Batemans Bay Flying-fox Camp

Management Options

Prepared for
Eurobodalla Shire Council

13 May 2016

DOCUMENT TRACKING

Item	Detail
Project Name	Batemans Bay Flying-fox Camp Dispersal Plan
Project Number	15SUT-2230
Project Manager	Beth Medway 8536 8600 PO Box 12 Sutherland NSW 1499
Prepared by	Beth Medway
Reviewed by	Angie Radford, Mark Shorter and Lindsay Usher (ESC)
Approved by	Beth Medway
Status	Final
Version Number	2
Last saved on	13 May 2016

This report should be cited as 'Eco Logical Australia 2016. *Batemans Bay Flying-fox Camp Management Options*. Prepared for Eurobodalla Shire Council.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Angie Radford, Mark Shorter and Lindsay Usher (ESC) and Joss Bentley (OEH).

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Template 29/9/2015

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Abbreviations

Abbreviation	Description
DoE	Commonwealth Department of the Environment
ELA	Eco Logical Australia
EPA	NSW Environment Protection Authority
EPBC	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESC	Eurobodalla Shire Council
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*
TSC	NSW *Threatened Species Conservation Act 1995*

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1 Introduction

1.1 Purpose and limitations of this report

Eurobodalla Shire Council has commissioned this report to review management options for the flying-fox camp at Batemans Bay in the context of the current camp size and associated community impacts. This report:

- evaluates the effectiveness of management actions that were approved by Council in accordance with the 2015 Water Gardens Camp Management Plan
- identifies other potential management actions and considers their likelihood of success, risks and estimated costs.

This report is not intended to encompass every possible action that could be taken to manage the flying-foxes at Batemans Bay. However, it does consider a wide range of actions that have been implemented or considered at other flying-fox camps, or suggested by the community.

1.2 Summary of community views

Conflict and distress can occur where flying-fox camps exist adjacent residents in urban areas. The main concerns raised by people in the Batemans Bay community include:

- **noise** associated with the camp, particularly during fly-in and fly-out periods, and when flying-foxes forage (feed) in the surrounding area at night
- **odour** which is strongest at the camp and associated with the scent male flying-foxes use to mark their territory. It is not associated with the faeces dropped during flight and is not a risk to human health
- **faecal drop** can be unsightly and stain (e.g. washed clothes, painted surfaces), and is particularly messy and prone to staining when flying-foxes have been feeding on the fruit of exotic Cocos palms. Flying-fox faeces on roofs will be washed into rainwater tanks when it rains. NSW Health recommends against drinking water from rainwater tanks where there is public drinking water available. Advice on safely managing rainwater for drinking purposes where there is no alternative supply is available on the NSW Health website at http://www.health.nsw.gov.au/environment/water/Pages/rainwater.aspx
- **risk of disease** (e.g. Australian Bat Lyssavirus, Hendra virus) for people, pets and livestock, noting that this risk is extremely small. The latest information from the NSW Department of Health is that there are no reports of Australian Bat Lyssavirus being spread by contact or exposure to flying-fox faeces, urine or blood. The only cases of human infection with the virus have been caused directly by flying-fox bites and scratches during handling of infected animals. Living, playing or walking near bat roosting areas also poses no risk of the disease as long as flying-foxes are not handled. Using soap and water to wash hands after accidental touching of flying-fox faeces, urine or blood is an adequate hygiene standard. To minimise the risk disease that could be associated with being bitten or scratched, untrained people should not handle sick, injured or dead bats
- **interruption of utility services** such as power, internet and phone which can be caused by flying foxes being electrocuted in susceptible wires.

These issues are discussed in greater detail in the 2015 Water Gardens Camp Management Plan.

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It is important to note that there are a wide range of views in the community about the level of impact associated with the flying-foxes and how the impacts should be managed. For example, some people would prefer that all of the flying-foxes are 'removed' from Batemans Bay whereas other people have expressed the view that no additional action should be taken. This report examines the risks, likelihood of success and costs of a range of options to address community concerns.

1.3 Previous plans and action

The 2015 Water Gardens Camp Management Plan recommended targeted, low risk and low cost management actions to mitigate impacts on people and properties that were most affected by the flying-fox camp. Council has subsequently approved expenditure for the following (to date):

- $17,000 for subsidised services for people living within 250 m of the camp (at the Water Gardens and Catalina), including:
    - washing line covers
    - gurney hires
    - car covers
    - caravan / trailer cover
    - deodorisers
- $2000 to remove Cocos palm trees
- $10,000 to remove vegetation between the Water Gardens camp and adjacent homes

Council has received some positive feedback regarding the targeted actions undertaken to date.

In response to the community concerns that have arisen as a result of the expansion of the camp size and numbers of foraging flying-foxes since March 2016, Council has increased the available funding for subsidised services.

1.4 Camp size

The current Batemans Bay camp encompasses the Water Gardens and habitat around Catalina, 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 weekly monitoring of the camp extent by OEH suggests that the GHFF population at Batemans Bay has peaked and is starting to decline. This trend is depicted in **Figure 1**.

Fluctuations in the size of flying-fox camps aligns with the availability of food (nectar) in the surrounding area. 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.

Long term trends in the national flying-fox population size are tracked by the CSIRO using census data collected across Australia. The data for the Batemans Bay camp shows that the peak times for the population are generally in March and April, although this can vary by a few weeks depending on weather and flowering conditions. The current large camp size reflects the unusual heavy flowering season.

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Figure 1: Approximate flying-fox camp extent in April - May 2016 (OEH)

2 Assessment of management options

The OEH Flying-fox Camp Management Plan Template categorises types of management actions as follows:

- Routine camp management actions (Level 1)
- Creation of buffers (Level 2)
- Camp disturbance or dispersal (Level 3)

Level 1 actions are generally the lowest risk, complexity and cost, whereas Level 3 are the highest.

The tables below discuss possible additional actions as they would apply to the current situation at Batemans Bay. The discussion is focused on actions that would mitigate impacts to residents and businesses in Batemans Bay (so does not include the 'do nothing' option, the 'continue as is' option or activities such as flying-fox research). The risks and likelihood of success are evaluated based on experience at camps across Qld, NSW and Victoria, and an understanding of the characteristics of the Batemans Bay camp and surrounds.

The estimated costs in the tables are in addition to those already approved by Council.

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Table 1: Level 1 actions

Action	Comment and recommendation	Estimated cost
Community support and advice	Council and OEH have directed resources to community liaison and advice for Batemans Bay residents over a number of years. This has included providing information about the risk of disease, and holding discussions with residents regarding the creation of a cleared buffer between the Water Gardens camp and adjacent homes. *Recommendation*: Council and OEH continue education and support programs through direct liaison with affected residents and business, and media such as radio, newspaper, social media (e.g. Facebook, Twitter), and Council and government agency websites. Costs covered by existing resources. Low risk to implement, but there is a risk of accentuating problems if community support and advice are not provided.	$30,000 pa (staff costs)
Utility services	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. • Telstra and Optus have recently improved back up supply in response to lack of telephone services during power failure.	Included in above costs

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Action	Comment and recommendation	Estimated cost
	Recommendation: Council to continue to work with Essential Energy and other agencies to address risks and concerns regarding delivery of services.	
Subsidise services to reduce impacts of flying-foxes	Currently approved subsidised services (see **Section 1.2**) are limited to areas within 250 m of the camp to target homes that are most likely to be impacted by roosting (camp) activities and the greatest areas of impact associated with fly-in and fly-out. However, dwellings and people that are affected by foraging flying-foxes in the wider area are not eligible for subsidised services at present. Council's records show that there is higher demand for subsidised services than is currently met / eligible. *Recommendation*: expand the eligibility criteria / area for subsidised services in response to demand (recommend an additional $30,000 be made available). This is a low risk, low cost action that is targeted directly to areas of greatest need.	>$30,000
Property modification to reduce impacts of flying-foxes	Modifications to the most affected properties (based on eligibility criteria to be established) could include: • installation of air conditioners to allow windows to be closed in warmer weather to reduce impacts from noise and odour • double glazing in bedrooms to mitigate noise during dawn fly-in (near the camp) or night-time foraging (other areas) • outdoor cover structures e.g. carport, awning over outdoor entertaining areas Potential costs would vary depending on the types of structures to be built. If this was fully subsidised and a large number of homes are considered to be eligible, the costs could potentially be high. The effectiveness of these measures would need to be trialled prior to a widespread roll-out. *Recommendation*: Investigate the potential demand for property modifications and develop eligibility criteria (noting need for equity).	Low to high depending on the number of properties and type of work to be done (e.g. $10,000 to >$500,000)
Remove Cocos palms	Flying-foxes feeding on exotic palm trees at night can disturb residents and drop faecal matter, which is particularly messy and susceptible to staining surfaces given the nature of the fruit. Palm trees are not part of the natural diet of flying-foxes and they can choke if large fruit is swallowed. It is therefore desirable for the palm trees to be removed from the landscape.	Up to $350 per tree Allow $10,000

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Action	Comment and recommendation	Estimated cost
	To date, Council has removed 12 exotic palm trees in the area. This is a low risk, low cost option with direct benefits. *Recommendation*: provide additional funds to remove Cocos palms in Batemans Bay to reduce noise and faecal drop impacts from foraging flying-foxes (recommend an additional $2000 be made available)	
Install physical barriers on the interface of the camp and residential boundaries	Installation of a barrier such as a noise wall or vegetated screens would be intended to reduce impacts from the camp to adjacent properties. However, a physical barrier would not reduce impacts associated noise and faecal drop during the fly-in and fly-out periods as the bats would fly over any barrier. Barriers may also adversely affect the visual amenity of the area, as many residents enjoy views to nearby bushland. The effectiveness of these measures would need to be trialled to test the effectiveness in the Batemans Bay context prior to a widespread roll-out. *Recommendation*: this is unlikely to be effective so is not recommended.	$100,000
Create or protect alternative flying-fox habitat	**Figure 2** illustrates the distribution of similar vegetation communities within about 5 km of the existing camp. Areas close to residences, schools etc are mapped as 'potential unsuitable habitat'. From the map there appears to be plenty of alternative flying-fox habitat in the area. There is no need to create artificial roosting habitat or additional habitat in this area. Protecting existing alternative habitat is low risk and no cost to Council. *Recommendation*: Maintain 'potential suitable habitat' areas through appropriate land use planning and management so that there are alternative camp locations if needed due to natural processes or as a result of a dispersal action. Liaise with OEH to determine if there is a need to protect or enhance alternative suitable roosting habitat areas across NSW.	nil

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Table 2: Level 2 actions

Option	Comment	Cost
Removing vegetation to create a buffer	In August 2015, Council cleared vegetation that was used by flying-foxes to roost in that was overhanging backyards, washing lines and car parks. This involved: • pruning of Casuarina and Pittosporum on Council land near South Street • removing and pruning Acacia and Casuarinas on private property near Crown Street • removing Robinia on NSW Land and Housing property near High Street • pruning Eucalypts, removing Grevilleas and some trees on Batemans Bay Local Aboriginal Land Council land near Short Street The 2015 Management Plan recommended that the buffer be maintained as follows: • 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. Some other areas (e.g. Bavarde Ave) have cleared asset protection zones where the camp interfaces with residences, so additional buffer would be required. Where vegetation from the camp overhangs an adjacent property (i.e. there is no existing buffer), it is recommended that Council liaise with the affected property owner to determine if clearing is needed / wanted (e.g. some properties along Albatross Rd). New buffers would need to be created when the flying-foxes are not in the camp (e.g. day-time, when no dependent young are in the camp). *Recommendation*: maintain the existing buffers and establish new buffers (by branch trimming or tree removal) in target locations in consultation with affected residents.	$5000 pa for buffer maintenance $30,000 for new buffers / branch trimming

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Option	Comment	Cost
Revegetating areas with plants that are unsuitable as roost habitat	Flying-foxes are highly adaptable and will roost in exotic or dead trees if the preferred native species are not available. They can roost in a closed or open canopy, with or without understorey. If revegetation is to occur in areas where roost habitat is lost (e.g. due to buffer clearing or death of significant numbers of roost trees), it is recommended that ground covers and shrubs be planted because these would be unsuitable for roosting. However, this approach could result in a bushfire hazard so would need to be given careful consideration. Further, the ecological and amenity value of the existing vegetation would need to be taken into account. *Recommendation*: further investigation would be needed to determine if revegetation with ground covers or shrubs in some locations would be suitable or effective	<$5000 for investigation
Nudging the camp using installed technology	There are a number of techniques that could be trialled to attempt to nudge the camp further from residences, including: • sprinklers - installed in the canopy of trees (alive or dead) on the edge of the camp • inflatable controls - these are often used for marketing purposes to attract attention to a business (e.g. 'waving man') and would need to be installed in cleared buffer zones • spray deterrents - 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 • radar systems with a spray deterrent unit (e.g. pheromone) - 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 also be used to notify a receiver that there is a change in the the roost area of flying-foxes and the data is time stamped. These measures would be activated under a strict regime that aims to gradually nudge the flying-foxes further into the core of the camp, effectively increasing the size of the buffer. An ecologist would need to supervise this activity (each day during the trial period) as it could trigger relocation to less suitable sites or pose risks	Trial $100,000

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Option	Comment	Cost
	to the welfare of flying-foxes. If risks become unacceptable, the ecologist would have the authority to immediately de-activate the measures. Nudging the camp would not resolve issues related to fly-in and fly-out or foraging. *Recommendation*: install sprinklers, inflatable controls and spray deterrents along the interface between the camp and residences to increase the buffer without removing additional vegetation. Implement the measures more widely if the trial is successful. To minimise risk, measures must be installed under supervision of an ecologist when the flying-foxes are not present. These measures must not be implemented during sensitive periods in the flying-fox life-cycle to avoid the risk of young being aborted or falling.	
Drones	The use of drones (unmanned aerial vehicles) is being trialled by orchardists in Queensland as a technique to scare away foraging flying-foxes. It involves having an automated detection system that would trigger a drone to fly just above the canopy to deter a flying-fox before it tries to forage in the orchard. Further research is needed to determine if this technique would be safe and effective. Its potential application to deter flying-foxes from the Batemans Bay camp is considered high risk due to the numbers of flying-foxes (and associated high risk of collision between flying-foxes and drones), wide area of the camp (so multiple detection units and drones would be needed), and close proximity to residences (safety and amenity issues). *Recommendation*: Not recommended	n/a
Establish a LGA-wide Conservation Agreement	Council may seek to establish a Conservation Agreement with the Commonwealth Department of Environment that would be supported by a regional Flying-fox Management Plan. The aim would be to provide a broader framework to manage all flying-fox camps to reduce conflict between camps and the community in a timely manner (including creation of buffer zones if required), and protect and enhance foraging habitat within the local government area (LGA). The Conservation Agreement and regional plan would be consistent with the *EPBC Act Referral guideline for management actions in grey-headed and spectacled flying-fox camps*.	Initially, staff time

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Option	Comment	Cost
	Recommendation: Liaise with the OEH and DoE to determine if this approach would assist Council to achieve its objectives.	
Deterrent using 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. *Recommendation*: this technology would not be effective for flying-foxes so is not recommended	n/a

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Table 3: Level 3 actions

Option	Comment	Cost
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 unlikely to be 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. *Recommendation*: this is not recommended	high
Active dispersal of a camp using disturbance	A Draft Dispersal Plan (ELA 2016) outlines the dispersal methods, risks and costs based on the current camp size. The Plan acknowledged that the risks and costs would be reduced if dispersal were to commence when the extent of the camp is substantially smaller than its current maximum size. The Plan also makes clear that any type of dispersal or disturbance is high risk and unlikely to succeed because of the likelihood of the flying-foxes relocating to other unsuitable or inappropriate sites. Dispersed flying-foxes are also likely to continue returning to Batemans Bay, and so any dispersal program would need to be implemented over a long time period (years). Dispersal activities can include smoke, light, noise and use of technology. These activities are undertaken each morning for approximately two hours when the flying-foxes are returning to roost. Dispersal is a gradual process that requires very careful monitoring and management. Dispersal needs to be supervised by specialist ecologists and at least half of the dispersal team should be vaccinated for Australian Bat Lyssavirus.	$1-8M

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Option	Comment	Cost
	Dispersal activities should be scheduled so that they avoid sensitive periods in the flying-fox life cycle (generally September – January), days of heat stress and ideally initiated when the camp is small in size. *Recommendation*: as outlined in the Draft Dispersal Plan, dispersal is a very high risk and high cost strategy with low success rate based on previous experience. It is therefore not recommended.	
Passive dispersal of a camp through changing water management	Much of the existing camp at the Water Gardens and Catalina is associated with low-lying, swampy conditions. It has been suggested that these areas could be drained, filled and revegetated (e.g. with turf, flower beds and sparse trees) to remove flying-fox habitat. Any change to the current water management regime would require a full catchment study. This would include investigation of water quality and quantity, visual amenity, soils and sedimentation, as well as ecological values of areas directly and indirectly impacted. The catchment study could inform engineering concept and detailed designs for possible redevelopment of the stormwater infrastructure, subject to approvals. The risks and costs associated with this option are extremely high (e.g. potential acid sulphate soils, water pollution), and there would be numerous approvals required from the EPA and other agencies *Recommendation*: this option is not recommended because even though it would result in the flying-foxes relocating to another area (which may or may not be problematic) it would also have dramatic impacts to the Batemans Bay environment	>$1M
Declare a 'State of Emergency'	It has been suggested that a State of Emergency should be declared under the NSW *State Emergency and Rescue Management Act 1989* to negate the need for approvals under other legislation. Further investigation would be needed in consultation with relevant authorities to determine if this is possible. Even if all approvals could be avoided so that a dispersal action could theoretically proceed immediately, the logistics of organising a dispersal are extremely challenging so could not commencing immediately. Also the risks of the dispersal not having the desired outcome are high (e.g. the flying-foxes could relocate to an unsuitable area) and this is why dispersal needs to be carefully planned and implemented, including appropriate monitoring and follow-up.	n/a

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Option	Comment	Cost
	Recommendation: this is not recommended	

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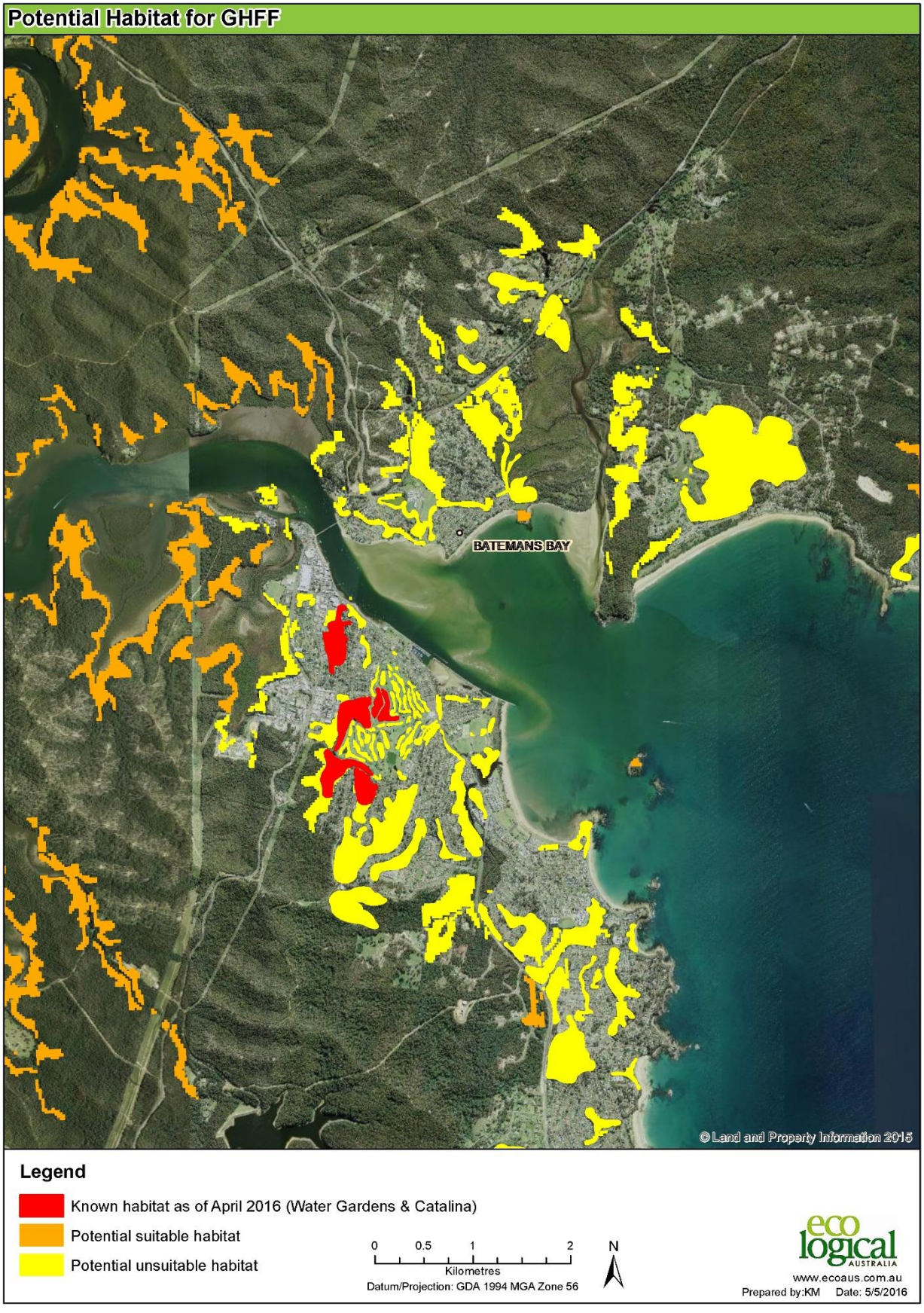

Figure 2: Potential habitat within approximately 5 km of the camp

3 Summary of recommendations

The following actions are recommended based on an assessment of risks, costs and likelihood of the action being targeted to the areas of greatest current impact.

Table 4: Summary of recommended actions

Action	Cost
Continue education and support programs through direct liaison with affected residents and business, and media such as radio, newspaper, social media (e.g. Facebook, Twitter), and Council and government agency websites. Costs covered by existing resources. Low risk to implement, but there is a risk of accentuating problems if community support and advice are not provided.	$30,000 pa (staff costs)
Council to continue to work with Essential Energy and other agencies to address risks and concerns regarding delivery of services.	Included in above costs
Expand the eligibility criteria / area for subsidised services in response to demand (recommend an additional $10,000 be made available). This is a low risk, low cost action that is targeted directly to areas of greatest need.	$30,000
Investigate the potential demand for property modifications and develop eligibility criteria (noting need for equity).	Included in staff costs above
Provide additional funds to remove Cocos palms in Batemans Bay to reduce noise and faecal drop impacts from foraging flying-foxes (recommend an additional $2000 be made available)	$10,000
Maintain 'potential suitable habitat' areas through appropriate land use planning and management so that there are alternative camp locations if needed due to natural processes or as a result of a dispersal action. Liaise with OEH to determine if there is a need to protect or enhance alternative suitable roosting habitat areas across NSW.	nil
Maintain the existing buffers and establish new buffers (by branch trimming or tree removal) in target locations in consultation with affected residents.	$5000 pa for buffer maintenance $30,000 for new buffers
Further investigation would be needed to determine if revegetation with ground covers or shrubs in some locations would be suitable or effective	Included in staff costs above
Install sprinklers, inflatable controls and spray deterrents along the interface between the camp and residences to increase the buffer without removing additional vegetation. Implement the measures more widely if the trial is successful. To minimise risk, measures must be installed under supervision of an ecologist when the flying-foxes are not present. These measures must not be implemented during sensitive periods in the flying-fox life-cycle to avoid the risk of young being aborted or falling.	Trial $100,000

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