential GHFF camp habitat based on having a similar vegetation community to the existing camp. These sites are considered the most likely areas that the flying-foxes would move to, although this is extremely unpredictable and they could travel much further or to other areas within 5 km that are not mapped in **Figure 5**.

Areas of potential habitat in **Figure 5** have been classified as:

- 'suitable' habitat i.e. similar vegetation communities that are not close to built-up areas
- 'unsuitable' habitat i.e. similar vegetation communities but inappropriate locations due to close proximity to residences, schools etc.

These areas are approximate only and would need to be validated by field investigation. It is noted that flying-foxes often prefer to camp in areas that are near water, have a suitable vegetation structure, and the surrounding landscape offers some protection from predators and extreme weather (e.g. gully).

If the dispersal action results in the flying-foxes moving to an unsuitable (inappropriate) location, further action would need to be taken by Council until the displaced animals are established in a suitable location. Further approvals may be required as part of this process.

Inappropriate locations also include sites that have other matters of national environmental significance. Further investigation would be needed to determine the likelihood of this occurring in the subject area.

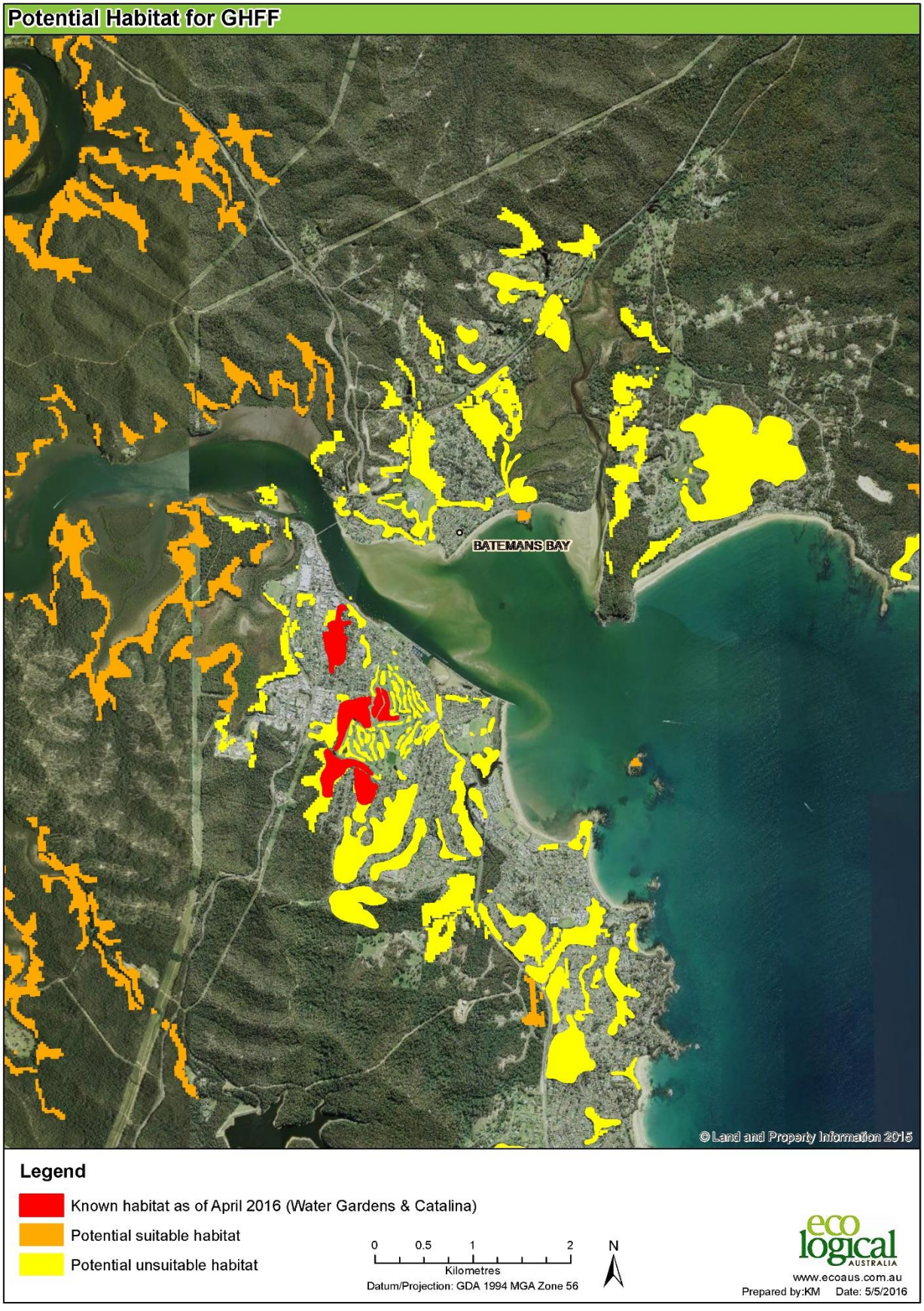

Figure 5: Potential suitable and unsuitable habitat within approximately 5 km of the camp

Table 3: Dispersal activities, success criteria and costs

Stages and steps	Measure of success	Costs
Stage 1 – Approvals, preparation and baseline monitoring	**All approvals and preparation complete**	**$135,300**
Prepare documentation for NSW and Federal approvals, and liaise with agencies as required	Approvals obtained within required timeframe	$20,000
Prepare a communication plan that covers all elements of the dispersal, including community education, notification of activities, and protocols for the dispersal team. The communication plan will include safe work method statements and protocols, including requirements for notification of medical centres and hospitals	Communication plan prepared and implemented	$20,000
Field investigation of existing and alternative camp habitats within 30 km (in accordance with expected approval conditions), including detailed monitoring of GHFF health within the existing camp, and identification of suitable locations for the dispersal teams to operate; install monitoring cameras at strategic locations	Update map of appropriate and inappropriate habitat; confirm that GHFF in the camp are healthy and there are no heavily pregnant females or dependent young; map of areas for dispersal teams to operate	$15,000
Prepare resources - Recruit suitable people to undertake the dispersal, including OEH recognised experts, vaccinated staff and field assistants; source (including purchase) equipment to conduct the dispersal	Adequate and suitable resources available within the required timeframe	$20,000 plus $5000 for equipment
Undertake site familiarisation and review of communications/safety protocols by all personnel to be involved in the dispersal activities	Signed statements by all personnel to be involved in dispersal that they are aware of their responsibilities	$57,800 (although this doesn't allow for additional team members to be rostered/inducted)
Establish base (likely to be the Community Centre) for briefing / debriefing the team each morning; first aid station; triage for injured animals; and place where residents can be directed to if they have questions or concerns	Base established and communicated	$2500

Stages and steps	Measure of success	Costs
Stage 2 – Initial dispersal and monitoring	**Batemans Bay camp 90% dispersed and dispersed flying-foxes relocated to suitable locations**	**$3,420,800**
Deploy personnel and basic equipment to cover the required area over eight weeks (56 days)	Adequate resources deployed and acting in accordance with their designated responsibilities; at least 90% of the camp dispersed to suitable locations by the end of eight weeks	$3,236,800
Trial dispersal technologies at suitable locations to support dispersal team efforts e.g. 'waving man' inflatables, spray deterrent onto canopy when flying-foxes are not in the camp, install radar deterrent/monitoring device on telegraph poles	Dispersal technologies effective and compliant with approval conditions	$100,000
Monitor impacts at Batemans Bay and habitat within a 30 km radius (with a focus on unsuitable habitat within a 10 km radius) and report to regulators and community (56 days)	No breach of approval conditions including no flying-fox injury or death; no human health or safety incidents; clear communication with all parties; reduction in community complaints	$84,000
Stage 3 – Prevent Batemans Bay camp from re-establishing	**No flying-foxes camped at Batemans Bay in the long term**	**$2,658,000 (ex contingency)**
Deploy personnel and equipment to cover the required area in the first year, with the level of resourcing reduced to match requirements (costs assume one dispersal team for three days/week for one year)	Adequate resources deployed and acting in accordance with their designated responsibilities; no flying-foxes camped in Batemans Bay by the end of year 1	$2,340,000
Monitor flying-fox habitat within a 10 km radius of Batemans Bay and report to regulators and community – Year 1 (costs assume one ecologist for three days/week for one year)	No breach of approval conditions including no flying-fox injury or death; no human health or safety incidents; clear communication with all parties; no complaints from the community	$234,000
Monitor flying-fox habitat within a 10 km radius of Batemans Bay and report to regulators and community – Years 2 & 3	No breach of approval conditions including no flying-fox injury or death; no human health or safety incidents; clear communication with all parties; no complaints from the community	$84,000

Stages and steps	Measure of success	Costs
If required, deploy personnel and equipment to disperse flying-foxes that re-establish the Batemans Bay camp – Years 2 &3	Adequate resources deployed and acting in accordance with their designated responsibilities; no flying-foxes camped in Batemans Bay	Contingency $1M

4 Risk assessment

Dispersal activities have unpredictable outcomes, are very costly, require ongoing commitment and maintenance, are often not successful and rarely achieve desirable outcomes for all stakeholders. Dispersal also often leads to flying-fox stress, injuries or fatalities, and may lead to increased human and animal health risk, nuisance issues, or human / flying-fox conflict at other sites.

A review of seventeen flying-fox camp dispersal actions between 1990 and 2013 by Roberts and Eby (2013) found that:

- In all cases, dispersed animals did not abandon the local area.
- In 16 of the 17 cases, dispersals did not reduce the number of flying-foxes in a 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.
- In all cases, it was not possible to predict where replacement camps would form.
- Conflict was often not resolved. In 71% of cases conflict was still being reported either at the original site or within the local area years after the initial dispersal actions.
- Repeat dispersal actions were generally required (all cases except extensive vegetation removal).
- 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).

Roberts and Eby (2013) found that there were a few exceptions to these patterns, but they only occurred when there were abundant financial and human resources (e.g. Royal Botanic Gardens (RBG) Melbourne and RBG Sydney) and/or specific landscape characteristics (e.g. isolation from neighbours (Batchelor, NT) or a habitat link to an 'acceptable' location (RBG Melbourne).

ELA was heavily involved in the planning and implementation of the Kareela camp dispersal in southern Sydney, which is considered to have been successful (at this point in time). We can confirm that the success can in large part be attributed to the significant and long-term investment in suitably trained resources that were locally based, careful planning and management, and the camp geography (small camp (<20,000 GHFF) in a small bushland gully with access from all sides.)

Some of the likely risk factors and suggested mitigation measures are set out in the table below for the proposed dispersal of the Batemans Bay camp. This list of risks is not comprehensive and additional risks are likely.

Table 4: Risks and mitigation measures

Risk	Comment	Mitigation measure
Approvals (refer to **Chapter 2**) are not obtained within the required timeframes	Under the TSC Act, no timeframes are set for applications which do not require a species impact statement (SIS). Following review of the application the Chief Executive of OEH may decide that the proposed action is likely to have a significant effect on threatened species, populations or ecological communities, or their habitat, in which case the TSC Act requires that the applicant submit a SIS. The TSC Act provides that the Chief Executive of OEH must make a decision on a licence application within 120 days of a SIS having been received. However, if the Chief Executive decides, following an assessment of the application, that the proposed action is not likely to have a significant impact, a section 91 licence is not required and the applicant will be issued with a certificate to that effect. The EPBC Act referral process may require public display of documentation and further environmental impact assessment. The referral may result in a 'controlled action' with or without conditions.	Council to liaise with the regulators to ensure the documentation is adequate to expedite the approval process and the proposed dispersal methods are designed to minimise adverse impacts
Failure to prepare for dispersal within the required timeframe	If the approvals and preparation is not complete within the required timeframe, it is likely the main phase of dispersal would fall when the female flying-foxes are heavily pregnant and starting to give birth (usually September-October).This would represent a significant risk to the health and sustainability of the GHFF population.	Adequate and suitable resources need to assigned to Stage 1 of the dispersal to facilitate preparatory processes. If Stage 1 cannot be completed within the required timeframe, Stage 2 should be delayed until after the breeding season (i.e. summer)
Loss / diversion of resources from other matters	Council and agency staff and resources would need to be diverted from other tasks to assist with the dispersal. This means that other matters would have reduced priority and may not be undertaken in a timely manner or at all.	Ensure adequate additional funds are available to support resourcing from third parties

Risk	Comment	Mitigation measure
Insufficient suitable resources to implement dispersal	Based on the numbers required for 'successful' dispersal at other camps, approximately 70 personnel will be needed every day during the initial eight weeks. At least half of these people will need to be vaccinated; ideally all personnel involved in on-ground activities would be vaccinated. It is unlikely that this number would be available locally, so some people would need to be accommodated in the area	Issue an expression of interest to relevant parties immediately so that resources can be prepared (e.g. additional vaccinations).
Unauthorised / illegal action	Some residents may become frustrated with the process and take unauthorised action, including dispersal activities outside of the specified time limits or prior to approvals being granted. This creates a negative effect that would undermines the strategic action of a targeted dispersal. It also would expose residents to legal action.	Regular communication with the community to explain the process and why this needs to be followed to maximise the chance of success
Dispersal to inappropriate locations within Batemans Bay	There is a high risk that the dispersed flying-foxes will locate in nearby areas that are currently uninhabited. Many of these areas are considered to be unsuitable habitat because of their proximity to dwellings, schools etc (see **Figure 5**) During the Kareela dispersal, staff were positioned within the areas near the camp (e.g. golf course, school, Sir Joseph Banks Gardens) so that the dispersed bats would be pushed back into the camp at the end of the session each morning. This meant that the dispersal was done carefully and slowly, but avoided dispersal to inappropriate locations nearby.	During dispersal have spotters in adjacent areas that are currently unoccupied by GHFF so that extra resources can be quickly allocated to those locations if needed during the dispersal each morning Council would be required to resolve any problems that arise at other locations that are directly linked to the dispersal
Dispersal to inappropriate locations outside Batemans Bay	This would include other camps in the region (e.g. Moruya), and areas of potential suitable and unsuitable habitat as shown in **Figure 5** (e.g. Surfside, water supply system) This could impacts on more residents and trigger legal action. The costs associated with this are unknown	Council would be required to resolve any problems that arise at other locations that are directly linked to the dispersal The budget allows for a contingency, but this may not be adequate

Risk	Comment	Mitigation measure
Health and safety risks for people involved in the dispersal action	Dispersal will be conducted in dark / dawn conditions in areas that are contain physical hazards such as swamps, bushland and steep or uneven terrain. There will be stressed animals and residents, as well as noise, smoke/fire and flashing lights.	A comprehensive site assessment will inform the safe work method statement On-site personnel will be inducted to the site during daylight, and trained in work and communication protocols There will be adequate supervision by trained specialists Only people who have been vaccinated for Lyssavirus will be allowed into the camp; others will be allowed on the edges of the camp or as spotters in nearby areas
Additional power outages and electrocution of flying-foxes	Dispersal activities will result in a longer period each morning when the flying-foxes are flying and therefore may increase the risk of contact with power lines. This may cause additional power outages and result in death or injury of GHFF due to electrocution	Continued liaison with Essential Energy
Conflict associated with foraging not resolved by dispersal action	Concerns about night-time noise associated with foraging flying-foxes will not be addressed unless the camp relocates at least 20 km from Batemans Bay as this is the typical foraging range from a camp	Raise awareness of the limitations of camp dispersal
Residents adversely impacted by dispersal activities	The main dispersal action will involve noise, smoke, lights near homes early each morning (pre-dawn / dawn) for a long time period (initially for eight weeks). Some residents may experience disrupted sleep during this period. There is also likely to be additional risk of faecal drop and disease	Discuss the proposed activities with residents most likely to be affected Identify a threshold for ceasing dispersal based on a certain number of community complaints
Impact to health of flying-foxes during dispersal	It is acknowledged that dispersal will stress the flying-foxes. The level of stress needs to be limited so that there is no injury or death.	Adequate monitoring and supervision by trained specialists Stop work if there is unacceptable levels of stress to GHFF

Risk	Comment	Mitigation measure
		Avoid dispersal during adverse weather conditions (e.g. very hot, cold, windy or heavy rain) Avoid dispersal during sensitive periods in the GHFF life cycle
Dispersal techniques not effective	Experience suggests that inexpensive, low technology techniques are effective if implemented correctly. These include banging metal trays and sticks, creating smoke in containers It is also proposed to trial a number of more expensive technology in certain locations	Daily review of what is effective and what isn't, and adjust methods accordingly
Bushfire	Use of smoke as a dispersal technique means that there is a risk of fire which could spread through vegetation and to nearby buildings.	Fire to be fully contained (e.g. in small drums) in suitable locations Discuss strategy with Rural Fire Service Avoid days of elevated bushfire danger or very windy conditions
Camp reduces size without dispersal action	The camp size naturally fluctuates with seasonal conditions, as illustrated in the maps in **Appendix B.** It is highly likely that the camp will naturally reduce in size in the next few weeks/months. This has already started to happen	Monitor the camp and adjust dispersal resources accordingly
Conflict between people about the dispersal activities	There are different and strong views within the community regarding flying-foxes. This may lead to conflict.	Good communication with all stakeholders is an essential part of the dispersal action. All personnel involved in the dispersal should refer enquiries and comments to the communications officer, and refer to communications protocols

Risk	Comment	Mitigation measure
Camp re-establishes in the medium to long term	This Plan proposes ongoing monitoring and dispersal activity for at least 3 years. There is a risk that this would need to be extended	Implement monitoring and follow-up dispersal actions to deter the camp from re-establishing
Community involvement in dispersal activities	Community involvement in dispersal activities is considered to be high risk. Factors to consider include: Availability - will people be able to turn up every morning pre-dawn for months and be available for the duration of dispersal activities Safety – the terrain is difficult, particularly in the dark/dawn, so there is a strong risk of slips and trips, which could pose liability issues for Council Role – all field teams must work under the instruction of the supervising ecologist e.g. commence and cease noise when instructed otherwise Council would be in breach of the approval conditions	All community volunteers would need to have suitable training and understand their responsibilities The cost structure does not assume their involvement, due to the risks associated with this potential workforce
Public / media heightened reaction to concerns about disease	Certain elements of the media may present misleading information about the risks of disease	Strong education and communication program, supported by agencies such as Local Land Services and Department of Health, and the Australian Veterinary Association

5 Monitoring, evaluation and reporting

5.1 Monitoring objectives

It is important to monitor and evaluate the effectiveness of the dispersal action to inform the next steps and improve the effectiveness of future management actions. The objectives of the monitoring program will be to:

- monitor feedback from the community
- monitor dispersal from existing camp areas within Batemans Bay
- monitor any re-establishment attempts within Batemans Bay and at alternative sites
- monitor the health and welfare of the Batemans Bay GHFF camp occupants and any GHFF in dispersed locations.

5.2 Proposed monitoring tasks

Specific monitoring requirements are expected to include:

- Identifying existing camps within a 30 km radius of the dispersal site and contacting relevant land managers to discuss the possible implications of a dispersal in the region.
    - Conducting population surveys at those sites in the week before and daily during the dispersal, and one week, one month, six months and 12 months after the dispersal.
- Identifying potential flying-fox roost sites within a 10 km radius of the dispersal site and assessing suitability of potential roost habitat.
    - Conducting population surveys at those sites in the week before and daily during the dispersal, and at least quarterly in the 12 months following the dispersal. This should include any newly established camps.
- Mapping the flying-fox camp where dispersal is planned, including key features and how they are used by flying-foxes in the week before dispersal, during dispersal activities, and one month after the dispersal.
- Conducting detailed flying-fox counts at the dispersal site including species present, numbers, condition of animals, and presence of pregnant females or females with young in the week before dispersal and daily during dispersal activities, and numbers of injured, orphaned and dead flying-foxes located during the seven days after the principal dispersal event (Stage 2 in **Table 3**) has finished. Attention should be given to whether female flying-foxes in the camp have become visibly pregnant or are supporting young as a trigger for stopping dispersal activities. Population surveys should also be conducted quarterly for 12 months after the management actions are complete to understand the long-term impact of the management actions.
- Measuring any area of roost vegetation removed through clearing including identification of species of plants, and any area of additional habitat identified or revegetated.
- Recording details of flying-fox behaviour during management activities, including signs of visible distress, injury or death. Any deaths should be assessed by a vet to determine the cause of death. There must be liaison with wildlife carers to monitor any increase in the number of flying-foxes being taken into care or showing signs of stress, including aborted young.
- Noting the circumstances under which disturbance or dispersal activities were stopped, for example due to undue stress on the flying-foxes.

- Identifying, mapping and recording management actions at any known splinter camps formed as a result of the initial dispersal.
- Surveying affected neighbours and the local community before and after management actions to monitor their response to the outcomes of the management actions as an integral part of the community engagement strategy and to evaluate 'success' of the dispersal. Surveys may also be required at other sites that receive flying-foxes from the dispersal. Recording any responses or complaints to the dispersal activities from residents or other individuals/ groups.
- Recording the details of the disturbance methods, timing, spatial extent, daily duration, triggers and contingencies for each site where activities are conducted. This should also include details of any wildlife carers engaged, names of experts on site during management implementation, and names of those conducting management actions.
- Assessing any outcomes of the dispersal activities, including community response.

5.3 Reporting

Licences are likely to require quarterly monitoring and evaluation reports be submitted to OEH for at least the first year following the dispersal activity. This will include completed data sheets in accordance with the templates in the OEH *Flying-fox Monitoring Data Sheet*.

6 Alternative actions

The Water Gardens Camp Management Plan reviewed 24 possible types of actions which were based on input from a wide range of flying-fox experts, Council and agency staff and others involved in flying-fox management. Some of these actions plus additional ideas are listed below. Further investigation would be needed to assess the feasibility of these alternative actions.

Table 5: Summary of alternative actions

Action	Comment
Install radar deterrents (trial proposed as part of this dispersal action)	Radar systems with a spray unit have been used to deter flying-foxes when they forage in orchards and may be suitable to nudge a camp. The device is solar powered would be permanently installed above the canopy (e.g. top of dead trees and power poles). It has a range of about 350 m. The device can be used to notify a receiver that there is a change in the population and the data is time stamped.
Apply spray deterrents (trial proposed as part of this dispersal action)	A cherry picker could be used to pump animal deterrent into the canopy when flying-foxes are foraging elsewhere. The spray comprises a natural pheromone, similar to that used to deter domestic animals.
Inflatable controls (trial proposed as part of this dispersal action)	These are often used for marketing purposes to attract attention to a business (e.g. 'waving man'). These could be installed in open areas such as along the side of the road, to assist with nudging a camp.
Install sprinklers	Sprinklers could be installed in areas such as where there is an interface between residences and the camp to help nudge the flying-foxes further from the area of conflict. This would not resolve issues related to fly-in and fly-out or foraging
No action	It is likely that the camp and associated impacts to the community will significantly reduce as the flowering season ends in the next few weeks / months. However, the camp may expand again when the next flowering season occurs (subsequent years), particularly in years such as this year when flowering is particularly heavy. Taking no action would not address community concerns.
Expand delivery of targeted actions (e.g. subsidised services) in accordance with the Water Gardens Camp Management Plan	Targeted actions to date have generally been well-received. There is more demand for subsidised services than current eligibility criteria allows for. This should also include further removal of Cocos Palms from the urban area to discourage night-time foraging on the fruit (which results in messy faecal drop).
Reschedule dispersal	The dispersal could be rescheduled at a time when the camp is much smaller than its current extent (e.g. February). This would reduce the risk and expense, and would be more likely to be successful (although still have a high risk of failure)
Nudging the camp further away from the houses	Certain locations where the camp boundary is close to homes could be targeted for 'nudging'. This would involve controlled disturbance along those edges to push the flying-fox camp further into bushland where that opportunity exists. This

Action	Comment
	would have similar risks to dispersal in that the disturbed flying-foxes could move to a less desirable location.
Removing vegetation to create a wider buffer	Wider buffers may offer some relief from the camp. However, it would have little impact on impacts associated with fly-in and fly-out activities.
Cull the flying-foxes to reduce numbers	Culling could be achieved by shooting or poisoning the flying-foxes. Results of culling are unpredictable because flying-foxes move around the landscape, over large distances and may occupy a variety of camps over short periods of time. Culling would only provide short-term relief to the conflicts and would need to be ongoing as other flying-foxes will continue to join the camp. This is not a viable option because it has never been proven successful in the long-term management of flying-foxes. The activities associated with performing a cull may violate the objectives of the *Prevention of Cruelty to Animals Act*. The risks associated with culling an animal in an urban environment such as Batemans Bay would be extremely high and there would be a direct threat to humans and other species (domestic animals and wildlife), especially if high numbers of dying and dead animals are found in the area. Licences/approvals required would not be granted by the Federal or State Governments for this action.
Sonar on rooftops	Unlike microbats, flying-foxes are not sensitive to sonar. Flying-foxes are responsive to noise in a similar way to humans. Sonar technology would therefore not be effective as a flying-fox deterrent.

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Appendix A Invitation for expression of interest

eurobodalla shire council

Our Reference: E15.9191

15 January 2016

Dear resident

Grey-headed Flying-foxes at Batemans Bay Water Gardens

On 8 December 2015 Eurobodalla Shire Council adopted the Water Gardens Grey-headed Flying-fox Camp Management Plan. The main objectives were to address the concerns of local residents and community near the Water Gardens, and the broader community, whilst not creating conflict between people and the flying-foxes, and managing the camp consistent with statutory requirements.

The Plan was developed using information specific to the Water Gardens and also drawing on experience from management of a wide range of other flying-fox camps throughout Australia. Community opinions and feedback were also considered and in this regard, I would like to thank the community for their participation during the consultation period of developing the Plan. The Plan can be located on Council's website http://www.esc.nsw.gov.au or a hard copy can be viewed at the Batemans Bay Community Centre.

We will continue to maintain the buffer zones between dwellings and the Water Gardens Reserve that were created in August 2015. The pruning and limited removal of vegetation has and will continue to provide some relief to residents by removing opportunities for the flying-foxes to roost in vegetation overhanging residential properties.

Council has also committed to enhancing the Water Gardens including weed and rubbish removal and a recent grant has been submitted to the State Government for funding to assist with this management action.

Funding has been provided to commence implementing the recommended actions. Council can provide eligible residents with assistance to help address some of the flying-fox issues that may be impacting you and as your property is located within 250m of the Water Gardens Reserve, you may be eligible to receive this support.

..../2

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t 02 4474 1000 | f 02 4474 1234
council@eurocoast.nsw.gov.au | www.esc.nsw.gov.au

The following table identifies actions that Council may be able to assist you with.

Recommended Management Action	Issue/s to be addressed and how Council may be able to help	How you can access assistance
Free rental access to a high pressure cleaner	Faecal drop on private property such as outdoor furniture and patios Council can assist by provision of free access for identified residents to a high pressure cleaner	Borrow for up to 5 days at one time from Batemans Bay Depot 150 Princess Highway, Batemans Bay. Open Monday to Thursday 8.30am – 4.30pm, 44724035. Show a driver's licence or rates notice to identify your property location. Credit card details will be collected when borrowing and when the cleaning equipment is returned in good working order, the credit card details will be returned with no cost incurred.
Car cover	Faecal drop on cars Council may assist by providing car covers where no garaging provision is available	Complete the attached Expression of Interest
Clothesline cover	Faecal drop on washing Council may help by providing a clothesline cover if you are unable to hang up and collect washing during the day	Complete the attached Expression of Interest
Removal of exotic cocos palms	Noise and faecal drop close to dwellings when feeding at night Council may remove cocos palms on private property	Complete the attached Expression of Interest

If you are interested in any of the above subsidised services, please complete the attached Expression of Interest (EoI) form by Friday 12 February 2016.

Council will consider the expressions of interest and provide you advice on your eligibility. We may also need to undertake site inspections to ascertain priorities and determine your requirements.

If you have any questions or would like further information, please do not hesitate to contact Courtney Fink-Downes on (02) 4474 7493 or courtney.fink@eurocoast.nsw.gov.au.

Yours sincerely

Deborah Lenson
Divisional Manager Environmental Services

Appendix B Camp extent May 2015-Feb 2016

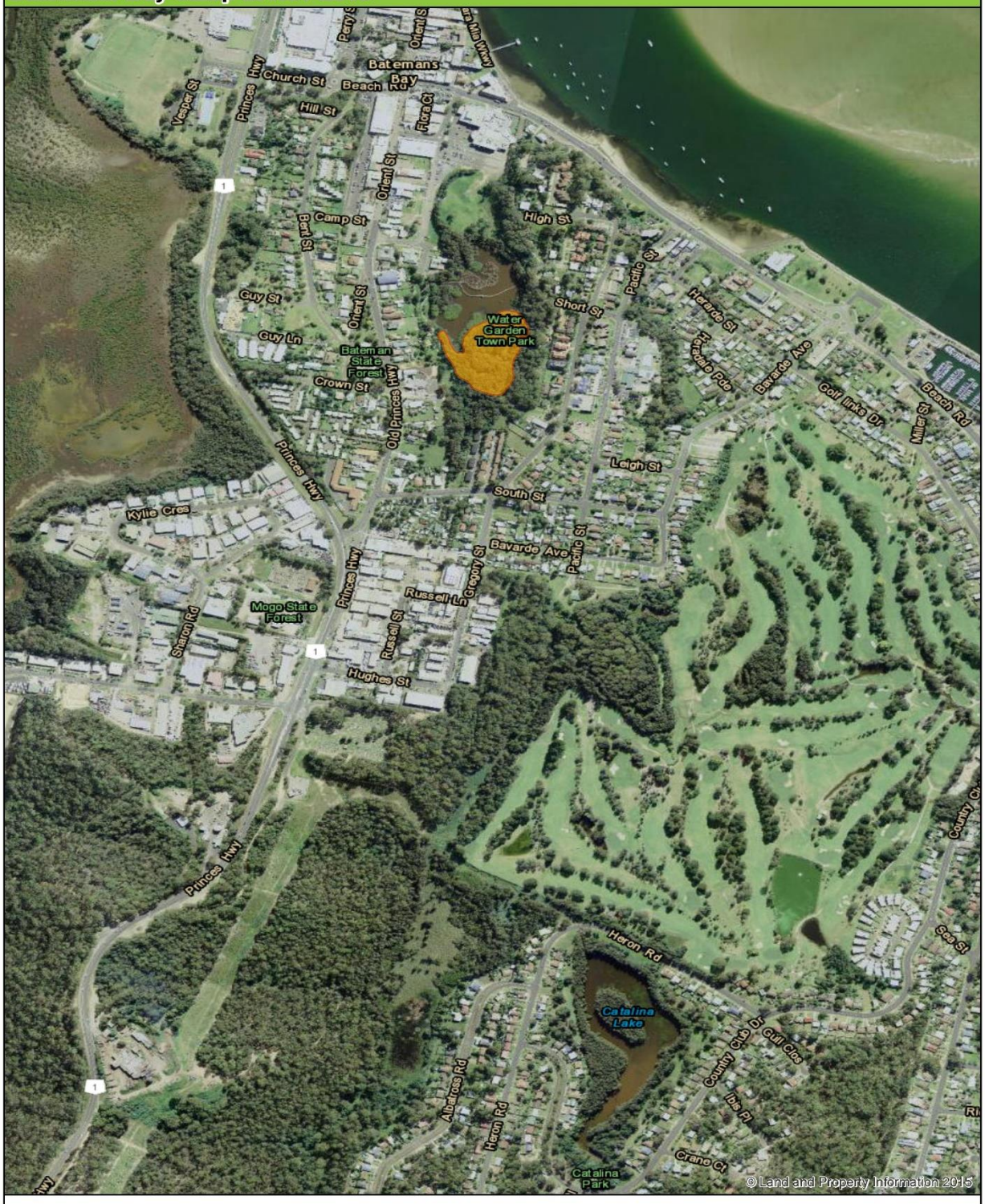
The maps below have been prepared using monitoring data provided by OEH.

The DoE has an ‘interactive flying-fox viewer’ which shows additional information on flying-fox camp locations, numbers and history of occupation based on quarterly monitoring by the CSIRO and others. It can be access at:

www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf


Batemans Bay camp in May 2015
Batemans Bay
Beach Rd
Church St
Princes Hwy
Vesper St
Hill St
Flora Ct
Orient St
Camp St
Bent St
High St
Guy St
Guy Ln
Water Garden Town Park
Batemans State Forest
Crown St
Old Princes Hwy
Pacific St
Short St
Herarde St
Tarakolo Rde
Bavarde Ave
Golf links Dr
Miller St
Beach Rd
Leigh St
South St
Kylie Cres
Bavarde Ave
Gregory St
Russell Ln
Russell St
Mogo State Forest
Sharon Rd
Hughes St
Princes Hwy
Heron Rd
Catalina Lake
Albatross Rd
Haron Rd
Crane Ct
Ibis Pl
Gull Cres
Country Club Dr
Sea St
Catalina Park
© Land and Property Information 2015
Legend
Approximate area of occupied flying-fox habitat
0 100 200 400
Metres
N
Datum/Projection: GDA 1994 MGA Zone 56
eco logical AUSTRALIA
www.ecoaus.com.au
Prepared by:KM Date: 5/4/2016

Batemans Bay camp in Nov 2015



Legend

Approximate area of occupied flying-fox habitat

0 100 200 400
Metres
Datum/Projection: GDA 1994 MGA Zone 56

N

eco logical AUSTRALIA
www.ecoaus.com.au
Prepared by:KM Date: 5/4/2016

Batemans Bay camp in Feb 2016

Legend

Approximate area of occupied flying-fox habitat

0 100 200 400
Metres
Datum/Projection: GDA 1994 MGA Zone 56

N

eco logical AUSTRALIA
www.ecoaus.com.au
Prepared by:KM Date: 5/4/2016

ecological AUSTRALIA

bsi. ISO 14001 Environmental Management

bsi. AS/NZS 4801:2001 Occupational Health and Safety Management

bsi. ISO 9001 Quality Management