Environmental Approval & Compliance Solutions

EPBC Act Self-Assessment Report

In situ management of Spectacled Flying-foxes *(Pteropus conspicillatus)* within Stage 2 of the Shields Street Heart Project

Cairns Regional Council

Document Control Summary

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Report Summary	
Key Words	Flying-fox, dispersal, Cairns, EPBC Act Self-assessment
Abstract	Cairns Regional Council (CRC) is undertaking construction activities within the Shields Street Heart project area in the Cairns City centre. Spectacled Flying-foxes (SFF) roost in a tree within Stage 2 of the project and CRC intends to deter/disperse them. This report presents the findings of an assessment of potential impacts of proposed deterrent/dispersal activities on the Spectacled Flying-fox, which is listed as Vulnerable under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act) and therefore an EPBC Act Matter of National Environmental Significance.

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1. Introduction

1.1 Background

Cairns Regional Council (CRC) is undertaking construction activities within the Shields Street Heart project area (the project area) in the Cairns City centre between Abbott and Grafton Streets. A mature Weeping Fig (*Ficus benjamina*; hereafter referred to as Fig Tree 2[1]) is located adjacent to Lake Street, in Stage 2 of the project area[2] (**Figure 1**). Spectacled Flying-Foxes (*Pteropus conspicillatus*; SFF) are currently roosting in Fig Tree 2; however, CRC has no information on how long SFFs have occupied the tree (*pers. comm.*, Mel Tortike, CRC, 4 January 2016). A businessman whose premises are adjacent to Fig Tree 2 believes that SFF arrived in November 2015 (*pers. comm.*, Duane Cash, Cairns City Tattoo and Body Piercing, 13 January 2016).

NRA was engaged by CRC to undertake assessments for flying-foxes at the Shields Street Heart construction site, including within Stage 2 (*see* NRA 2016 for methods and results until 29 February 2016). The assessments have occurred on a weekly basis, commencing 4 January 2016, and/or as requested by CRC.

SFF occupied Fig Tree 2 during all NRA assessments between 4 January and 4 April 2016 (see **Attachment A** for results of field assessments). The estimated abundance of SFF varied from ~500 to ~1,000 between 4 January and 4 April 2016. Female SFF with dependent young[3] were observed during all of NRA's daytime assessments of Fig Tree 2 between 4 January and 21 March 2016, but were not observed on 29 March or 4 April 2016.

Agonistic interactions between SFF were frequently observed on 14 and 21 March, and on these dates large numbers of SFF (100+) remained in Fig Tree 2 after evening fly out. The peak mating season for SFF is between March and May (Churchill 2008; Richards *et al*. 2008), and NRA's observations are likely to be explained by the territorial behaviour of male SFF. Other Australian flying-foxes are known to vigorously defend mating territories (in roost trees) during the breeding season and may decrease their foraging time as a result (Welbergen 2011). It is therefore likely that the increased rate of agonistic interactions among SFF represented territorial behaviour, and that the SFF that remained in Fig Tree 2 after fly out were males that had forgone foraging so that they could defend their territories. The number of agonistic interactions was markedly lower on 29 March and 4 April 2016; on these dates instances of what appeared to be copulation were observed during daytime assessments and only 3 to 5 SFF remained in Fig Tree 2 after fly out.

CRC is considering dispersal of SFF from Fig Tree 2 to facilitate construction work beneath the tree, and enable minor pruning of portions of the tree's canopy with the emphasis on removing branches that pose a risk to human safety, interfere with the proposed construction works, or encroach on adjacent buildings. NRA has advised CRC that dispersal and pruning have the potential to have an impact on the SFF, which are listed as Vulnerable under the Commonwealth *Environmental Protection and Biodiversity Conservation* Act 1999 (EPBC Act).

[1] Location of Fig Tree 2: MGA94, 55K, 0369646E, 8128673N.

[2] The Shields Street Heart Project is being conducted in two stages. Stage 1 (between Lake St and Grafton St) is the area where construction work is currently underway; Stage 2 (between Lake St and Abbott St) will be developed in the future.

[3] Juvenile SFF that were observed clinging to adult females, or otherwise interacting with adult females

1.2 Are the Spectacled Flying-foxes in the Cairns CBD an 'important population'?

Four of the significant impact criteria for Vulnerable species in the *EPBC Act Significant Impact Guidelines* relate to 'important populations' (DoE 2013a). An 'important population' is a population that is necessary for a species' long-term survival and recovery, and may include populations identified as such in recovery plans, and/or that meet the following criteria.

- They are key source populations either for breeding or dispersal.
- They are populations that are necessary for maintaining genetic diversity.
- They are populations that are near the limit of the species range.

The most recent Australian population estimate (January 2015) for the SFF was ~100,000 to 145,000 (Westcott *et al.* 2015). The species is restricted to areas where tropical rainforest occurs, north of Cardwell in north-eastern Queensland (DERM 2010, DoE 2016b). The colony in Cairns CBD (the Cairns City SFF population) is one of many in the local region, and is not near the limit of the species' range. However, the Cairns City population is listed as a 'Nationally Important Flying-fox Camp' (DoE 2016a), and SFF within this population are known to breed and rear young in the Cairns CBD. Spectacled Flying-fox numbers in the Cairns City SFF population are seasonally variable, and are currently likely to be ~8,000 to 12,000 individuals; however, following the breeding season (*ie* after April-May) the population in the Cairns CBD has in the past decreased in numbers (*pers. comm.*, A. McKeown, CSIRO, 2 February 2015).

Based on the upper estimate for the Cairns City SFF population (12,000 individuals), and the lower estimate for the total SFF population in Australia (100,000), the Cairns City SFF population could conservatively be estimated as 12% of all SFF. On this basis, the Cairns City SFF population is considered an 'important population'.

1.3 Scope

NRA was commissioned by CRC to assess the potential impacts of the proposed action (*ie* dispersing SFF from Fig Tree 2) on Matters of National Environmental Significance (MNES). The specific purpose of the study was to assess the likelihood of significant impacts, as defined under the EPBC Act and related *EPBC Act Significant Impact Guidelines* (DoE 2013a), occurring as a result of the dispersal and subsequent pruning of Fig Tree 2. The significance determination was to be made pursuant with the 'self-assessment' process detailed in the *EPBC Act Significant Impact Guidelines* (DoE 2013a) and in consideration of the '*Referral guideline for management actions in grey-headed and spectacled flying-fox camps*' (DoE 2013b).

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PROJECT: EPBC Act Self-Assessment Report - In situ management of Spectacled Flying-foxes (Pteropus conspicillatus) within Stage 2 of the Shields Street Heart Project
TITLE: Location of Fig Tree 2 in Cairns CBD

JOB NO: 154025
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SOURCE:
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Figure 1

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2. Significant Impact Tests/Determinations

The following significant impact determination introduces mitigation measures (**Table 1**) ahead of considering the potential for significant impacts (**Table 2**).

Suggested measures to mitigate impacts are presented in **Table 1**. These measures have been informed by the mitigation standards recommended in Part 3 of the *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* (DoE 2013b), and the Queensland 'Code of Practice – Ecologically sustainable management of flying-fox roosts' under the *Nature Conservation Act* 1992. It should be noted that NRA's assessment of potential impacts assumes that CRC will apply these mitigation measures.

Potential impacts of the proposed deterrence/dispersals on *P. conspicillatus* (a MNES) and pruning of the roost tree from which they will be dispersed, considering impact mitigation, were assessed against 'significant impact criteria' in the *EPBC Act Significant Impact Guidelines* (DoE 2013a). The results of these assessments are presented in **Table 2**.

The potential for significant impacts on other MNES have not been assessed in this report.

Table 1: Mitigation measures for deterrence/dispersal of *P. conspicillatus* within Stage 2 of the Shields Street Heart Project

	Recommendation
1	Deterrence/dispersal must be conducted in the presence, or following the advice, of a person with appropriate knowledge and experience relevant to the management of flying-foxes and their habitat.[1]
2	Deterrence/dispersal must not occur during or immediately after climatic extremes (*eg* heat stress event, cyclone event) or during a period of significant food stress.
3	Deterrence/dispersal should not occur if there is evidence of breeding activity in Fig Tree 2 including: (1) males establishing and maintaining breeding territory; (2) mating; and (3) females in the late stages of pregnancy, or which have dependent young that cannot fly on their own
4	Deterrence/dispersal must be carried out using non-lethal means such as acoustic, visual and/or physical disturbance, or use of smoke.
5	Deterrence/dispersal should commence immediately prior to dusk fly out from Fig Tree 2, or immediately from the time SFF return to Fig Tree 2 in the morning after foraging.
6	Deterrence/dispersal must be limited to a maximum of 2 hours in the evening or 3 hours in the morning.
7	If any animal is injured or killed during deterrence or dispersal, the activity must cease immediately, and the Queensland Department of Environment and Heritage Protection and the Commonwealth Department of the Environment must be notified as soon as possible.
8	Procedures on how to deal with injured flying-foxes should be documented and communicated to all staff participating in dispersal activities.
9	Minor pruning of Fig Tree 2 can be conducted after dispersal, with the emphasis on removing limbs that pose a risk to human safety, interfere with the proposed construction works, or encroach on adjacent buildings.

[1] Advice should be based on a survey of Flying-fox presence/absence in Fig Tree 2 within the previous week.

Table 2: Significance test for impacts on *Pteropus conspicillatus* (Vulnerable, EPBC Act) from deterrence/dispersal from Fig Tree 2, in Stage 2 of the Shields Street Heart Project

Significant impact criteria	Response
1. Lead to a long-term decrease in the size of an important population of a species. OR 2. Reduce the area of occupancy of an important population. OR 3. Fragment an existing important population into two or more populations.	Dispersal of SFF from Fig Tree 2 is unlikely to lead to a long-term decrease in the size, reduce the area of occupancy of an important population, or fragment it into two or more populations. No females with obviously dependent young[1] have been seen in Fig Tree 2 since NRA's observations on 29 March 2016. Occupancy since 4 January 2016 has varied between approximately 500 and 1,000 individuals during the day; however, since 29 March has consisted of <700. Territorial and mating behaviour have recently been observed. NRA understands that CRC intends to disperse SFF only after an ecologist has determined that the peak mating season has ended[2] so that potential negative effects on recruitment are likely to be avoided. Fig Tree 2 is on the periphery of the area occupied by the Cairns City SFF population. The proposed action will discourage the use of this roost tree in the short term, though in the mid to long term is not likely to reduce the area of occupancy of the Cairns City SFF population. If the SFF in Fig Tree 2 are dispersed, it appears likely that they will occupy nearby trees in which SFF roosting occurs, and are not likely to be mortally injured. The closest currently-occupied roost tree is the primary SFF camp in the Cairns CBD (at the Cairns Library), ~200 m to the north-north-east. This disturbance will be temporary and is unlikely to result in the long term decrease in the size of the Cairns City SFF population.
4. Disrupt the breeding cycle of an important population.	Dispersal of SFF from Fig Tree 2 is unlikely to disrupt the breeding cycle of an important population. No females with obviously dependent young have been observed in Fig Tree 2 since NRA's observations on 29 March 2016. The peak mating season for SFF is between March and May (Churchill 2008; Richards et al. 2008). Males were observed engaging in frequent agonistic interactions during NRA's observations on 14 and 21 March 2016; outside of these dates such interactions were infrequent (*eg* 1to 2 were generally observed during each assessment). Instances of what appeared to be copulation were observed on 29 March and 4 April 2016. NRA understands that CRC intends to disperse SFF only after an ecologist determines that the peak mating season has ended.
5. Adversely affect habitat critical to the survival of a species. OR 6. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Dispersal of SFF from Fig Tree 2 is unlikely to adversely affect habitat critical to SFF survival, or modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline Fig Tree 2 is within a pedestrian mall. Minor pruning of the tree will be conducted, with the emphasis on removing limbs that pose a risk to human safety, interfere with the proposed construction works, or encroach on adjacent buildings. This action will result in the loss of small areas of available roosting space. This magnitude of loss is unlikely to negatively affect the survival of the species and cause the population to decline. No females with obviously dependent young have been seen in Fig Tree 2 since NRA's assessment on 29 March 2016, and there is no evidence that SFF are using the tree as a food resource. As mentioned above, Fig Tree 2 on the periphery of the area occupied by the Cairns City SFF population, and there are numerous other roost trees within the local area that are currently occupied by SFF.

Significant impact criteria	Response
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	Dispersal of SFF from Fig Tree 2 is unlikely to result in invasive species becoming established in the area.
8. Introduce disease that may cause the species to decline.	Dispersal of SFF from Fig Tree 2 is unlikely to result in disease introductions.
9. Interfere substantially with the recovery of the species.	Dispersal of SFF from Fig Tree 2 is unlikely to result in substantial interference with the species' recovery. As mentioned above, <1,000 SFF will be dispersed, and the disturbance will only occur in the short term. Dispersal will occur outside of the breeding season and the dispersed animals are likely to move to nearby roost trees within the Cairns CBD that are currently occupied by SFF.

[1] Obviously dependent young – Juvenile SFF that were observed clinging to adult females, or otherwise interacting with adult females.

[2] Occasional mating can occur over many months; however, the peak mating season is generally between March and May (Churchill 2008; Richards et al. 2008)

3. Conclusion

Significant impacts as a result of the proposed action are not anticipated, primarily for the following reasons.

- It is not likely that dispersed SFF will be injured or killed.
- Disturbances will be short-term only.
- Fig Tree 2 will not be destroyed and roosting space will remain after pruning.
- Fig Tree 2 is on the periphery of the area occupied by SFF in Cairns CBD.
- No obviously attached or otherwise dependent young have been observed in Fig Tree 2 since 29 March 2016.
- CRC will not conduct dispersals while there is evidence that SFF are engaging in territorial behaviour associated with the breeding season, or mating.
- There are numerous roost trees within 400 metres of Fig Tree 2 that are currently occupied by SFF, including the largest SFF camp in the CBD at Cairns Library. The deterrence/dispersal of SFF from Fig Tree 2 could therefore be considered ***in situ*** management[4].

The opinions expressed in this report are based on the technical and practical experience of expert environmental practitioners. They are not presented as legal advice. Nor do they represent decisions from the regulatory agencies charged with the administration of the relevant acts. As per previous advice to CRC, the preparation of an EPBC Act Referral is recommended; however, the ultimate decision on whether to submit a Referral for assessment under the EPBC Act is CRC's responsibility.

[4] The 'Referral guideline for management actions in grey-headed and spectacled flying-fox camps' states: "***In situ*** management actions may include:…Disturbing animals at the boundary of the camp to encourage roosting in adjacent vegetation".

4. References

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Attachment A:
NRA’s Flying-fox Assessments - Shields Street Heart Project (Stage 2)

Attachment A – Flying Fox Assessments (January to April 2016) - Shields Street Heart Project (Stage 2)

Date of assessment	Duration of assessment	Number of Spectacled Flying Foxes estimated within Stage 2[1]	Salient information including evidence of dependent young[2] or breeding activity
4 January 2016	1 hr 30 min[3] (06:00-07:30)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. One attached/dependent young (hereafter referred to as pups) was seen during assessment.
11 January 2016	1 hr 5 min[3] (07:00-08:05)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. One pup was seen during the assessment.
19 January 2016 (morning)	2 hrs[3] (07:00-09:00)	Initial estimate of ~400-500[5] (+ pups). Sex of 8 SFF identified; 5 males and 3 females (2 of the females had attached pups).	Trial of scabbling work on a low concrete wall was conducted under Fig Tree 2 (video recorded by CRC). The approximate number of SFF in Fig Tree 2, sex and presence/absence of pups was determined prior to the scabbling trial. The scabbling trial was conducted for two minutes between 07:30 and 07:32 hrs; SFF in Fig Tree 2 did not seem to be significantly affected by the trial.
19 January 2016 (midday)	55 min (14:20-15:15)	Estimate refined to ~600 (+ pups).[6] Sex of 33 SFF identified; 22 males and 11 females (6 of the females had attached pups).	Construction activities were not occurring in Stage 2. Numbers were estimated more rigorously than during the morning assessment. NRA's estimate of SFF increased to ~600, plus young. Six of 11 female SFF that were definitively sexed had pups.
19 January 2016 (evening)	1 hr 45 min (18:15-20:00)	~600[7] (+ pups) before fly out. 10+ juveniles after fly out.	Construction activities were not occurring in Stage 2. An evening assessment was conducted, in the presence of a member of Flying Fox Management Advisory Committee (and flying-fox carer) Heather Owen. By 19:30 hrs almost all adults had departed. Ten juvenile SFF were seen in the tree after fly out. Dense canopy precluded visibility; however, moving foliage suggested additional SFF were present.
25 January 2016	6 min (08:15-08:21)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. Numbers appeared to have reduced since previous assessments. 200-300 SFF occupied the nearby Fig Tree 1 in Stage 1 at some time between the evening of 22 January and morning of 25 January, and it is possible that they had previously occupied Fig Tree 2. A female with a pup was observed in Fig Tree 2.
27 January 2016	2 min (08:52-08:54)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. Within two minutes of observation, NRA had identified a female SFF with a pup.
29 January 2016	5 min (13:12-13:17)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. The primary purpose of the site visit was to verify that SFF no longer occupied Stage 1. Numbers appeared to have increased since the 25 and 27 January 2016 assessments; 200-300 SFF vacated the Stage 1 project area on or before 29 January 2016, and it is possible that they relocated to Fig Tree 2. Males and females (including a female with pup) were observed.

Date of assessment	Duration of assessment	Number of Spectacled Flying Foxes estimated within Stage 2[1]	Salient information including evidence of dependent young[2] or breeding activity
1 February 2016	7 min (07:19-07:26)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. It rained during the assessment and SFF became inactive. Two adult males were definitively sexed, and approximately 10% of SFF observed were unaccompanied small/juveniles but large enough that they might be able to fly. Rain made it impossible to determine whether dependent young were present.
3 February 2016	1 hr 11 min (05:57-07:02 & 07:14-07:20)	~400-500[5] (+ pups) before trial. ~200-250[5] (+ pups) after trial.	Females with pups were observed. Concrete cutting trial commenced at 06:15 hrs adjacent to the wall where the scabbling trial had been undertaken on 19 January 2016 (videos recorded by NRA). The trial was stopped after approximately one minute because SFF were disturbed and flew from Fig Tree 2. Approximately 200-250 animals relocated to trees in the vicinity of the Cairns Library 200-350 m away, where many other SFF were roosting. SFF returned to Fig Tree 2 at a rate of approximately one every 5 minutes. Observation during the trial and subsequent inspections identified no SFF on the ground, and no SFF was killed or injured.
8 February 2016	56 min (07:30-08:26)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken Concrete cutting was occurring approximately 40 m away; SFF did not appear distressed by the cutting (video recorded by NRA). Juvenile SFF on the ground under Fig Tree 2; small/dependent. NRA attached it to a t-shirt, hung it in a sheltered position and then notified FNQ Wildlife Rescue. It was subsequently collected by a wildlife carer.
15 February 2016	17 min (07:36-07:53)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. Males and females (including a female with pup) were observed.
22 February 2016	11 min (08:19-08:30)	Hundreds.[4]	Construction activities were not occurring in Stage 2 and a detailed assessment was not undertaken. Male and female SFF (including three females with pups) were observed.
29 February 2016 (morning)	46 min (08:06-08:52)	~800-900 (+ pups).[8] Sex of 25 SFF identified; 18 males and 7 females (2 of the females had attached pups).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 700-800 SFF, plus young. Two of 7 female SFF that were definitively sexed had pups.
29 February 2016 (evening)	15 min (21:07-21:22)	12 + juveniles	Construction activities were not occurring in Stage 2. Twelve juvenile SFF were seen in the tree after fly out. Dense canopy precluded visibility; however, moving foliage suggested additional SFF were present. No females with pups were observed.
7 March 2016 (morning)	37 min (08:13-08:50)	~800-900 (+ pups).[9] Sex of 20 SFF identified; 14 males and 6 females (3 of the females had attached pups).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 800-900 SFF, plus young. Three of 6 female SFF that were definitively sexed had pups. Approximately 10% of SFF observed were unaccompanied small/juveniles but large enough that they might be able to fly. NRA observed two instances of agonistic interactions between SFF.

Date of assessment	Duration of assessment	Number of Spectacled Flying Foxes estimated within Stage 2[1]	Salient information including evidence of dependent young[2] or breeding activity
7 March 2016 (evening)	20 min (21:00-21:20)	40-50+ adults and juveniles	Construction activities were not occurring in Stage 2. Adults and juveniles were observed. SFF were more numerous than in previous evening surveys, possibly related to breeding season (*ie* males establishing and defending territories). No females with pups were observed.
14 March 2016 (morning)	15 min (08:25-08:40)	~750-850 (+ pups).[10] Sex of 20 SFF identified; 14 males and 6 females (2 of the females had attached pups).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 750-850 SFF, plus young. Two of 6 female SFF that were definitively sexed had pups. Approximately 10% of SFF observed were unaccompanied small/juveniles but large enough that they might be able to fly. NRA observed many instances of agonistic interactions between SFF. Likely to be territorial behaviour, as it is the breeding season.
14 March 2016 (evening)	40 min (21:00-21:25 and 21:45-22:00)	100+ adults and juveniles	Construction activities were not occurring in Stage 2. NRA observed 100+ adults and juveniles. SFF more numerous, agonistic interactions were more frequent, and noise levels seemed higher than in previous evening surveys. Likely to be related to breeding season (*ie* males establishing and defending territories). No females with pups were observed.
21 March 2016 (morning)	21 min (08:34-08:45)	~850-950 (+ pups).[11] Sex of 20 SFF identified; 12 males and 8 females (1 of the females had an attached pup).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 850-950 SFF. One of 8 female SFF that were definitively sexed had pups; it took approximately ten minutes to locate these animals, whereas females with pups were observed within 1-5 minutes during all previous daytime surveys. Becoming more difficult to determine whether relatively small SFF are large juveniles or small adults. Observed many instances of agonistic interactions between SFF. Likely to be territorial behaviour, as it is the breeding season.
21 March 2016 (evening)	30 min (21:00-21:30)	100+ adults and juveniles	Construction activities were not occurring in Stage 2. NRA observed 100+ adults and juveniles. SFF were relatively inactive which was likely the result of light rain during the survey. SFF were more numerous than in surveys prior to 14 March. Likely to be related to breeding season (*ie* males establishing and defending territories). No females with pups were observed.
29 March 2016 (morning)	20 min (08:25-08:45)	~600-700[12] Sex of 20 SFF identified; 12 males and 8 females (no attached pups seen).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 600-700 SFF. No females with pups were observed. Agonistic interactions were less frequent than during the previous two weeks. Copulation, or attempted copulation, was observed. Six Little Red Flying-foxes (***Pteropus scapulatus***) were observed. This species has not been observed in Fig Tree 2 during previous surveys; however, has recently been roosting in trees adjacent to Cairns Library. Little Red Flying-foxes are not listed as threatened or migratory under the EPBC Act and are 'Least Concern' under the Queensland *Nature Conservation Act* 1992.

Date of assessment	Duration of assessment	Number of Spectacled Flying Foxes estimated within Stage 2[1]	Salient information including evidence of dependent young[2] or breeding activity
29 March 2016 (evening)	30 min (21:00-21:30)	3 juveniles	Construction activities were not occurring in Stage 2. Three juvenile SFF were observed. No females with pups were observed. 41 Little Red Flying-foxes were observed. This species is not listed as threatened or migratory under the EPBC Act.
5 April 2016 (morning)	25 min (08:15-08:40)	~550-650[13] Sex of 20 SFF identified; 12 males and 8 females (no attached pups seen).	Construction activities were not occurring in Stage 2. A detailed assessment was conducted, and numbers were estimated. NRA observed approximately 550-650 SFF. No females with pups were observed. Agonistic interactions were less frequent than during 14 and 21 March assessments. Copulation, or attempted copulation, was observed. 70-80Little Red Flying-foxes (*Pteropus scapulatus*) were observed. This species has not been observed in Fig Tree 2 during previous surveys; however, has recently been roosting in trees adjacent to Cairns Library. This species is not listed as threatened or migratory under the EPBC Act.
5 April 2016 (evening)	30 min (20:00-20:30)	3 medium-sized SFF	Construction activities were not occurring in Stage 2. Three medium-sized SFF were observed in tree, and two flying over which may have landed in upper canopy. Difficult to determine whether SFF observed were large juveniles or small adults. No females with pups were observed. 47 Little Red Flying-foxes were observed. This species is not listed as threatened or migratory under the EPBC Act.

[1] Spectacled Flying foxes were recorded only in a single Weeping Fig (*Ficus benjamina*; referred to as Fig Tree 2 in the attached report) located at MGA94, 55K, 0369646E, 8128673N.

[2] Dependent young (or pups) = juveniles that were attached to females. It is possible that some 'unaccompanied' juveniles were still reliant on adult females; however, relevant interactions between juveniles and adults were not observed.

[3] Duration is time spent within Stage 1 and 2 of the Shield Street Heart project.

[4] Numbers were not formally estimated.

[5] Estimate based on a count of SFF in approximately 1/10 of Fig Tree 2.

[6] Estimate based on the average of four counts of portions of the canopy = 592 (126 in 1/4; 35 in 1/20; 95 in 1/5; and 230 in 1/3). Six of 33 SFF observed had attached young, which would increase numbers by ~100.

[7] Estimate based on previous formal estimate at 14:20 pm on the same day.

[8] Estimate based on the average of three counts of portions of the canopy = 871 (68 in 1/10; 154 in 1/6; and 168 in 1/6). Two of 25 SFF observed had attached young, which would increase numbers by ~70.

[9] Estimate based on the average of three counts of portions of the canopy = 870 (90 in 1/10; 101 in 1/10; and 70 in 1/10). Three of 20 SFF observed had attached young, which would increase numbers by ~130.

[10] Estimate based on the average of three counts of portions of the canopy = 797 (82 in 1/12; 71 in 1/10; and 87 in 1/8). Two of 20 SFF observed had attached young, which would increase numbers by ~80.

[11] Estimate based on the average of three counts of portions of the canopy = 893 (79 in 1/10; 91 in 1/10; and 163 in 1/6). One of 20 SFF observed had attached young, which would increase numbers by ~45.

[12] Estimate based on the average of three counts of portions of the canopy = 652 (83 in 1/6; 112 in 1/6; and 131 in 1/6). No dependent young observed.

[13] Estimate based on the average of three counts of portions of the canopy = 606 (81 in 1/6; 95 in 1/6; and 127 in 1/6). No dependent young observed.

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