

Supplementary Material

Threatened but not conserved: flying-fox roosting and foraging habitat in Australia

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Table S1. Three variables used to categorise the distribution of roosts and surrounding foraging habitat of four species of flying-fox (grey-headed, black, little red, and spectacled) across Australia, measured at two spatial scales: local (at roost) and foraging buffer (25km radius surrounding roost).

Variable	Description/use	Source of data
Land use	Categorical raster dataset for national-scale land use in Australia for the 2010-11 year, with a 1km ² spatial resolution, combined with protected area data from 2014. World Water Bodies polygon data added for incorporation of oceanic water in buffer measurements. Data used to identify land uses at (local) and around (25km buffer) colonies.	Land use of Australia 2010-11; Collaborative Australian Protected Areas Database (CAPAD) 2014; World Water Bodies 2018, Esri, Garmin International, Inc.
Vegetation type	Categorical raster dataset for land cover vegetation groups, using NVIS major vegetation group data (spatial resolution 100m ²). World Water Bodies polygon data added for incorporation of oceanic water in buffer measurements. Data used to identify the vegetation types at (local) and around (25km buffer) colonies.	Present Major Vegetation Groups - NVIS Version 5.1; World Water Bodies 2018, Esri, Garmin International, Inc.
Active roosts	Location of roosts where flying-fox colonies have been observed at least once within the survey period (2012 - 2017), using point data derived from NFFMP. Data used to identify land use and vegetative characteristics of roost locations.	CSIRO and Commonwealth Department of the Environment

Table S2. Vegetation associated with flying-fox roosts identified during 18 quarterly surveys 2012-2017.

Classification	All Roosts (n = 430)	Grey-headed (n = 310)	Black (n = 291)	Little red (n = 156)	Spectacled (n = 36)
Cleared, non-native vegetation, buildings	257 (59.8%)	178 (57.4%)	187 (64.3%)	104 (66.7%)	21 (58.3%)
Rainforest & vine thickets*	36 (8.4%)	24 (7.7%)	21 (7.2%)	10 (6.4%)	6 (16.7%)
Eucalyptus open forest*	35 (8.1%)	28 (9.0%)	18 (6.2%)	7 (4.5%)	2 (5.6%)
Eucalyptus woodlands*	29 (6.7%)	27 (8.7%)	13 (4.5%)	10 (6.4%)	0
Melaleuca forests & woodlands*	23 (5.3%)	16 (5.2%)	18 (6.2%)	7 (4.5%)	4 (11.1%)
Mangroves*	22 (5.1%)	11 (3.5%)	19 (6.5%)	7 (4.5%)	3 (8.3%)
Eucalypt tall open forest*	9 (2.1%)	9 (2.9%)	5 (1.7%)	2 (1.3%)	0
Other grasslands, herblands, sedgeland, rushland	5 (1.2%)	5 (1.6%)	4 (1.4%)	3 (1.9%)	0
Casuarina forests & woodlands	3 (0.7%)	3 (1%)	3 (1%)	2 (1.3%)	0
Heathland	3 (0.7%)	3 (1%)	1 (0.3%)	0	0
Eucalyptus low open forest*	1 (0.2%)	1 (0.3%)	0	0	0
Callitris forests & woodlands	1 (0.2%)	0	1 (0.3%)	0	0
Tropical eucalyptus woodlands/grassland*	1 (0.2%)	0	0	1 (0.6%)	0
Mallee woodlands & shrublands	1 (0.2%)	1 (0.3%)	0	1 (0.6%)	0
Low closed forest & tall closed shrubland	1 (0.2%)	1 (0.3%)	0	0	0
Other shrublands	1 (0.2%)	1 (0.3%)	1 (0.3%)	0	0
Tussock grasslands	1 (0.2%)	1 (0.3%)	0	1 (0.6%)	0
Regrowth, modified native vegetation	1 (0.2%)	1 (0.3%)	0	1 (0.6%)	0

*Flying-fox roost vegetation described in published literature.

Table S3. Vegetation within the 25km radius (buffer) around flying-fox roosts identified during 18 quarterly surveys 2012-2017.

Vegetation Classification	All Roosts (n = 430)		Grey-headed (n = 310)		Black (n = 291)		Little red (n = 156)		Spectacled (n = 36)	
	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>	<i>mean</i>	<i>s.d.</i>
Cleared, non-native vegetation, buildings	43.75	21.77	47.14	20.48	46.53	19.87	47.95	23.82	21.24	10.39
Eucalypt open forests	10.49	8.95	11.49	9.15	11.61	8.83	10.66	9.42	5.61	2.96
Eucalypt woodlands	7.66	10.44	6.72	9.47	4.95	7.56	1.55	6.42	9.98	11.25
Rainforests & vine thickets	5.03	9.18	2.90	5.06	3.49	5.87	1.85	5.79	27.16	12.98
Eucalypt tall open forests	4.52	9.19	5.81	10.38	4.23	8.53	3.07	6.94	1.22	1.35
Melaleuca forests & woodlands	1.03	1.45	0.89	1.29	1.16	1.47	0.99	1.61	2.14	1.92
Mangroves	0.79	1.16	0.62	1.07	0.91	1.24	0.13	0.68	1.72	1.53
Eucalypt open woodlands	0.68	2.67	0.16	0.81	0.40	2.30	0.30	1.73	1.73	2.29
Heathlands	0.49	1.05	0.63	1.19	0.36	0.60	0.16	0.44	0.02	0.09
Other grasslands, herblands, sedgelands, rushlands	0.47	0.69	0.48	0.71	0.60	0.76	0.00	0.05	0.19	0.22
Regrowth, modified native vegetation	0.33	2.65	0.25	2.20	0.00	0.01	0.00	0.00	0.07	0.11
Tropical eucalypt woodlands/grasslands	0.32	3.29	0.00	0.00	0.36	3.53	0.65	4.67	0.00	0.00
Low closed forests & tall closed shrublands	0.20	0.67	0.19	0.65	0.25	0.72	0.00	0.00	0.01	0.01
Tussock grasslands	0.20	1.31	0.14	1.24	0.04	0.18	0.15	1.67	0.02	0.08
Acacia forests & woodlands	0.18	0.91	0.03	0.31	0.13	0.73	0.33	1.37	0.10	0.17
Casuarina forests & woodlands	0.17	0.20	0.17	0.19	0.17	0.17	0.04	0.14	0.22	0.22
Other forests & woodlands	0.15	0.55	0.09	0.39	0.08	0.38	0.13	0.54	1.03	1.51
Other open woodlands	0.14	0.71	0.12	0.70	0.19	0.84	0.00	0.00	0.01	0.03
Callitris forests & woodlands	0.12	1.30	0.08	1.14	0.00	0.02	0.17	1.62	0.00	0.00
Other shrublands	0.11	0.23	0.09	0.21	0.07	0.19	0.04	0.16	0.39	0.29
Eucalypt low open forests	0.10	0.42	0.12	0.45	0.07	0.38	0.10	0.48	0.00	0.00
Naturally bare	0.07	0.22	0.05	0.11	0.08	0.25	0.01	0.05	0.11	0.10
Mallee woodlands & shrublands	0.07	0.74	0.09	0.87	0.02	0.06	0.00	0.02	0.00	0.00
Acacia shrublands	0.02	0.05	0.03	0.06	0.02	0.04	0.00	0.02	0.00	0.00
Chenopod shrublands, samphire shrublands & forblands	0.01	0.05	0.01	0.05	0.01	0.04	0.01	0.06	0.09	0.12

Unclassified native vegetation	0.01	0.08	0.01	0.09	0.00	0.01	0.00	0.03	0.00	0.00
No data	0.03	0.21	0.02	0.14	0.00	0.01	0.05	0.32	0.00	0.00
Ocean	20.74	20.76	19.20	19.82	22.07	21.33	15.17	20.01	26.17	19.09
Inland aquatic	1.61	2.22	1.93	2.42	1.49	2.12	0.87	1.80	0.66	0.73
Sea & estuaries	0.34	0.50	0.36	0.50	0.48	0.54	0.15	0.39	0.00	0.00
