

Review of past flying-fox dispersal actions between 1990-2013.

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To understand the utility of dispersals as a management tool to resolve conflict between humans and flying-foxes, the outcomes of 17 recent camp dispersal attempts were systematically reviewed. The review identified a set of common outcomes of camp dispersals that should guide their use in Australia. A further observation was that the outcomes of dispersals are often not known for several years.

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

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

Further reading:

Roberts B.J., Catterall C.C., Eby P., and Kanowski J.K. (2012a) Long-distance and frequent movements of the flying-fox *Pteropus poliocephalus*: implications for management. *PLoS ONE*, **7**(8): e42532. doi:10.1371/journal.pone.0042532.

Roberts B.J., Eby P., Catterall C.C., Kanowski J.K. and Bennett G. (2012b) The outcomes and costs of relocating flying-fox camps: insights from the case of Maclean, Australia, pp. 277-287 in *The Biology and Conservation of Australasian Bats*, edited by B. Law, P. Eby, D. Lunney and L. Lumsden. Royal Zoological Society of NSW, Mosman, NSW, Australia.

¹ Local area is defined as the area within a 20 km radius of the original site = typical feeding area of a flying-fox.

Table 1 Summary of known documented attempts to disperse Australian flying-fox camps using non-lethal methods, during 1990 to 2013.

Location	Species	FF population estimate at time of dispersal	Method	Did the animals leave the local area?	Did the local population reduce in size?	How far did they move?	Were new camps formed (number of new camps if known)?	Number of separate actions	Cost (if known)	Was conflict resolved at the original site?	Was conflict resolved for the community?	Source+
Barcaldine, Qld	R	>50,000	VN	no	no	≈2 km	yes (1)	trees in township felled		yes	no	1,2
Batchelor, NT	B	200	BNS	no	no	<400 m	yes (1)	2		yes	yes	3,4
Boyne Island, Qld	BR	25,000	LNS	no	no	<500 m	yes (2)	3		yes	no	5,6,7
Bundall, Qld	GB	<400	V	no	no	uk, but 4 camps were within 5 km	yes (3)	1		yes	uk	8,9,10
Charters Towers, Qld	RB	variable	HLNPOW	no	no	200 m	no (returned to original site)	repeated since 2000	>\$500,000	no	no	11,12
Dallis Park, NSW	BG	28,000	V	no	yes	300 m	yes (1)	2		yes	no	13
Duaringa, Qld	R	>30,000	VNFO	no	no	400 m	yes	1	\$150,000	yes	uk	14
Gayndah, Qld	RB	200,000	VN	no	no	600 m	yes	3 actions, repeated		yes	no	9
Macleay, NSW	BGR	20,000	NS	no	no	350 m	yes (7)	>23	>\$400,000 and ongoing	no	no	13
Mataranka, NT	BR	>200,000	BHLNOSW	no	no	<300 m	uk	>9		no	no	13
North Eton, Qld	B	4800	VNFB	uk	no	<1.5 km initially	yes (≈4 majority temporary)	2	\$45,000	yes	yes (conflict at one site)	10,15,16, 17

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Royal Botanic Gardens, Melbourne, Vic	G	30,000	NS	no	no	6.5 km	yes (2)	6 mths	\$3 million	yes	yes, ongoing management required	13
Royal Botanic Gardens, Sydney, NSW	G	3,000	LNPOW	no	no	4 km	no	ongoing daily actions for 12 mths	>\$1 million and ongoing	yes	yes	13,18,19
Singleton, NSW	GR	500	LNUW	no	no	<900 m	no (returned to original site)	>3	\$117,000 and ongoing	no	no	13,20
Townsville, Qld	BR	35,000	BNS	no	no	400 m	no (returned to original site)	5		no	no	13
Warwick, Qld	GRB (dispersal targeted R)	200,000	NLBP	no	no	≈1 km	no (site known to be previously occupied by GB)	5 days	\$28,000	yes	uk (complaints persisted until migration)	8,21,22
Young, NSW	L	<5000	VN	no	no	<600 m	yes (1)	uk		yes	no	23

* G = grey-headed flying-fox; B = black flying-fox; R = little red flying-fox

B = "birdfrite"; F = fog; H = helicopter; L = lights; N = noise; P = physical deterrent; O = odour; S = smoke; U = ultrasonic sound; V = extensive vegetation removal; W = water.

+ 1 Storm Stanford (Wildlife carer, pers comm. 2013); 2 Louise Saunders (Bats Qld, pers comm. 2013); 3 Phillips *et al.* (2007) Displacement of Black flying-foxes *Pteropus alecto* at Batchelor, Northern Territory *Australian Zoologist* 34: 119-124; 4 John McCarthy (Northern Territory Government, pers comm. 2010); 5 Roberts (2006) *Management of Urban Flying-fox Camps: Issues of Relevance to Camps in the Lower Clarence, NSW*. Valley Watch Inc., Maclean; 6 Information from Gladstone Regional Council in 2010 and 2013; 7 Joe Adair (formerly DEHP, pers. comm. 2010); 8 Trish Wimberly (Australia Bat Clinic pers. comm. 2013); 9 Information obtained from Department of Environment and Heritage Protection (DEHP) in 2013; 10 Billie Roberts unpublished data; 11 Scott Sullivan (DEHP, pers. comm. 2010); 12 Information from Charters Towers Regional Council in 2010 and 2013; 13 Roberts *et al.* (2012b) and additional references within; 14 Perry Deeds (Central Highlands Regional Council, pers. comm 2013); 15 Jarmaine (2010) *Species Management Plan*, Mackay Regional Council; 16 Heidi Jarmaine (Mackay Regional Council, pers. comm. 2013); 17 Daryl Barnes (Walkerston resident, per comm. 2013) 18 Peggy Eby (Ecologist, pers comm. 2013) 19 John Martin (RBG, pers comm. 2013); 20 Singleton Council Meeting Minutes; 21 Information from the Southern Downs Regional Council in 2013; 22 Tim Low (pers. comm. 2013); 23 Young Shire Council.