



DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

# Subsidies for products and services to assist communities living with flying-foxes

Insights from flying-fox subsidy programs in New South Wales



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Cover photo: Flying-foxes roosting near a residence. Matthew Mo/DPIE

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## Executive summary

Communities living near flying-fox camps often struggle with impacts from noise, odour and flying-fox droppings. Land managers of flying-fox camps have a range of options to mitigate these impacts. Camp dispersals are not effective in the long term without ongoing actions and costs. It is often more effective to manage camps where they are, and help affected communities reduce camp impacts where possible. A range of products and services are available to affected communities to reduce flying-fox impacts. Land managers have started subsidy programs for these products and services to support affected communities. This report summarises six recent subsidy programs and evaluates their uptake and effectiveness for reducing flying-fox impacts.

Councils of the Eurobodalla, Ku-ring-gai, Cessnock, Tamworth and Sutherland local government areas have employed subsidy programs. Some offered a range of subsidies, while others addressed specific issues. Well-defined eligibility criteria provide a transparent system for determining which residents are entitled to subsidies. Approaches to these criteria may be based on a distance radius from the camps or an area in which most impacts occur. Some programs also grouped eligible residents into different tiers to preference those who were more affected. Subsidies were commonly delivered as reimbursements for purchases. Other councils provided upfront funding for purchases, which did not assure that legitimate purchases were made, but avoided additional administrative burden. The Eurobodalla subsidy program initially provided free handouts of products and services, but ceased this approach following a program review.

Overall, the most commonly offered subsidies were vehicle and clothesline covers, high-pressure cleaners and exotic tree removal. When vehicle and clothesline covers were offered, these products were generally more readily taken up than other subsidies; however, there were secondary issues associated with these products. Droppings would collect on covers making frequent removal cumbersome, and clotheslines could be damaged by strong wind gusts caught in covers. Rainwater first-flush diverters and pool covers were taken up by only a small number of residents. For communities relying on potable tank water, removing exotic trees that attract flying-foxes may assist in reducing contamination of water sources. Subsidies for exotic tree removal ranged in uptake between programs. There was substantial demand for the service from a community impacted by foraging animals rather than a nearby camp. This service may be more applicable to the broader community than other subsidies.

There was moderate demand for high-pressure cleaners, and they were generally effective for cleaning droppings from hard surfaces; however, residents were concerned about the ongoing effort required and the potential impact on water bills. There was moderate demand for air conditioners that allowed residents to keep windows closed against camp odours. Residents reported frustration about the loss of liberty, however, as well as potential impacts on energy bills. Where available, double-glazing subsidies were in high demand, achieving an average 65% reduction in noise levels.

Some of the subsidy programs were co-funded by the NSW Government's Flying-fox Grants Program, which was administered by Local Government NSW.

## Introduction

In recent decades, flying-fox camps have increasingly been forming in urban areas due to access to reliable food sources, protection from some predators and possibly ease of navigation in built-up areas.

Communities living near flying-fox camps often struggle with impacts from noise, odour, flying-fox droppings and damage to vegetation. Community concerns about contracting diseases carried by flying-foxes are also common. Land managers of flying-fox camps, typically local councils, can assist affected communities by working to reduce the impacts of camps on surrounding residents and businesses.

Camp dispersals are ineffective in the long term without ongoing actions and costs or the complete removal of roost vegetation. Effective in-situ management of flying-fox camps is often the preferred approach. Land managers increasingly rely on community engagement and assistance as key strategies for flying-fox camp management.

## Products and services to mitigate flying-fox impacts

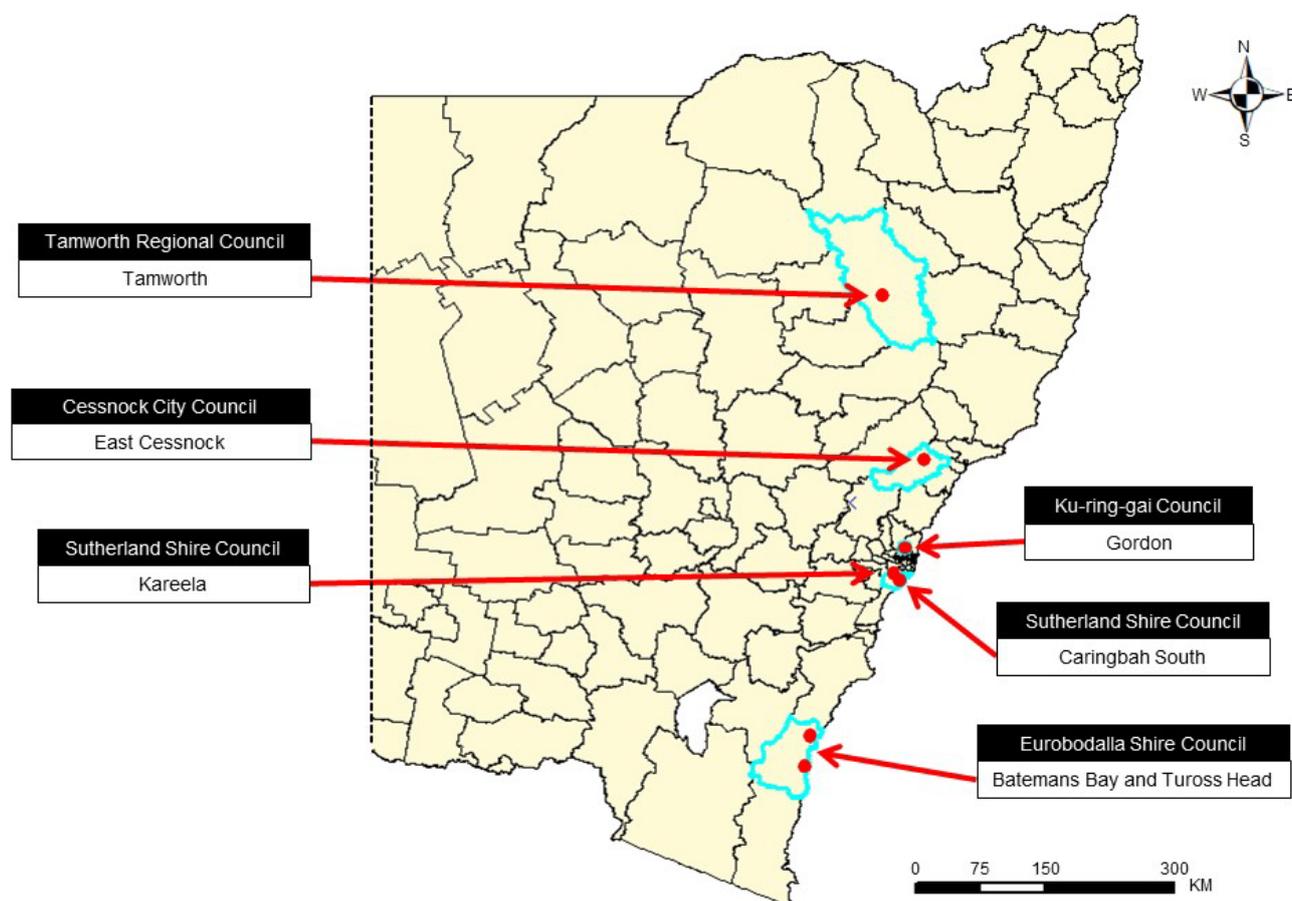
There is a range of products and services that may assist residents and businesses to reduce the impacts of flying-foxes on their amenity (Table 1).

**Table 1** Products and services that may assist in reducing the impacts of flying-foxes on community amenity

Product or service	Purpose
Vehicle cover	Prevent droppings soiling vehicles
Carport	Prevent droppings soiling vehicles, boats or caravans
Clothesline cover	Prevent droppings soiling washing on clotheslines
Clothes dryer	Replace the need to hang washing on clotheslines
Pool or spa cover	Prevent droppings soiling pool or spa water
Shade cloth, marquee or pergola	Prevent droppings soiling outdoor living and entertainment areas
Rainwater first-flush diverter	Prevent droppings contaminating potable water in tanks
High-pressure water cleaner	Clean droppings off hard surfaces
Cleaning services	Clean droppings off hard surfaces
Air conditioner	Provide air flow and cooling to compensate for closed doors and windows, preventing odour from entering dwellings
Fragrance dispenser or deodoriser	Mask odours within dwellings
Double-glazing of windows	Reduce noise entering dwellings
Door seals	Reduce noise entering dwellings
Screen planting	Remove view of flying-fox camp from dwellings
Removal of exotic trees or fruits	Eliminate flying-fox food source near dwellings
Tree netting	Protect cultivated fruit from flying-fox damage
Lighting	Discourage flying-fox foraging near dwellings
Subsidised water bills	Compensate for increased water usage from removing droppings
Subsidised energy bills	Compensate for increased energy usage from using electrical appliances

## Case studies of recent subsidy programs

This report provides an overview of six recent subsidy programs for flying-fox impact mitigation (Figure 1; Table 2). Program design varied in each case study, providing useful information for other land managers seeking to design and implement similar programs.



**Figure 1** Locations of subsidy programs outlined in this report, showing council area (black box) and flying-fox camps (white box)

**Table 2** Case studies of subsidy programs outlined in this report

Land manager	Flying-fox camp/s	Species present
Eurobodalla Shire Council	Water Gardens, Catalina, Tuross Head	Grey-headed flying-fox
Ku-ring-gai Council	Gordon	Grey-headed and black flying-fox
Cessnock City Council	East Cessnock	Grey-headed and little red flying-fox
Tamworth Regional Council	Tamworth	Grey-headed and little red flying-fox
Sutherland Shire Council	Kareela	Grey-headed flying-fox
Sutherland Shire Council	Caringbah South	Grey-headed flying-fox

# Batemans Bay and Tuross Head

## Background

In 2012, grey-headed flying-fox camps were recorded in the Water Gardens Town Park in Batemans Bay and the Catalina Country Club Golf Course. The impacts of these camps on the Batemans Bay community are primarily managed by Eurobodalla Shire Council. The Water Gardens camp has been particularly contentious, being situated immediately adjacent to residential properties.

In 2015, local mass flowering attracted large influxes of flying-foxes to the South Coast region. During this time, the Water Gardens camp extended to the reserve perimeter, encroaching on trees overhanging residential properties. Following this event, council introduced a subsidy program in January 2016. From March to July 2016, an even larger influx arrived, causing the Water Gardens camp to encroach on neighbouring properties, and the Catalina camp spilled into adjacent roosting habitats beyond the golf course, which included trees in backyards. This reinforced the need to assist communities to reduce the impacts of the flying-foxes on their amenity. With funding from the NSW Government, council implemented a dispersal program to move flying-foxes away from high conflict areas.

The Tuross Head flying-fox camp was first reported in February 2017. This camp is situated in remnant bushland on private land, 38 kilometres south of Batemans Bay. The camp is usually surrounded by bushland but has filled to the edges where the camp becomes visible from homes, creating some amenity issues.

## Program design

When the Eurobodalla subsidy program was first released in 2016, residents within 300 metres of the Water Gardens and Catalina camps were eligible to receive free products and services. An expression of interest was developed for residents to indicate their preferences for vehicle covers, clothesline covers, free hire of high-pressure cleaners and removal of cocos palms (Table 3).

Council has adapted the program over time in response to changes in the flying-fox situation and its own reviews:

- Concessions for free hire of high-pressure cleaners were made for other shire residents when demand near the camps was low.
- During the March–July 2016 influx, residents in South Durras were granted the option of cocos palm removal to reduce dropping impacts on rainwater tanks.
- In 2018 there were community concerns around the Tuross Head camp. The council responded by extending the program to offer free vehicle covers to residents within 300 metres of the camp.

**Table 3** Eligibility criteria for residents to receive products and services under the Eurobodalla subsidy program

Product or service	Eligibility criteria
Vehicle cover	Residents within 300 metres of the Batemans Bay and Tuross Head camps
Clothesline cover	Residents within 300 metres of the Batemans Bay camps
Free hire of high-pressure cleaner	Residents within 300 metres of the Batemans Bay camps, and other residents when demand was low
Removal of cocos palm	Residents within 300 metres of the Batemans Bay camps, and South Durras

Council reviewed the early program and changed the design in 2019. Under the revised program, eligible residents will be able to apply for a once-off subsidy. Subsidies will be delivered as reimbursements instead of being provided with free products. To ensure the program prioritises the most affected residents, properties within 300 metres of the camps are grouped into three tiers (Table 4). Different maximum funding amounts apply to each tier. The revised program also incorporates an expanded range of products and services (air deodorisers, cleaning products, shade sails, pool covers, air conditioners, clothes dryers, double-glazing), as well as an option for alternative products and services to be suggested for council's consideration.

**Table 4** Eligibility criteria for funding amounts in the revised Eurobodalla subsidy program

Tier	Eligibility criteria	Maximum funding amount
1	Properties within 50 metres of the camps	Up to \$500 per resident
2	Properties from 50 to 200 metres of the camps	Up to \$250 per resident
3	Properties from 200 to 300 metres of the camps	Up to \$125 per resident

## Subsidy uptake

Subsidies were taken up by 190 residents in the Eurobodalla Shire, mostly by residents directly adjacent to the camps (Table 5). There was greatest demand for vehicle and clothesline covers. Demand for high-pressure cleaner hire was higher around the Water Gardens, while demand for cocos palm removal was higher around the Catalina camp. Few subsidies were taken in Tuross Head. This may reflect the small number of residents who were significantly impacted.

In South Durras, 19 residents accessed the subsidies, removing 39 cocos palms. This represented almost half the cocos palms removed through the program.

Concessions for other shire residents to access high-pressure cleaner hire resulted in five residents accepting the subsidy. Most of them were in Surfside, which is more than one kilometre from the camps on the other side of the Clyde River.

Deodorisers were not formally offered under the initial program but were provided to three residents near the Water Gardens upon request.

**Table 5** Uptake of subsidies offered by Eurobodalla Shire Council by communities directly affected by flying-fox camps and communities affected by foraging flying-foxes

Locations	Number of residents	Vehicle cover	Clothesline cover	High-pressure cleaner hire	Cocos palms removed	Deodoriser
<b>Flying-fox camps</b>						
Water Gardens	90	55	68	17	15	3
Catalina	72	52	70	6	30	
Tuross Head	4	4				
<b>Foraging locations</b>						
South Durras	19				39	
Maloneys Beach	1			1		
Sunshine Bay	1			1		
Surfside	3			3		
<b>Total</b>	<b>190</b>	<b>111</b>	<b>138</b>	<b>28</b>	<b>84</b>	<b>3</b>

## Feedback from subsidy recipients

From August to September 2016, Eurobodalla Shire Council released an online survey to collect feedback on the implementation of both the subsidy and dispersal programs. The feedback from this survey was incorporated into the 2019 program design. Three questions in the survey were relevant to the subsidy program:

- Did you apply for/use any of council's subsidised services?
- Were the subsidised services helpful in dealing with the impacts of the flying-foxes?
- Do you have any suggestions for other subsidised services that would help you when flying-foxes are present in large numbers?

Of the 93 survey respondents, 31 had accessed subsidies. The majority of respondents who received subsidies indicated they were useful for mitigating flying-fox impacts. The survey did not seek feedback on the effectiveness of each product or service. Residents raised some concerns:

- Vehicle and clothesline covers collect droppings, which then need to be cleaned by residents.
- Regular removal of vehicle covers is cumbersome and difficult during wet conditions.
- Clothesline covers caused damage to clotheslines when caught in strong wind gusts.
- The need for ongoing use of high-pressure cleaners impacted water bills.

Survey respondents suggested a range of needs to consider for future subsidy programs:

- subsidies to address flying-fox droppings on solar panels
- clothes racks for hanging washing indoors
- perfumed candles
- subsidised water bills
- rainwater first-flush diverters.

# Gordon

## Background

Flying-foxes have been recorded in the Ku-ring-gai local government area since early settlement. The Gordon flying-fox camp is believed to have formed in 1965 after a bushfire destroyed a camp in West Wahroonga. At the time, there were fewer flying-fox camps in the Sydney metropolitan area, making the Gordon camp exceptional. In the early years, it was also recognised as the only significant maternity site for grey-headed flying-foxes south of Wingham Brush on the Mid North Coast. The camp is occupied primarily by this species; however, black flying-foxes have also been recorded. Little red flying-foxes have occasionally been present but are considered rare visitors.

The camp is situated within the Ku-ring-gai Flying-fox Reserve, a 14-hectare bushland remnant that is covered by a 1991 conservation agreement between Ku-ring-gai Council and the NSW Minister for Energy and Environment. Flying-foxes have generally roosted far enough from adjacent residential properties to not have a detrimental impact on amenity; however, over the last five years, flying-foxes have roosted at the boundary of the reserve, causing amenity impacts on adjacent residents.

In January 2018, Ku-ring-gai Council received \$50,000 under the Flying-fox Grants Program to implement the Ku-ring-gai Flying-fox Reserve Management Plan 2013 and 10-year Site Management and Roosting Habitat Plan 2018–2028. A subsidy program for double-glazing of windows was included in this implementation.

## Program design

The Gordon subsidy program focused on the installation of double-glazing on windows to reduce flying-fox noise penetrating nearby homes. Eligibility criteria were designed in three tiers to include properties within 90 metres of the centre of the camp but prioritise those within 80 metres (Table 6). Council offered subsidies to 15 properties, offering up to \$5000 to Tier 1 properties. With the remaining funds, council offered subsidies of up to \$5000 to Tier 2 properties, and up to \$4000 to Tier 3 properties. Proposed works were agreed between residents and council prior to works commencing. Subsidies were released upon council receiving a copy of the paid invoice and email correspondence from the supplier confirming the resident's home address.

Double-glazing was not practical for all eligible residents. As a result, council made concessions to extend the program to include any retrofitting works that would reduce noise inside homes; however, no residents pursued this option.

**Table 6** Tiered eligibility criteria designed for the Gordon subsidy program

Tier	Eligibility criteria
1	Properties which are wholly or partly within an 80-metre radius of the centre of the Gordon flying-fox camp, averaged across 2013–2017.
2	Properties in which Ku-ring-gai Council has recorded roosting flying-foxes between 2013 and 2017 that are not eligible for Tier 1.
3	Properties which are wholly or partly within a 90-metre radius of the centre of the Gordon flying-fox camp, averaged across 2013–2017, that are not eligible for Tiers 1 and 2.

## Subsidy uptake

Subsidies for double-glazing were taken up by 11 residents. Most of these residents spent between \$4000 and \$8000 in retrofitting, depending on suppliers and the number and size of windows retrofitted. In most cases, subsidies did not cover the full costs of retrofitting.

## Feedback from subsidy recipients

In April 2018, Ku-ring-gai Council released an online survey to the 11 subsidy recipients, to which nine responded. The survey questions were as follows:

- What did you install?
- How much did the work cost in total?
- Thinking about the noise impacts of the flying-fox camp that your household experienced, on a scale of 1–10 where 1 is very minor and 10 is unbearable, what was the situation like prior to installation?
- Thinking about the noise impacts of the flying-fox camp that you experienced, on a scale of 1–10 where 1 is very minor and 10 is unbearable, what is the situation like post-installation?
- Do you consider the retrofitting to have been successful?
- How well do you feel council managed the rebate program?

Survey feedback indicated that double-glazing was effective in mitigating noise impacts for all but one survey respondent. The resident that indicated otherwise was only able to install double-glazing in one room, hence the limited reduction in noise. As part of the survey, residents were asked to rate the noise impacts on a scale of one to ten before and after installation. Ratings from the eight residents who installed double-glazing were a mean 8.9 prior to installation and 3.1 post-installation. This equates to an average 65% reduction in noise impacts.

The survey did indicate that some residents felt a loss of personal freedom from not being able to leave windows open when flying-foxes were present.

# East Cessnock

## Background

A grey-headed flying-fox camp was first reported on Crown land behind the East Cessnock Primary School in late 2011. This occurred during a flying-fox food shortage in eastern Australia. The camp is situated within a 4.2-hectare bushland remnant surrounded by the primary school, an industrial lot and residential properties. It is generally occupied by fewer than 7000 flying-foxes, however, larger influxes have occurred. In December 2015, little red flying-foxes arrived, and the camp numbers increased to 150,000 individuals from February to May 2016. This resulted in the camp spilling into adjacent roosting habitat and encroaching on nearby residential and industrial properties. During this time, residents reported stress and respiratory complications associated with noise and odour from the camp.

In December 2017, Cessnock City Council received \$50,000 under the Flying-fox Grants Program to implement the East Cessnock Flying-fox Camp Management Plan, part of which funded a subsidy program that was introduced in April 2018.

## Program design

Council researched local costs for vehicle covers, clothesline covers, pool covers and high-pressure cleaners to determine minimum purchase prices for each product. Subsidies were set at 50% of the minimum purchase price for each product (Table 7). Owners and tenants of residential properties within 500 metres of the camp were eligible, with preference given to properties within 400 metres. This covered 279 properties. Eligible owners and tenants could apply for multiple subsidies. Council awarded subsidies at its discretion based on overall demand. Successful applicants received a cheque to the value of the subsidy amount for the selected product.

**Table 7** Maximum reimbursement amounts for products offered by the East Cessnock subsidy program, and uptake by residents

Product	Minimum purchase price	Subsidy amount	Uptake by residents
Pool cover	\$17.50 per m <sup>2</sup>	\$8.75 per m <sup>2</sup>	3
Vehicle cover	\$60.00	\$30.00 each	31
Clothesline cover	\$199.00	\$99.50 each	25
High-pressure cleaner	\$99.00	\$49.50 each	28

## Subsidy uptake

Twenty-nine residents accessed the subsidies, most of whom received multiple subsidies. Vehicle covers were the most common subsidy, followed by high-pressure cleaners and clothesline covers (Table 7). Pool covers were installed by three residents.

The program was not fully subscribed by eligible residents. Two residents more than 500 metres from the camp also received subsidies.

## Feedback from subsidy recipients

In November 2018, council distributed a postal survey to residents who had accessed subsidies. The survey questions were as follows:

- What items did you install or use?
- Were these items effective in reducing the flying-fox impacts on you and your property?
- What equipment or services would have been effective in reducing flying-fox impacts?
- Do you anticipate needing a subsidy for equipment or services in the future?
- If support was offered in the future, what subsidised equipment or services would you consider?

Survey uptake was low, only attracting nine responses. Subsidies did not appear to reduce flying-fox impacts for most residents, who reported the following complaints:

- Regular removal of vehicle covers is cumbersome.
- It was difficult to remove soiled vehicle covers without coming into contact with droppings.
- Covers protected cars and washing from droppings but did not address noise and odour issues.
- It was onerous to have to use high-pressure cleaners several times per day.

# Tamworth

## Background

Flying-foxes have had an occasional presence in Tamworth for many years. Consistent seasonal occupancy began in June 2012. The current flying-fox camp is situated in riparian vegetation along the Peel River. The camp occupies two areas, sometimes referred to as separate camps. One section of the camp is situated above the junction of the Goonoo Goonoo Creek, sometimes referred to as the Gipps Street camp. A second section is situated below the creek junction, sometimes referred to as the King George V Avenue camp. Both grey-headed and little red flying-foxes roost in Tamworth, at times numbering over 80,000 individuals. Nearby residents report impacts from foraging activity in street and backyard trees.

In October 2016, Tamworth Regional Council received \$50,000 from the Flying-fox Grants Program to implement the Peel River Flying-fox Camp Management Plan. Some of these funds were dedicated to a subsidy program offered in May 2017 to residents affected by the King George V Avenue section of the camp.

## Program design

The subsidy program was bounded by King George V Avenue, East Street, New England Highway and Crawford Street. Eligible residents were invited to apply for partial reimbursement of the cost of purchasing vehicle and clothesline covers, rainwater first-flush diverters and/or exotic tree removal. For vehicle and clothesline covers and rainwater first-flush diverters, reimbursements were capped at half their mean market value as determined by council (Table 8).

Reimbursements for exotic tree removal were based on arborist quotes. Council sought suggestions from residents for alternative subsidies to reduce flying-fox impacts. Subsidies were subject to property inspections by council officers to confirm flying-fox impacts.

**Table 8** Reimbursement caps in the Tamworth subsidy program, and uptake by residents

Product/service	Mean market value	Reimbursement cap	Uptake
Vehicle cover	\$150	\$75	4
Clothesline cover	\$250	\$125	5
Rainwater first-flush diverter	\$30	\$15	2
Exotic tree removal	Dependent on quote	Dependent on quote	0
Other equipment suggested by residents: <ul style="list-style-type: none"> <li>high-pressure cleaner</li> </ul>	N/A	N/A	1

## Subsidy uptake

Subsidies were accessed by 10 residents, two of whom accessed two subsidies. Most were for purchasing vehicle and clothesline covers. One resident successfully requested purchase of a high-pressure cleaner. Two residents more than five kilometres from the camp requested vehicle and clothesline covers. These requests were not granted as the flying-fox impacts on these residents were not considered significant.

## Feedback from subsidy recipients

In May 2019, council made telephone contact with residents who had accessed subsidies. Five subsidy recipients were available to provide feedback to the following survey questions:

- How did you become aware that subsidies were available?
- What items did you install or use?
- Were these items effective in reducing the flying-fox impacts on you and your property?
- What equipment or services would have been effective in reducing flying-fox impacts?
- Do you anticipate needing a subsidy for equipment or services in the future?
- If support was offered in the future, what subsidised equipment or services would you consider?

The feedback was generally negative. While subsidies assisted with specific issues, the broader problem of flying-fox impacts remained unresolved. Residents expressed interest in future subsidies, particularly for double-glazing, high-pressure cleaners, laundry services, clothes dryers and air conditioners.

# Kareela

## Background

In February 2008, a grey-headed flying-fox camp established in a 2.2-hectare bushland remnant in Kareela, southern Sydney. The camp is adjacent to residential properties and three schools, resulting in droppings, noise and odour issues. The impacts on the community were heightened by concerns for the welfare and safety of special needs students in one of the adjacent schools. The camp was subject to dispersal activities in August 2015, however, flying-foxes re-formed the camp in November 2016.

In May 2017, Sutherland Shire Council received \$27,780 from the Flying-fox Grants Program, which was used to fund a subsidy program offered to both affected residents and the schools.

## Program design

The Kareela subsidy program offered capped reimbursements for an extensive range of equipment and services (Table 9). Properties within 100 metres of the camp boundary were deemed eligible for subsidies, equating to 24 residents and three schools. Reimbursement amounts were capped based on distance from the camp to prioritise residents closer to the camp (Table 10). A budget of \$45,600 was available for the three schools, which allowed for a maximum subsidy of \$15,200 per school. When one school declined the funds, this share was divided equally between the remaining schools, so the maximum subsidy became \$22,800 per school. Funds were released upon the presentation of a paid invoice.

**Table 9** Reimbursement caps in the Kareela subsidy program, and uptake by residents and schools  
Shading indicates eligible products and services.

Product/service	Reimbursement cap	Community sector	Resident uptake	School uptake
Palm tree fruit removal	\$100 per tree	Resident	0	–
Palm tree removal	\$1,000 per tree	Resident	1	–
Vehicle cover	\$240 per cover	Resident	1	–
Clothesline cover	\$290 per cover	Resident	0	–
Pool cover	\$500 per cover	Resident	1	1 <sup>a</sup>
Double-glazing	\$800 per m <sup>2</sup>	Resident	0	–
Single carport	\$1,800	Resident, school	0	1
Double carport	\$3,500	School	–	0
Air conditioner	\$1,800 per unit	Resident	4	–
High-pressure cleaner	\$500 per unit	Resident, school	8	0
Shade cloth	\$100 per m <sup>2</sup>	School	–	0
Fragrance dispensers	\$60 per dispenser	School	–	0
Cleaning costs	\$50 per hour	School	–	0

<sup>a</sup> Pool covers were not an eligible subsidy for schools; however, an agreement was made between council and one of the schools that a pool cover would be more beneficial than a shade cloth for mitigating droppings issues.

## Subsidy uptake

The Kareela program was not fully subscribed. Subsidies were accessed by 15 residents, or more than half of the eligible residents. A large proportion of subsidies were used to purchase high-pressure cleaners. Air conditioners were also moderately sought. Vehicle covers, pool covers and tree removal were not popular.

**Table 10** Tiered eligibility criteria designed for the Kareela subsidy program

Tier	Eligibility criteria
1	Properties within 50 metres of the camp boundary; reimbursement amounts range from \$1500 for the closest property to \$1290 for the furthest property.
2	Properties from 50 to 75 metres of the camp boundary; reimbursement amounts ranged from \$750 for the closest property to \$600 for the furthest property.
3	Properties from 75 to 100 metres of the camp boundary; reimbursement amounts ranged from \$500 for the closest property to \$355 for the furthest property.

Two schools accessed the subsidies. One school installed a carport, while the other school negotiated for a commercial-size pool cover to be installed instead of a shade cloth.

## Feedback from subsidy recipients

In May 2018, council posted a survey form to eligible residents, asking for feedback on both the effectiveness of the subsidised products and services and why some residents did not access the subsidy. The survey questions were as follows:

- Did you make a claim for purchase(s) under the 2017 Sutherland Shire Council Flying-fox Amenity Impact Reduction Grant?
- What did you purchase?
- Has your amenity issue improved as a result of your chosen item/action?
- Were there any additional items/actions that you feel would have better addressed your specific amenity issue?
- If you did not make a claim, what was the reason?
- Did you feel the amenity grant was a worthwhile use of council funds?
- Would you recommend the Flying-fox Amenity Grant to other councils considering a similar grant program?
- Would you have preferred an alternative to the Flying-fox Amenity Grant?

Seven residents responded, six of whom had accessed subsidies. Subsidies for a pool cover, air conditioners and high-pressure cleaners were represented in these responses.

While most respondents supported the concept of a subsidy program, they did not necessarily consider the subsidised product effective in reducing flying-fox impacts. This was likely driven by sentiments that subsidies did not compensate for the impacts experienced, and that removal of flying-foxes was more desirable.

Council engaged directly with the schools for feedback, who reported that the pool cover and carport effectively protected assets.

## Caringbah South

### Background

The Caringbah South flying-fox camp is situated within the EG Waterhouse National Camellia Gardens, often referred to as the Camellia Gardens camp. The camp formed in July 2016 during the onset of a nectar shortage across eastern Australia. It was subsequently managed by Sutherland Shire Council as a splinter camp of the Kareela flying-fox camp, which had been dispersed in August 2015. To date, only grey-headed flying-foxes have been recorded at the site. Council is concerned about the impact of roosting flying-foxes on heritage trees. Nearby residents have reported noise and dropping impacts from foraging flying-foxes.

Flying-foxes were attracted to cocos palms on residential properties, increasing the frequency of disturbances for these residents. The sticky cocos palm fruits result in droppings that are highly viscous and difficult to clean from surfaces. Council initiated a cocos palm subsidy program in December 2018.

### Program design

Council allocated a budget of \$11,000 to fund the program. Residents within 250 metres of the camp were eligible. Letters of offer were sent to these 163 residents inviting applications before the closing date. Program funds were apportioned to applicants on a sliding scale based on factors including proximity to the camp, number of cocos palms on the property and personal hardship. Examples of personal hardship included applicants with low income or pensioners. Once pre-approved, applicants were given until 31 May 2019 to engage arborists to complete tree removal. Council required the claim form and a copy of the paid invoice by this date to release the subsidy.

**Table 11** Maximum subsidy amounts allocated to nine pre-approved applicants in the Caringbah South subsidy program, and the uptake of subsidies by eight applicants

Applicant	Maximum subsidy	Subsidy claimed	Financial outcome	Cocos palms removed
1	\$1,100	\$700	Full reimbursement	3
2	\$1,320	\$1,000	Full reimbursement	3
3	\$1,100	\$1,100	Partial reimbursement	1
4	\$1,100	\$1,100	Partial reimbursement	7
5	\$1,430	\$0	Subsidy unclaimed	0
6	\$1,100	\$1,100	Partial reimbursement	2
7	\$1,430	\$1,430	Partial reimbursement	3
8	\$1,100	\$1,100	Partial reimbursement	1
9	\$1,320	\$1,320	Partial reimbursement	2

### Subsidy uptake

Nine residents applied for subsidies (Table 11). Subsidy amounts allocated to each property were between \$1100 and \$1430. Subsidies were released to eight residents, two of whom managed to cover the full costs of tree removals within their maximum subsidy amount. The remainder claimed their maximum subsidies as partial reimbursements. In total, the program facilitated removal of 22 cocos palms.

## Feedback from subsidy recipients

In July 2019, council distributed a survey form to eligible residents. The survey questions were:

- Did you make a claim for the cocos palm subsidy?
- How many cocos palms were removed?
- Have amenity issues improved?
- If you did not make a claim, what was the reason?
- Did you feel the cocos palm subsidy was a worthwhile use of council funds?
- Would you recommend the cocos palm subsidy to other councils considering a similar grant program?

Survey forms were returned by eight residents, two of whom had claimed subsidies. They both indicated that the amenity issue had improved since removing the cocos palms. One resident who did not claim a subsidy reported improvement to their amenity resulting from neighbours participating in the program.

Most respondents who did not make a claim had no cocos palms on their property. One resident was satisfied to routinely remove the fruits instead of removing the tree. Some residents reported that the application process was difficult or confusing.

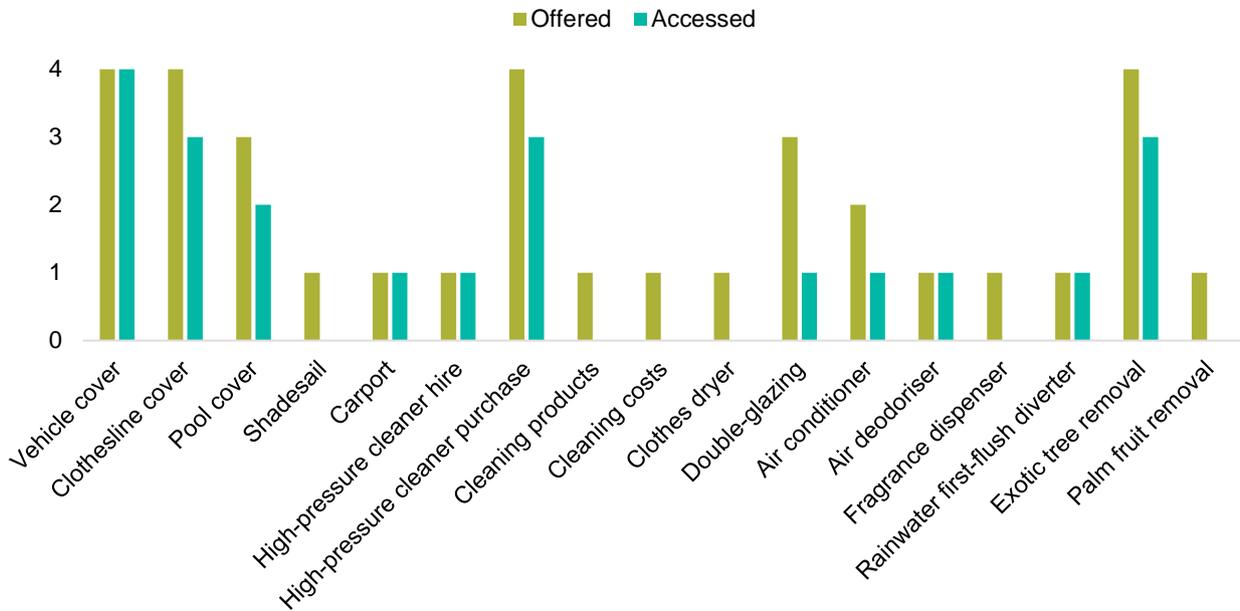
Most residents indicated the program was a worthwhile use of council funds and recommended this program for other councils to consider.

## Insights from past subsidy programs

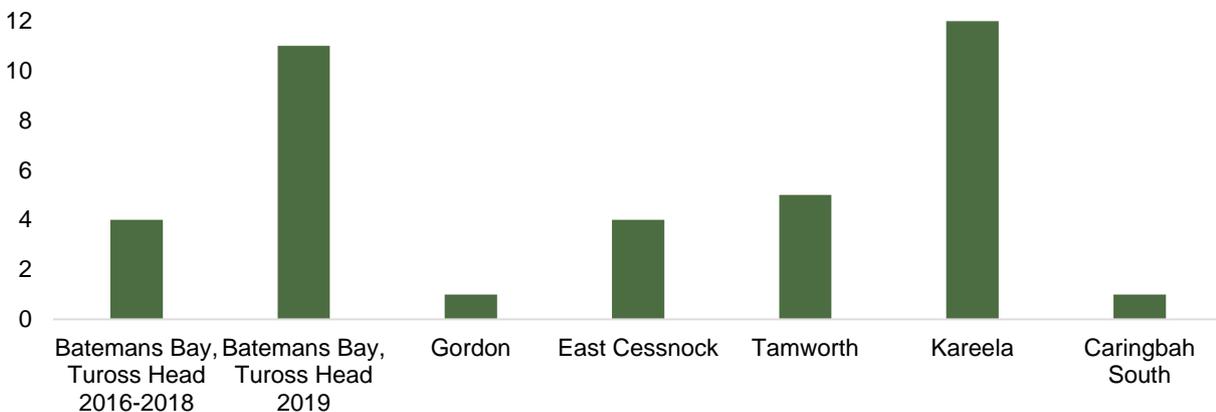
The subsidy programs outlined in this report varied in many aspects. While the end goal of each program was conflict mitigation, the nature of conflict varied case by case. Land managers considering similar programs should carefully tailor their programs to their communities and the specific causes of conflicts experienced near the camp.

### Suite of products and services offered

The most commonly offered subsidies were vehicle and clothesline covers, high-pressure cleaners and exotic tree removal (Figure 2). Where communities experienced many impacts on amenity, councils offered a range of products and services; for example the Eurobodalla and Kareela subsidy programs (Figure 3). Where there was one major amenity issue, programs focused on one product or service; for example, the Gordon and Caringbah South subsidy programs. In East Cessnock and Tamworth, impacts were mostly associated with droppings. Accordingly, these programs focused on products and services to mitigate those issues.



**Figure 2** Number of subsidy programs offering the various products and services, and level of uptake



**Figure 3** Number of products and services offered in each subsidy program

## Uptake and effectiveness of products and services

In programs that included vehicle and clothesline covers, these products had greater uptake than other subsidies. Despite this, both products resulted in secondary issues for some residents (Table 12). Droppings collect on covers, requiring cleaning effort by the user. The frequent need to remove covers from vehicles can be cumbersome. There were also reports of clotheslines being damaged by strong wind gusts caught in the covers. There was only one case of a carport being installed, which appeared to alleviate impacts on vehicles parked underneath.

High-pressure cleaners had moderate uptake. The equipment was generally effective for cleaning droppings from hard surfaces; however, secondary issues were reported, including the ongoing cleaning effort required by users, and concern about increased water bills.

Air conditioners were the second most preferred product by residents in the Kareela subsidy program; however, some residents complained that the need to keep windows and doors closed meant a loss of liberty. Frequent use of air conditioners may also have a significant impact on energy bills.

**Table 12** Effectiveness of products and services accessed in the subsidy programs, and reported issues arising from these subsidies

Product or service	Effectiveness	Associated issues
Vehicle cover	Protected vehicles from droppings but presented secondary issues.	Cumbersome to remove when vehicles are needed, especially in wet conditions. Droppings collect on covers and need cleaning, which can be unpleasant and result in physical contact with droppings.
Carport	Protected vehicles from droppings.	No issues reported in feedback surveys.
Clothesline cover	Mostly protected washing on clotheslines from droppings but presented secondary issues.	Droppings collect on covers and need cleaning, which can be unpleasant and result in physical contact with droppings. When strong wind gusts were caught in covers, clotheslines were vulnerable to damage.
Pool cover	Protected swimming pools from droppings.	No issues reported in feedback surveys.
High-pressure cleaner	Generally effective for removing droppings from hard surfaces but presented secondary issues.	Ongoing need to clean, potentially impacting water bills.
Air conditioner	Generally provided air flow and cooling when windows and doors were shut but presented secondary issues.	Despite benefits from air conditioning, the need to keep windows and doors closed presented a loss of liberty. Air conditioner use potentially impacted energy bills.
Double-glazing of windows	Reduced the amount of noise penetrating homes.	No issues reported in feedback surveys, except when an insufficient number of windows were retrofitted with double-glazing, resulting in inadequate noise reduction.
Removal of exotic trees	Eliminated food source, which is expected to reduce flying-foxes visiting these properties.	No issues reported in feedback surveys.

Double-glazing subsidies were readily sought in the Gordon subsidy program, with 11 of the 15 eligible residents taking up the subsidy. These property modifications were effective for reducing noise levels within homes, with resident ratings before and after retrofitting showing a 65% reduction in noise levels. Some residents reported that having to keep windows shut represented a loss of liberty.

Subsidies for exotic tree removal varied in uptake between programs. Removal of such trees likely reduced foraging opportunities for flying-foxes; however, issues may persist if there are other food trees attracting flying-foxes. No councils reported any secondary issues associated with removing exotic trees. The service appeared to deliver sustained conflict reduction. In the Eurobodalla subsidy program, there was considerable demand for exotic tree removal from a community impacted by flying-fox foraging. This service may also provide benefits to other communities impacted by large numbers of foraging flying-foxes.

Rainwater first-flush diverters were only offered in the Tamworth subsidy program. There was low uptake compared with vehicle and clothesline covers. As with pool covers, this product only applied to a small number of residents. Where affected communities rely on tank water, removal of exotic trees that attract flying-foxes may offer a longer-term solution.

## Eligibility criteria

Well-defined eligibility criteria provide a transparent system for determining whether residents and other stakeholders are entitled to subsidies. Subsidy programs applied two different approaches to assess eligibility:

- **Distance-based approach** – identified properties within a certain radius of the camp as eligible. This was used in most programs.
- **Landmark-based approach** – defined an area in which residents were most affected by flying-foxes. Only the Tamworth subsidy program used this approach because the primary conflict area was enclosed by four roads. Properties that were eligible had to be situated within this area.

Land managers considering eligibility criteria should consider which approach most accurately captures the residents and other stakeholders most affected by flying-foxes.

Furthermore, land managers may consider grouping eligible residents into different tiers to give preference to those who are more affected. Some of the programs used tiering to allocate higher subsidies to residents closer to the camp. Tiering may also be used to guide the timing of the available subsidies; for example, the Gordon subsidy program was open to applications from the residents closest to the camp before those who lived further away.

## Delivery of subsidies

The subsidy programs varied in their delivery (Table 13). Reimbursement was the most common approach, followed by upfront funding for purchases. In the Eurobodalla program, products were initially provided at no cost to residents. On review, this council changed to a reimbursement system.

In most cases, councils required that paid invoices be presented before subsidies were released. This approach demonstrated that applicants had purchased the intended equipment and services; however, this approach can add administrative burden for councils, especially if many subsidies are approved.

In contrast, the direct funding approach relies on the applicant proceeding with the agreed purchases. In any case, they may be satisfied with the financial compensation. Provided only affected residents are eligible to receive funds, this approach may result in similar rates of resident satisfaction to a reimbursement approach.

**Table 13** Subsidy delivery approaches

Subsidy program	Approach to delivering subsidies
Eurobodalla	Direct provision at no cost (2016–2018); reimbursement within approved amount per resident (2019)
Gordon	Reimbursement within approved amount per resident
East Cessnock	Direct funding based on specified amounts per product, representing 50% of minimum purchase price as determined by council
Tamworth	Reimbursement based on approved amounts per product or service, representing 50% of mean market value as determined by council
Kareela	Reimbursement within approved amount per resident and specified capped amounts per product or service, representing 100% of mean market value as determined by council
Caringbah South	Reimbursement within approved amount per resident