Sunshine Coast Council

Flying-Fox Dispersal Feasibility Study

Cassia Wildlife Corridor, Coolum Beach and Tepequar Drive Roost, Maroochydore.

Environmental Operations
May 2013

Table of Contents

Introduction

Purpose

The purpose of this report is to provide to Council, the findings of a cost, risk and feasibility study associated with the submission of damage mitigation permit to the Department of Environment and Heritage Protection for dispersal of two (2) flying-fox roosts located at Cassia Wildlife Corridor, Coolum Beach and Tepequar Drive, Maroochydore (Stella Maris Catholic School).

Flying-fox Mitigation Strategies

Regional Flying –Fox Management Plan

SCC has developed a Regional Flying-Fox Management Plan. The draft plan has been endorsed by Councillors at the April Ordinary Meeting, and is currently with the State Government pending approval.

The intent of the Flying-Fox Management Plan is to provide a range of clear management options to guide decision making while still allowing the flexibility required for site specific management.

- The management recommendations within the plan have been underpinned by State Government principles of:
- Complaints regarding Flying-fox colonies in urban areas are primarily dealt with through community education;
- Any considerations to relocate or disperse a Flying-fox colony will be based on a comprehensive assessment of the situation;
- The relocation or dispersal of a Flying-fox camp will only be considered as a last option;
- Alternative roosting sites must be available before any attempt to relocate a Flying-fox camp is approved; and
- Attempts to move a Flying-fox camp will only be carried out with an approval

Community Education

SCC has responded to community complaints regarding flying-foxes both over the phone, and in person during site visits. Residents have communicated the following impacts to council officers:

- Increased noise levels (associated reduction in the quality of sleep resulting in sleep deprivation);
- Unpleasant odour;
- Concern about psychological health;
- Concern about disease risk (refer *Human Health Considerations* below);
- Reduced visual amenity, caused by the defoliation of the reserve and line of sight presence of flying-foxes;
- Concerns about water quality of the standing water on the sites (Stormwater drain or natural creek line);
- Concern about change in property values;

- Increased maintenance required to property to reduce the damage caused from droppings; and
- Reduced amenity levels where outdoor living areas are present.

Council Officers have advised residents to adopt the following procedures to reduce/mitigate impacts:

- Close windows and doors to reduce noise and smell impacts;
- Remove washing before sunset;
- Cover outdoor furniture before sunset;
- Retrofit shade sails to property to protect outdoor areas from droppings;
- Ensure vehicles are parked undercover, or use car-covers to protect from droppings;
- Don't pick up any injured or dead flying-foxes, contact the local wildlife groups;
- If any dead flying-foxes are located use gloves, double bag and dispose of the carcass.

Community education has also been undertaken by EHP during site visits, phone complaints and educational letter drops within the affected area.

Human Health Considerations

There are potential human health risks from Australian Bat Lyssavirus (ABL) and Hendra Virus.

Council has actively sought advice from Queensland Health to quantify the degree of risk of becoming infected with ABL; Queensland Health has advised that this risk is very low. It is estimated that in Australia only one per cent of flying-foxes carry ABL and it can only be transmitted by direct contact through a skin-penetrating bite or scratch. Three people have died from ABL infections in Australia since 1996. The availability of a post-exposure vaccination reduces the risk of contracting ABL even further.

Similarly research carried out by Queensland Primary Industries and Fisheries indicates that while flying-foxes are a natural host for Hendra Virus, which can be fatal to humans, there is no evidence that they can transmit this virus to humans or even to horses (however the virus has been transmitted from horses to humans).

Other health conditions that can be carried by flying-foxes (as advised by Queensland Health) include;

a. *Histoplasmosis* is a very rare lung infection. It can be found in Bats, Dogs, Cattle, Horses, Rats and other animals and the organisms can be excreted through droppings. Queensland Health recommends personal protective equipment when working near these animals to protect from exposure to dust.

b. *Leptospirosis* is a bacterial disease transmitted via urine of infected animals. It is a rare disease that can be fatal to humans. Rodents and Cattle carry the disease. Bats may also carry the disease. To prevent exposure, avoid contact between bat urine and broken skin, eyes, nose or mouth.

c. *Salmonella* and other bacteria that can cause gastroenteritis may be found in animal faeces. The infection may be acquired by eating undercooked or raw food contaminated with the bacteria, or acquired by close physical contact with dogs, poultry and cattle. It is assumed that some flying-foxes may also carry the bacteria.

Queensland Health can provide further information regarding health risks.

State and Federal Permit for Dispersal Activity

The flying-foxes and the roost site are protected under State and Federal legislation, application for permit to undertake action is required.

Note that landholders consent is required for each of the permit/referral processes. Council officers are in the process of gaining landholder consent for Tepequar Drive Roost.

Permit applications have been submitted by Council Officers for Cassia Wildlife Corridor.

Damage Mitigation Permit under the Nature Conservation Act 1992

Permit approval timeframes for Department of Environment and Heritage Protection (EHP) are between 20 and 40 business days.

Reason for application

Section 184(1) of the *Nature Conservation (Wildlife Management) Regulation 2006* States:

Restriction about purposes for which permit may be granted:

The Chief Executive may grant a Damage Mitigation Permit (DMP) only for one or both of the following purposes-

b) To prevent or minimise a threat, or potential threat, to human health and wellbeing caused by a protected animal.

Referral under the Environmental Protection and Biodiversity Conservation Act 1999

Referral is required for this project under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) referral timeframes for approval are 20 business days.

Roost Management Plan

As a component of the permit applications, Council Officers have prepared a Roost Management Plan (RMP) for each site, which details the site specific management of the roost area during dispersal activity.

The RMP is used as a guide of proposed works within the roost site, details welfare strategies, provides mitigation strategies for site specific threats and

Each RMP document details

a) Site location;
b) Site History;
c) Proposed activity;
d) Project timeframes ;
    a. Flying-fox lifecycle timeframes; and
    b. Activity timeframes (daytime/night-time works).
e) Ongoing mitigation strategies;
f) Flora/Fauna assessment results;
g) Environmental Health assessment results;
h) Dispersal Strategy;
    a. Activity participants;
    b. Impacts;
    c. Animal welfare considerations; and
    d. Human health considerations.
i) Flying-fox Monitoring;
j) Early intervention dispersal methods and strategies;
k) Alternative roost sites;
l) Risk Matrix;
m) Reporting;
n) Ongoing Maintenance; and
o) Communications Strategy.

Under a State Government DMP, the roost management plan is a conditioned document. As such, all actions proposed under the RMP are to be complied with under the permit.

Refer to the attached Cassia Wildlife Corridor Roost Management Plan. The Tepequar Drive Roost Management Plan is under development.

Risk

Financial Risk

There is a certain level of direct financial risk based on the unpredictable outcome of flying-fox dispersals. Where the alternative roost site is of equal or higher conflict than the original location, Council is responsible for dispersal of flying-foxes from that location. We understand that the Queensland State Government Damage Mitigation Permit will be conditioned to ensure that ongoing management of the colony is undertaken by the SCC.

There is a direct financial risk associated with the three options. However, the primary risk is the uncertainty associated with the ongoing implications of the dispersal, i.e. no guarantee of control of alternative roost site, and as a consequence, the intervention requirements of that location. As discussed in the literature review below, typically, successful dispersals are

heavily resourced with budgets for ongoing dispersal attempts each year (in some cases over decades) to avoid re-colonisation of a roost site.

We note that residents in Yamba, NSW are currently undertaking legal action against Clarence Valley council, where dispersed flying-foxes are now roosting in urban areas.

There is a risk that undertaking work within the grounds of Stella Maris Catholic School may set a precedent for flying-fox dispersals on privately owned land. Tepequar Drive Roost contains protected remnant vegetation; there is financial output for offset costs that, at this stage, is not captured within this report.

We estimate the financial risk as *high*, based on a likely likelihood and a moderate consequence. (Risk assessments based on the Corporate WH&S Risk Calculator, 2009).

Environmental Risk

Recent studies by the Queensland Centre for Emerging Infectious Diseases have likened the stress output from flying-foxes within colonies undergoing dispersal, similar to the natural stress levels experienced during mating. The stress is considered to be measurable and short-lived.

Based on the outcomes of this study, we consider the animal welfare/stress risk to the flying-foxes to be *high* based on likely likelihood and a moderate consequence. This can be mitigated under the assumption that the roost will disperse to appropriate habitat for the flying-foxes.

Further to this, works at Tepequar Dr, Maroochydore would result in the loss of remnant vegetation (Melaleuca forest) and mapped essential habitat for two species of Acid Frog, *Crinia tinnula (*Wallum Froglet) and *Litoria freycineti* (Wallum Rocketfrog).

Legislative Risk

There is *moderate* legislative risk where the conditions of the Damage Mitigation Permit are observed. This is based on an unlikely likelihood and moderate consequences.

Social Risk

There is a risk that the flying-fox urban problem may be transferred to a higher risk community (E.g. Aged Care Facility, Hospital). We determine this risk to be *high*, based on a likely likelihood and a moderate consequence.

This risk will be mitigated through the use of an ‘early intervention’ approach, regional awareness of the project, and implementation of a communications plan.

If undertaken, dispersal action may be viewed as successful by the primarily affected residents. However, it is likely that where new camp sites are established in nearby urban areas, the wider community may view the dispersal as unsuccessful.

Flying-fox Dispersal Success in Australia

Flying-fox roost dispersal activities have been undertaken in many places around Australia with varying degrees of success and cost involved.

When referring to attempts to relocate flying-fox camps using non-lethal methods, Roberts Et. Al. (2011) state that:

"Some have succeeded in moving flying-foxes from their original camp site, however in most cases the effect has been temporary, and ongoing programs of dispersal have been required after the flying-foxes made regular attempts to return, while others have simply been unsuccessful in dispersing the bats."

Specifically, this paper reviews 10 dispersals undertaken in Queensland, New South Wales, Victoria and Northern Territory from 1990 to 2009. The paper refers to a case study of the Maclean Flying Fox dispersal. At the time of finalisation of the paper, the Maclean roost site had been dispersed into seven (7) new camps, over a six (6) year period of dispersal activity. The paper also discusses that:

"The outcome after nearly a decade of dispersal attempts at Maclean was that flying-foxes continued to return periodically to the original site, and there were more camp sites established in the region, over a wider area than previously known from historical records, and the number of affected residents experiencing conflict had increased."

Within the study, the author recommends the creation of buffers, or constructing sound barriers as more effective 'local scale mitigation' than attempted relocation of a camp.

Discussions between Council Officers and the lead author have been initiated to assist with the preparation of the feasibility study. The author advised that although flying-foxes had potential to relocate within a 20km radius from the original roost site, they were more likely to relocate to a suitable site between 200m and 2km away.

Council Officers have identified a number of unsuitable, high risk roost locations within this radius from the original sites, these include, private resorts, child care facilities, schools and equine facilities. If the roost was to relocate to any of these locations, the dispersal would not be seen as successful by the impacted community, and potentially the wider community.

Hall (2002) suggests that camp dispersals (in some cases) result in flying-foxes dispersing into even less suitable sites such as nearby residential backyards.

Roberts (2006) suggests that the long life expectancy of flying-foxes (>14 years) and highly migratory behaviour, with return to known camp sites, are key factors in the lack of success of relocation attempts.

Roberts (2006) also attributes successful examples of flying-fox dispersals, such as the Melbourne Botanical Gardens, to the significant budget and resources available, as this is possibly the only example of abandonment of a site for an extended period.

Note that the review of published research into flying-fox dispersals has not resulted in a conclusive, successful dispersal methodology recommendation.

References

Hall, L. (2002). Management of flying-fox camps: what have we learnt in the last twenty-five years? Pp 215- 224 in Managing the Grey-headed Flying-fox as a Threatened Species in NSW, edited by P. Eby and D.Lunney. Royal Zoological Society of NSW, Mosman, NSW.

Roberts, B. (2006). *Management of Urban Flying-fox Camps: Issues of relevance to camps in the Lower Clarence Valley, NSW*. Valley Watch Incorporated.

Roberts, B. J., Eby, P., Catterall, C. P., Kanowski, J., & Bennett, G. (2011). The outcomes and costs of relocating flying-fox camps: insights from the case of Maclean, Australia. *The biology and conservation of Australasian bats. Mosman, NSW: Royal Zoological Society of NSW*, 277-287.

Sunshine Coast Council

Cassia Wildlife Corridor

Flying-fox Dispersal Feasibility Study

Background

Flying-foxes have been recorded to be present within the Coolum district since prior to 1938 where a roost site was located 2.1miles north of the Yandina-Coolum Beach road (Nambour Chronicle and North Coast Advertiser, 1938).

Flying-foxes have been anecdotally recorded within the Cassia Wildlife Corridor (CWC) over previous years; however, the first formal recognition of the location as a camp site, by form of a monitoring survey was undertaken by EHP officers in November 2011. Survey results are tabled below in Figure 1.0.

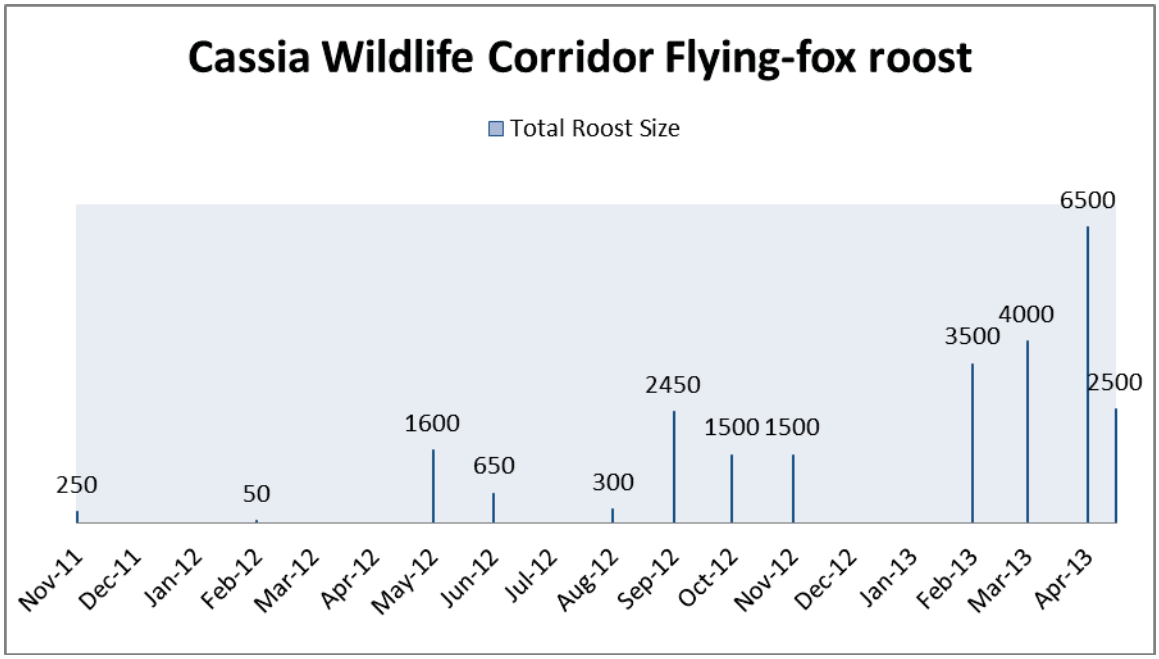

Figure 1.0 Cassia Wildlife Corridor flying-fox roost total population size. Monitoring survey data was provided by EHP.

Roost survey results (Figure 1.0) indicate a considerable increase in total roost size over the 18 month survey period, peaking in early April, and decreasing in late April. SCC has recorded a similar increase in customer complaints over the time period. Along with this, SCC has recorded an increase in the severity of the complaint, with most recent complaints detailing lack of sleep, and residents refusing to inhabit the outside of their properties.

Timeline

November 2011	First formal count undertaken by EHP indicated the presence of 50 Black flying-fox (*Pteropus alecto) (*BFF) & 200 Grey-headed flying-fox (Pteropus poliocephalus) (GHFF).
February 2012	First customer complaint received notified SCC of flying fox presence. EHP officers identified the presence of approximately 50 flying-foxes situated behind the residence during the meeting with the complainant EHP received additional complaints from residents of Cassia Ave, in relation to noise and odour of the roost. Complaint details were forwarded to SCC.
April 2012	Joint site inspection was undertaken with EHP and SCC officers.
June 2012	Regional Flying Fox Management Plan work commenced.
August 2012	EHP flying-fox surveys were undertaken at the time300 BFF were recorded within reserve.
September 2012	EHP flying-fox survey was undertaken 2300 BFF and 150 GHFF were recorded. Surveys indicated that female BFF were pregnant. EHP advised residents that no further action would occur on site until March-April 2013 after the young become independent. Due to breeding occurring the CWC site was recognised as a 'roost' site as the FF had congregated for breeding and the rearing of young.
October 2012	EHP flying-fox survey indicated increase in Flying-fox (FF) present. FF were confined to a 9885m^2 area, located in the centre of the CWC. Heavily pregnant females and dependant young were observed.
November / December 2012	Drainage Works at Yandina – Coolum Road end of Corridor.
3 December 2012	Regional Flying Fox Management Plan Strategic Discussion Forum.
21 December 2012	Complaints received from State Ministers of Parliament office requesting information in to the increased numbers of FF within the CWC and impacts currently being had on local residents Response received by State Minister – requesting that SCC takes the lead in Regional Management Plan.
February 2013	SCC and EHP received an increase in customer complaint activity recorded. Complaints detailed issues such as: • Increased presence of FF within CWC;

- Increased noise with continued vocalisation throughout the day; and
- Reduced quality of life (reduced sleep, reduced use of outdoor areas, and increased time spent cleaning property due to increase in faeces).

15 February 2013	EHP undertakes FF survey. Fly-out counts indicate approximately 3500 FF in CWC CWC was recorded as being high defoliated due to the numbers of FF roosting within the roost.
8 March 2013	EHP undertake FF survey, records indicate further increase. Fly-out count indicates approx. 4000 FF EHP officer witnessed resident of Cassia Ave trying to disturb the FF. Local residents contacted local State MP Fiona Simpson, advising that numbers within the roost have increased and they are concerned about the rapid growth in numbers and the potential health risks associated with it.
11 March 2013	SCC Councillor Robinson attended the site to liaise with residents that had contacted him to describe impacts from FF. (Environmental Operations team in attendance).
15 March 2013 (AM)	Email received from residents describing further increase in activity. Flying-foxes spill over into residential landscapes. EHP officer advised that the FF were behaving erratically within the AM period, as a result undertook site inspection and located a member of the public within the roost.
15 March 2013 (PM)	Environmental Operations team and EHP attended the CWC site and observe an 'unintentional' disturbance of the colony, as a result from some tree removal works occurring on an adjacent property. EHP officer requested that the property owner cease work and re-diverted the activity to continue away from the roost location as an attempt to minimise the disturbance to the FF and residents
21 March 2013	SCC Cr Robinson submitted a "Notice of Motion" to undertake a feasibility study into obtaining a flying-fox Damage Mitigation Permit to undertake works to disperse flying-foxes from the CWC.
3 April 2013	Pre-lodgement meeting undertaken between Council officers and EHP officers.

Proposed Activity – Cassia Wildlife Corridor

Proposed project works within the reserve can be undertaken beginning with Option 1, Option 2 or Option 3. Note that Option 2 works contain a component of Option 1.

Note that vegetation works undertaken in all options are to be in accordance with the Australian Standards 4373-2007 Pruning for amenity trees.

Option 1

We propose to establish a three (3) metre buffer zone from the adjacent residential properties into the CWC.

The action is to be undertaken over a period of three (3) to five (5) days and is to commence at each end and progress to the centre.

Option 1 Actions

- Removal of all native and non-native trees and shrubs located within the three (3) metre buffer zone;
- Removal of overhanging branches extending from the CWC into buffer zone and residential property;
- Environmental weed control of ground cover/understorey species and native understorey/mid-canopy species throughout CWC;
- Vegetation modification within the designated road reserve between properties 25 and 27 Cassia Ave Coolum;
- Tree trimming and removal within adjacent residences (where appropriate, with landholder consent); and
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).

Option 1 Justification

- Buffer establishment will increase the space between flying-foxes and residents;
- Vegetation modification within the designated road reserve will alleviate impacts experienced by adjacent residents during ‘spill over’ from the roost site;
- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site.
- Understorey/mid-canopy clearing may change the microclimate of the roost site; and
- Tree trimming or removal within adjacent residences will remove available roost space in residential properties.

Option 1 Success Indicator

a) Alleviation of impacts to residents (indicated by reduced customer complaint activity).

b) Less than 1000 flying-foxes in CWC roost*

*Historically, where the population expanded to over 1000 flying-foxes, residents experienced a higher level of lifestyle impact - indicated by increased customer complaint activity.

Option 2

We propose to remove/trim up to 80% of the known and potential roost trees within the CWC.

Tree trimming and removal will commence at each end of the Corridor and traverse towards the centre.

This action is to be undertaken sympathetically to the existing environment, and where possible, non-roost trees are to be retained insitu.

Option 2 Actions

- Removal / Trimming of up to 80% of known and potential roost trees within CWC;
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).
- Option 1 Action.

Option 2 Justification

- The intent of this action is that the site becomes unsuitable as a flying-fox roost, thus reducing conflict with adjoining residences;
- Previous action within Queensland (Gold Coast, 2011) indicated that natural abandonment of roost site coincided with at least 75% removal of understorey and at least 30% removal of canopy.
- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site.
- Removal/trimming of roost trees is intended to change the microclimate of the site, and decrease available habitat;
- This action is intended to remove site fidelity links between flying-foxes and CWC;
- Retention of 20% of canopy trees retains some bushland amenity for adjacent residences ; and
- Non-lethal dispersal techniques where required (Refer Non-lethal dispersal techniques below).

Option 2 Success Indicator

a) All flying-foxes dispersed from CWC;

b) Complete reduction of impacts to residents (indicated by reduced customer complaint activity).

Option 3

We propose to remove 100% of known and potential roost trees within the CWC.

Tree removal will commence at each end of the Corridor and traverse towards the centre.

Option 3 Actions

- Removal of 100% of known and potential roost trees within CWC;
- Vegetation modification within the road reserve between 25 and 27 Cassia Ave Coolum;
- Tree trimming and removal within adjacent residences (where appropriate); and
- Non-lethal dispersal techniques where required (Refer Non-lethal dispersal techniques below).

Option 3 Justification

- The intent of this action is to force the relocation of the flying-foxes to another location.
- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site.

Option 3 Success Indicator

a) All flying-foxes dispersed from CWC;

b) Complete reduction of impacts to residents (indicated by reduced customer complaint activity).

Non-lethal Dispersal Techniques

At each option of works, non-lethal dispersal techniques can be used in conjunction with vegetation management to increase success of the action.

Non-lethal methods may be used for a three hour period (one hour prior to sunrise, and two hours afterward) to discourage roosting within CWC.

Non-lethal dispersal techniques may include the following;

- Wind clown (inflatable clown);
- Smoke/fogging Machines;
- Noise (stock whips, BirdFrite, loud banging of kitchen equipment and heavy music);
- Gas guns (Zon Bird Scare Guns) (where appropriate in residential areas); and
- Lighting (intensive industrial flood lighting).

Where flying-foxes are located in residential properties after the allocated time period for non-lethal dispersal techniques, flying-foxes are to be left in situ until the next dispersal period.

Cost Analysis

Refer to attached cost analysis for breakdown of costs for each option.

Option	Cost	Measure of Success	Expected success	Rationale	Ongoing Maintenance costs Per annum
1	$137,488	• Some alleviation of impacts to residents • Less than 1000 flying-foxes located within CWC	Unknown but expected to be low	• Buffer establishment will increase space between flying-foxes and residents • Understorey clearing may change the microclimate of the roost site • Tree trimming/removal on adjacent properties will remove available roost space in residential properties. • Buffer establishment considered 'Best Practice' for flying-fox mitigation.	$8,446
2	$453,253	• Alleviation of impacts to residents	Unknown but expected to be good.	• Inclusive of Option 1 works • Site will become unsuitable as a flying-fox roost. • Retention of at least 20% of canopy will retain some bushland amenity for adjacent residents. • Staged approach (Progression from Option 1 to 2) considered the 'Best Practice' approach to flying-fox dispersal.	$18,445
3	$552,753	• Alleviation of all impacts to residents	100% Success	• Action will force the relocation of flying-foxes from this site. • Option 3 is **not**	$13,120

	considered 'Best Practice' approach to flying-fox dispersal.

Alternative Options

Council officers have investigated non-destructive methods of dispersing the flying-fox roost. Preliminary investigations into closing the stormwater drain located down the mid-line of the CWC through the use of concrete piping. Closing the stormwater drainage within CWC would reduce the available surface water (a key component in the selection of flying-fox roost sites). However, due to the low water table, drainage works may not result in decrease to humidity (microclimate) within the roost site.

A cost for this work has been estimated at $962,000 with a confidence level of 60%, by Council's Water Management and Drainage Services officers.

Existing Environment

Fauna

Fauna survey undertaken on 19 March 2013 indicated the presence of 11 species of bird, two (2) species of reptile and two (2) species of mammal.

EPBC Protected Matters search results indicated a total of 53 listed threatened species and 32 listed migratory species within a 2km radius of the site. One (1) species of conservation significance was observed during survey (*Pteropus poliocephalus*).

Wildlife Online search results indicated a total of 198 species have been recorded within a 2km radius of the site, including seven (7) Amphibians, 165 Birds, 13 Mammals and 13 Reptiles. One (1) species of conservation significance was observed during survey (*Pteropus poliocephalus*).

Two (2) trail cameras (Uway NT 50B) were installed within the CWC on 27 March 2013 for a period of seven (7) days. A bait ball (oats and peanut butter) was placed within one (1) metre of the camera to attract fauna to the camera trap. Results captured species as follows:

- *Rattus rattus* (Black Rat);
- *Bufo marinus* (Cane Toad);
- *Physignathus lesueurii* (Eastern Water Dragon); and
- *Alectura lathami* (Brush Turkey).

Flora

Flora survey was undertaken by council officers on 19 and 27 March 2013. No species of State or Federal significance were located within the CWC.

Historical aerial photographs (2000) generally indicate an increase in canopy cover within the corridor along the drainage line, in comparison with current aerial images.

Noise

Noise assessment undertaken by SCC Environmental Health Officers indicated excess of noise from 3 – 4am in the region of 5 – 6dB(A) over the recommended background levels as specified in Australian Standards AS 1055.2-1997.

Alternative Roost Sites

Alternative roost sites have been identified within a 20km radius of the CWC. The criteria used to identify these sites have been based on the location having the following attributes:

- A closed canopy at least 5m high;
- Dense vegetation within 500m of a river or creek;
- Within 50km of a coastline, or at an elevation less than 65m above sea level;
- Level topography; and
- Be at least one (1) hectare in size.

There are a number of existing and new locations available for use by the displaced flying-foxes. Refer to alternative habitat mapping within the Roost Management Plan for identification of new sites based on the above criteria. Further to this, there is potential for the roost to fragment into an unknown number of new camps in adjacent residential areas.

These include the following existing flying-fox camps and roost sites:

Current known roosts within 20km of proposed dispersal site	**Land uses**	**Issues or potential issues**
Goat Island, Noosaville	State Land Protected Land Tenure Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Weyba Creek, Noosaville	State Land and Council Land Partial Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Eumundi – Kenilworth Rd, Eerwah Vale	Private Land	*Low conflict site* currently unoccupied by Flying-foxes
Palmer Coolum Resort, Coolum	Private Land	*Low conflict site* currently unoccupied by Flying-foxes We understand that the Current owner has approached EHP for advice on application of a DMP.
Nambour Bypass, Parklands	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Talangatta St, Parklands	Council Reserve Private Land	*High conflict site* currently unoccupied by Flying-foxes **Opportunity for Early Intervention under DMP Permit approval.** SCC to ensure that maintenance works are

		undertaken in accordance with 2010 Species Management Plan.
Current known roosts within 20km of proposed dispersal site cont.	**Land uses**	**Issues or potential issues**
Dunning St, Palmwoods	Council Land Private Land	*Medium conflict site* currently occupied by Black Flying-foxes and Grey-headed Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.
Eudlo Creek	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes.
Stella Maris / Tepequar, Maroochydore	Private Land Council Land	*High conflict site* permanently occupied by all Black Flying-foxes and Grey-headed Flying-foxes Little Red Flying-foxes were observed in March 2013 for the first time Defined as a roost site, therefore, no opportunity for early intervention.
Goonawarra Dr, Mooloolaba	Council Reserve	*High conflict site* currently occupied by Black Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.

Impacts

Take No Action

- Some residents will continue to experience impacts from flying-fox presence within the corridor;
- Community frustration may result in unauthorised dispersal or culling activity, with potential animal welfare issues; and
- Inconsistent with the Regional Flying-Fox Management Plan objective 'To address and manage the concerns of residents experiencing impacts associated with living in close proximity to large or problematic flying-fox camps'.

Option 1

- Loss of flying-fox and other fauna habitat;
- Increased edge effects (e.g. Weed impacts and tree failures);
- Flying-foxes may roost in nearby residential properties;
- New roost site may be in an inappropriate location (E.g. Palmer Coolum Resort);
- Adjacent residents may be unhappy with the buffer area due to lack of privacy, security concerns and increased thoroughfare through the corridor;
- If Option 1 did not result in the dispersal of flying-foxes, residents may see the vegetation outcome as unacceptable
- Reduction in ecological viability; and
- Reduction in bushland amenity level for adjoining properties.

Option 2

- Loss of flying-fox and other fauna habitat;
- Reduction/loss of bushland amenity for adjoining properties;
- Potential de-stabilisation/erosion of banks within CWC;
- Flying-foxes may roost in nearby residential properties;
- New roost site may be in an inappropriate location (E.g. Palmer Coolum Resort);
- Adjacent residents may be unhappy with the vegetation changes due to lack of privacy, security concerns and increased thoroughfare through the corridor;
- Change to visual amenity for Coolum community;
- Reduction/loss in ecological viability;
- Increased risk of tree failures; and
- Potential for temporary water quality issues.

Option 3

- Loss of flying-fox and other fauna habitat;
- Reduction/loss of bushland amenity for adjoining properties;
- Flying-foxes may roost in nearby residential properties;
- New roost site may be in an inappropriate location (E.g. Palmer Coolum Resort);
- Potential de-stabilisation/erosion of banks within CWC;
- Adjacent residents may be unhappy with the vegetation loss due to lack of privacy, security issues and increased thoroughfare through the corridor;
- Change to visual amenity for Coolum community;
- Reduction/loss in ecological viability; and
- Potential for temporary water quality issues.

Sunshine Coast Council

Tepequar Drive Roost

Flying-fox Dispersal Feasibility Study

Landholders Consent

Council officers have met with Stella Maris School Principal and Parish representative to discuss potential action within the school land. Discussions are ongoing to gain landholders consent and to ensure thorough understanding of the potential outcomes of each option detailed within this study.

At this stage, the landholder has not consented to proposed works.

Timeline

19 August 2011	Joint site visit undertaken by Council officers, EHP officers, Cr Blumel, Stella Maris School Principal.
2 September 2011	Meeting with Council officers, EHP officers, Cr Blumel, Stella Maris School Principal and Residents.
22 September 2011	Working group met with representatives from Queensland Health, EHP officers, DEEDI officers, Residents, Stella Maris School Principal and representatives and Council officers.
18 October 2011	Council develops flying-fox departmental directive "Flying-fox Colony Management (Customer Action Requests".
	Council undertakes investigation into feasibility of a regional approach to flying-fox management.
16 March 2012	Community meeting arranged by residents – attended by Council officers, residents, Stella Maris School Principal, Cr Blumel and State MP Fiona Simpson.
May 2012	Regional Flying-fox Management Plan work commenced.
November 2012	SCC undertakes removal of dumped building materials from Aragon St end of bushland reserve.
3 December 2012	Regional Flying-fox Management Plan Strategic Discussion Forum.
21 December 2012	Response received by State Minister – request that SCC takes the lead in Regional Management Plan.
21 March 2013	SCC Cr Robinson submits a Notice of Motion to undertake feasibility study into application for a Damage Mitigation Permit to undertake works to disperse flying-foxes from the Tepequar Drive Roost (TDR).

The first formal recognition of the location as a camp site, by form of a monitoring survey was undertaken by EHP officers in May 2011. Survey results are tabled below in Figure 2.0.

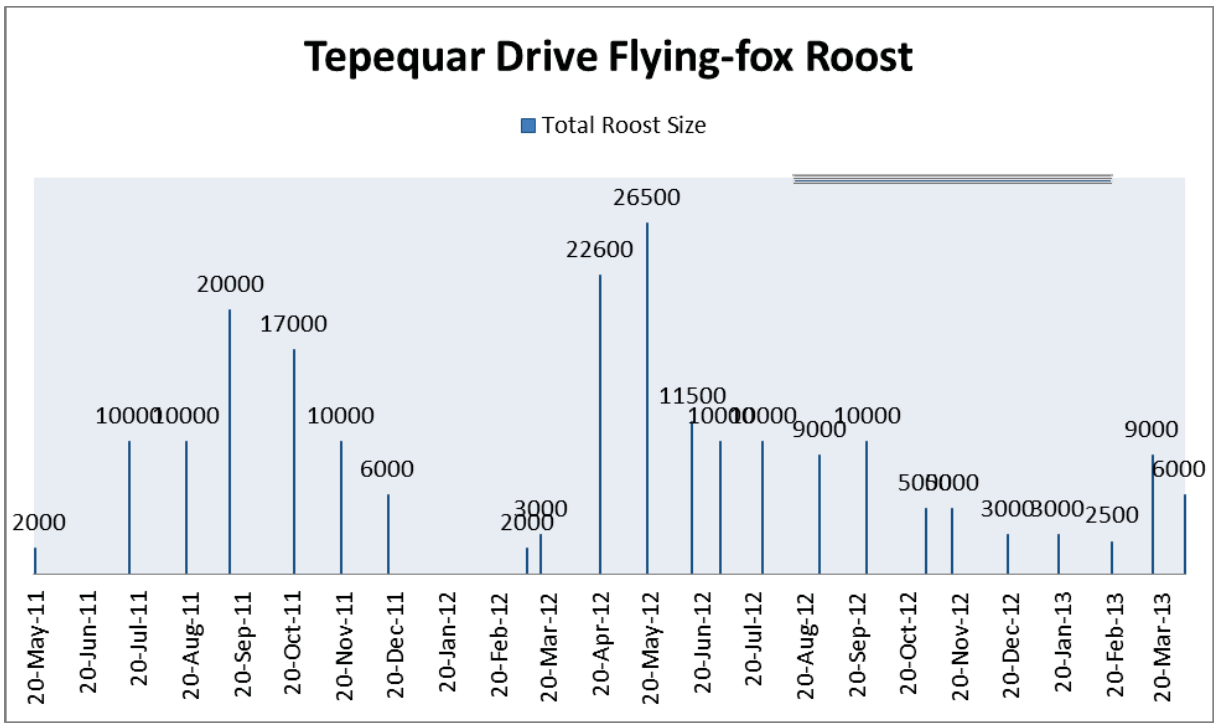

Figure 2.0. EHP monitoring survey results at Tepequar Drive Roost from May 2011 to present.

Population figures for TDR vary seasonally, with three species of flying-fox observed within the roost. Large areas of the roost site have been defoliated due to use by flying-foxes.

Council officers have attended many working group meetings on site with Councillors, EHP officers, State MP Fiona Simpson, Queensland Health, Biosecurity Queensland, Residents and Stella Maris School representatives.

We note that Stella Maris Catholic School has advised that it has not experienced negative impacts from the flying-fox roost. The school maintains that the risk has been mitigated through an extensive education program with the school children and families.

Proposed Activity – Tepequar Drive Roost

Option 1

We propose to establish a 10 metre buffer from fence line (15 metres from residential buildings), establish access tracks into the vegetation and use non-lethal dispersal methods for flying-fox dispersal.

The action is to be undertaken over a period of three (3) to five (5) days and is to commence at the northern end.

Option 1 Actions

- Removal of all native and non-native trees and shrubs located within the (10) metre buffer zone;
- Establish access tracks into the vegetation for the purposes of dispersal access;
- Vegetation modification to maintain a buffer of vegetation between potential roost trees and the school grounds; and
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).

Option 1 Justification

- Buffer establishment will increase the space between flying-foxes and residents;
- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site; and
- Intensive non-lethal dispersal may discourage flying-foxes from roosting.

Option 1 Success Indicator

a) Alleviation of impacts to residents (indicated by reduced customer complaint activity);

b) Reduction of 'line of sight' visual amenity of flying-foxes from resident's outdoor areas;

c) Reduction in available roost habitat.

Option 2

We propose to establish a 23 metre buffer from fence line (28 metre from residential buildings), establish access tracks into the vegetation and use non-lethal dispersal methods for flying-fox dispersal.

The action is to be undertaken over a period of three (3) to five (5) days and is to commence at the northern end.

Option 2 Actions

- Removal of all native and non-native trees and shrubs located within the 28 metre buffer zone from residential buildings;
- Establish access tracks into the vegetation for the purposes of dispersal access;
- Vegetation modification to maintain a buffer of vegetation between potential roost trees and the school grounds; and
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).

Option 2 Justification

- Buffer establishment will increase the space between flying-foxes and residents;

- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site: and
- Intensive non-lethal dispersal may discourage flying-foxes from roosting.

Option 2 Success Indicator

a) Alleviation of impacts to residents (indicated by reduced customer complaint activity);

b) Noise impacts to residents are below Australian Standards for Amenity Noise;

c) Reduction of 'line of sight' visual amenity of flying-foxes from resident's outdoor areas; and

d) Reduction in available roost habitat.

Option 3

We propose to remove up to 100% of known and potential roost trees within the TDR.

Due to site topography, tree removal is to be undertaken by a combination of machine and manual work. Site constraints present a challenge for teams working in areas of TDR due to high water levels.

Option 3 Actions

- Removal of up to 100% of known and potential roost trees within TDR;
- Non-lethal dispersal techniques will break the association that flying-foxes have with the roost site; and
- Non-lethal dispersal techniques where required (Refer Non-lethal dispersal techniques below).

Option 3 Justification

- The intent of this action is to force the relocation of the flying-foxes to another location.

Option 3 Success Indicator

a) All flying-foxes dispersed from TDR;

b) Complete reduction of impacts to residents (indicated by reduced customer complaint activity).

Non-lethal Dispersal Techniques

At each option of works, non-lethal dispersal techniques can be used in conjunction with vegetation management to increase success of the action.

Non-lethal methods may be used for a three hour period (one hour prior to sunrise, and two hours afterward) to discourage roosting within TDR.

Non-lethal dispersal techniques may include the following;

- Wind clown (inflatable clown);
- Smoke/fogging Machines;

- Noise (stock whips, BirdFrite, loud banging of kitchen equipment and heavy music);
- Gas guns (Zon Bird Scare Guns) (where appropriate in residential areas); and
- Lighting (intensive industrial flood lighting).

Where flying-foxes are located in residential properties after the allocated time period for non-lethal dispersal techniques, flying-foxes are to be left in situ until the next dispersal period.

Cost Analysis

Refer to attached cost analysis for breakdown of costs for each option.

Tepequar Drive Roost contains protected remnant vegetation; there is financial output for offset costs that, at this stage, is not captured within this report.

Option	Cost	Measure of Success	Expected success	Rationale	Ongoing Maintenance costs Per annum
1	$126,490	• Alleviation of impacts to residents	Unknown but expected to be low.	• Buffer establishment will increase space between flying-foxes and residents • Reduction of habitat available for roosting flying-foxes. • Buffer establishment considered 'Best Practice' for flying-fox mitigation.	$3,092
2	$143,590	• Alleviation of impacts to residents	Unknown but expected to be good	• Buffer establishment will increase space between flying-foxes and residents • Adjacent residents noise exposure under Australian Standards for amenity noise. • Reduction of habitat available for roosting flying-foxes. • Buffer establishment considered 'Best Practice' for flying-fox mitigation.	$3,308
3	$405,960 or $213,880*	• Alleviation of impacts to residents	100% Success	• Action will force the relocation of flying-foxes from this site. • Option 3 is **not** considered 'Best Practice' approach to flying-fox dispersal.	$3,760

* This option presents a high level of animal welfare risk and may not be suitable over the entire site. Subject to permit conditions under the *Environmental Protection and Biodiversity Conservation Act 1999* and *Nature Conservation Act 1992.*

Alternative Options

Council officers have investigated non-destructive methods of mitigating impacts to residents. Noise attenuation fencing is expected to mitigate flying-fox noise for the residents immediately adjacent to the roost site by 6 – 10 dbA. Noise attenuation fencing is not expected to mitigate noise for the wider community, or mitigate other flying-fox related concerns. Attenuation fencing costs have been estimated below in Figure 3.0.

Component	Cost	Output(s)	Year
Initial Investment	**$92,000**		
Annual Rehabilitation Expense	$0		
Annual Operational Expense	$550		
Annual Maintenance Expense	$4,030		
Estimated Whole of Life Cost	***$206,500***		
Annual Depreciation	$3,680		

Notes

* The above calculation is based on a useful life of 25 years.

Existing Environment

Fauna

Fauna survey is in progress, and is to include a frog call playback survey to ascertain the presence of acid frogs within the TDR site. The site is mapped as essential habitat for two species of acid frog.

EPBC Protected Matters search results indicated a total of 51 listed threatened species and 47 listed migratory species within a 2km radius of the site. One (1) species of conservation significance was observed during surveys conducted to date (*Pteropus poliocephalus*).

Wildlife Online search results indicated a total of 296 species have been recorded within a 2km radius of the site, including 11 Amphibians, 223 Birds, 32 Mammals and 30 Reptiles. One (1) species of conservation significance was observed during surveys conducted to date (*Pteropus poliocephalus*).

Flora

Flora survey was undertaken by council officers on 27 March 2013. No species of State or Federal significance were located within the TDR.

Regional Ecosystem mapping have indicated that the vegetation on the site is mapped as *Least Concern* vegetation consisting of RE12.3.5 *Melaleuca quinquenervia* open forest to woodland.

Noise

Acoustic assessment was undertaken on site on 3 April 2013 by Council Environmental Health Officers. The data collected indicated that there is some disturbance to residents adjoining the flying-fox roost. Daytime noise levels are 55dB(A) at affected properties, this being 5 dB(A) above the daytime recommended 50dB(A) for the type of residential area.

Extrapolation of the data collected and the calculation of attenuation distances has given a figure of 28 - 30m from affected premises to the nearest flying fox roost in order to reduce the noise levels to the recommended levels (Australian Standards) at 4am.

Alternative Roost Sites

Alternative roost sites have been identified within a 20km radius of the TDR. The criteria used to identify these sites have been based on the location having the following attributes:

- A closed canopy at least 5m high;
- Dense vegetation within 500m of a river or creek;
- Within 50km of a coastline, or at an elevation less than 65m above sea level;
- Level topography; and
- Be at least one (1) hectare in size.

There are a number of existing and new locations available for use by the displaced flying-foxes. Refer to alternative habitat mapping within the Roost Management Plan for identification of new sites based on the above criteria. Further to this, there is potential for the roost to fragment into an unknown number of new camps in adjacent residential areas.

Alternative sites include the following existing flying-fox camps and roost sites:

Current known roosts within 20km of proposed dispersal site	Land uses	Issues or potential issues
Cassia Ave, Coolum	Council Land	*High conflict site* currently occupied by Flying-foxes Defined as a roost site, therefore, no opportunity for early intervention.
Palmer Coolum Resort, Coolum	Private Land	*Low conflict site* currently unoccupied by Flying-foxes We understand that the Current owner has approached EHP for advice on application of a DMP.

Current known roosts within 20km of proposed dispersal site	Land uses	Issues or potential issues
Nambour Bypass, Parklands	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Talangatta St, Parklands	Council Reserve Private Land	*High conflict site* currently unoccupied by Flying-foxes **Opportunity for Early Intervention under DMP Permit approval.** SCC to ensure that maintenance works are undertaken in accordance with 2010 Species Management Plan.
Dunning St, Palmwoods	Council Land Private Land	*Medium conflict site* currently occupied by Black Flying-foxes and Grey-headed Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.
Eudlo Creek	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes.
Goonawarra Dr, Mooloolaba	Council Reserve	*High conflict site* currently occupied by Black Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.
Tooway Creek, Moffat Beach	Council Land (Riparian zone)	*Medium conflict site* currently occupied by Flying-foxes Defined as a roost site, therefore, no opportunity for early intervention.

Impacts

Take No Action

- Some residents will continue to experience impacts from flying-fox presence within the corridor;
- Community frustration may result in unauthorised dispersal or culling activity, with potential animal welfare issues; and

- Inconsistent with the Regional Flying-Fox Management Plan objective 'To address and manage the concerns of residents experiencing impacts associated with living in close proximity to large or problematic flying-fox camps'.

Option 1

- Loss of flying-fox and other fauna habitat;
- Change to bushland amenity for school;
- Change to bushland amenity for residents;
- Flying-foxes may roost in nearby residential properties or in trees within the school;
- New roost site may be located at Maroochydore High School (Flying-foxes previously known to roost in this site);
- New roost site may be in an inappropriate location (E.g. Palmwoods Roost);
- Increased edge effects;
- Reduction in ecological viability; and
- Reduction in bushland amenity level for adjoining properties.

Option 2

- Loss of flying-fox and other fauna habitat;
- Change to the bushland amenity for school;
- Change to the vegetation structure of the TDR;
- Flying-foxes may roost in nearby residential properties or in trees within the school;
- New roost site may be located at Maroochydore High School (Flying-foxes previously known to roost in this site);
- New roost site may be in an inappropriate location (E.g. Palmwoods Roost);
- Reduction of bushland amenity for adjoining properties;
- Potential for temporary water quality issues;
- Reduction in ecological viability; and
- Potential de-stabilisation/erosion of banks within TDR.

Option 3

- Loss of flying-fox and other fauna habitat;
- Loss of remnant melaleuca vegetation community;
- Loss of bushland amenity for school;
- Flying-foxes may roost in nearby residential properties or in trees within the school;
- New roost site may be located at Maroochydore High School (Flying-foxes previously known to roost in this site);
- New roost site may be in an inappropriate location (E.g. Palmwoods Roost);
- Reduction/loss of bushland amenity for adjoining properties;
- Potential de-stabilisation/erosion of banks within TDR;
- Change to visual amenity for Maroochydore community;
- Reduction/loss in ecological viability; and
- Potential for temporary water quality issues.

Sunshine Coast Council

Sunshine Coast Council
Cassia Wildlife Corridor – Roost Management Plan




www.sunshinecoast.qld.gov.au
mail@sunshinecoast.qld.gov.au
T 07 5475 7272 **F** 07 5475 7277
Locked Bag 72 Sunshine Coast Mail Centre Qld 4560

Acknowledgements

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Disclaimer

Information contained in this document is based on available information at the time of writing. All figures and diagrams are indicative only and should be referred to as such. While the Sunshine Coast Regional Council has exercised reasonable care in preparing this document it does not warrant or represent that it is accurate or complete. Council or its officers accept no responsibility for any loss occasioned to any person acting or refraining from acting in reliance upon any material contained in this document.

Introduction

Applicant

Sunshine Coast Regional Council

C/O Kate Winter, Conservation Officer, Environmental Operations

Locked Bag 72

SCMC QLD 4560

Kate.winter@sunshinecoast.qld.gov.au

Mob: 0414 503 219

Aims

The aim of this Roost Management Plan (RMP) is to provide:

1. A guide of proposed works to be undertaken within the Cassia Wildlife Corridor (CWC);
2. Welfare strategies to ensure safety of flying-foxes and other fauna throughout the proposed activity;
3. Provide mitigating strategies to relevant site specific threats;
4. Create a profile of the species observed on the subject site which are listed as *'vulnerable'* under the *Environmental Protection and Biodiversity Conservation Act 1999* and protected under the *Nature Conservation Act 1992;* and
5. Assess the significance of potential impacts using the 'Significant Impact Criteria" (DEWHA 2009).

Objective

There are three objectives proposed within this application:

1. To disperse all flying-foxes within the CWC.
2. To undertake works in a timely fashion to reduce potential impacts to flying-foxes residing within CWC; and
3. To prevent or minimise a threat, or potential threat to human health or wellbeing caused by flying-foxes.

Site Location

The site is located at 67 – 73 Yandina Coolum Road, and can be described as Lot 359 on RP 113206. The site is named the 'Cassia Wildlife Corridor' (CWC) and will be referred to as this throughout this RMP. The CWC is located within the Sunshine Coast Council area (SCC).

The CWC is between 38 - 90 metres wide and 350 metres long, totalling an area of 1.2100 hectares. Residential structures are located along the boundary of the reserve, in some instances within 3 – 5 metres. The CWC is closely surrounded by residential properties on the east and western boundary. To the north, a childcare centre is located on Jones Rd, and Yandina-Coolum Rd forms the southern boundary.

The land was originally designated to Council in 1967 for drainage purposes. The land was named the Cassia Wildlife Corridor.

Refer Appendix A for site locality map.

Proposed Activity

Proposed project works within the reserve can be undertaken beginning with Stage 1, Stage 2 or Stage 3.

This RMP and permit application is to cover all options of proposed works to be undertaken in any order or as a stand-alone management action.

EHP is to be notified of works stage selected 48hrs prior to commencement.

Note that vegetation works undertaken in all options are to be in accordance with the Australian Standards 4373-2007 Pruning for amenity trees.

The following indicator may be used as an achievement of overall project success;

- No accidental injury or death ('take') of any flying-foxes.

Stage 1

We propose to establish a three (3) metre buffer zone from the adjacent residential properties into the CWC.

The action is to be undertaken over a period of three (3) to five (5) days and is to commence at each end and progress to the centre.

Stage 1 Actions

- Removal of all native and non-native trees and shrubs located within the three (3) metre buffer zone;
- Removal of overhanging branches extending from the CWC into buffer zone and residential property;
- Environmental weed control of ground cover/understorey species and native understorey/mid-canopy species throughout CWC;
- Vegetation modification within the designated road reserve between properties 25 and 27 Cassia Ave Coolum;
- Tree trimming and removal within adjacent residences (where appropriate, with landholder consent); and
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).

Stage 1 Justification

- Buffer establishment will increase the space between flying-foxes and residents;
- Vegetation modification within the designated road reserve will alleviate impacts experienced by adjacent residents during 'spill over' from the roost site;
- Understorey/mid-canopy clearing may change the microclimate of the roost site; and
- Tree trimming or removal within adjacent residences will remove available roost space in residential properties.

Stage 1 Success Indicator

a) Alleviation of impacts to residents (indicated by reduced customer complaint activity).

b) Less than 1000 flying-foxes in CWC roost*

*Historically, where the population expanded to over 1000 flying-foxes, residents experienced a higher level of lifestyle impact - indicated by increased customer complaint activity.

Stage 2

We propose to remove/trim up to 80% of the known and potential roost trees within the CWC.

Tree trimming and removal will commence at each end of the Corridor and traverse towards the centre. The action is to be undertaken in a timely manner, with the view for all action to be completed within a three (3) to five (5) day period.

This action is to be undertaken sympathetically to the existing environment, and where possible, non-roost trees are to be retained insitu.

Stage 2 Actions

- Removal / Trimming of up to 80% of known and potential roost trees within CWC;
- Non-lethal dispersal techniques where required (refer non-lethal dispersal techniques below).

Stage 2 Justification

- The intent of this action is that the site becomes unsuitable as a flying-fox roost, thus reducing conflict with adjoining residences;
- Previous action within Queensland (Gold Coast, 2011) indicated that natural abandonment of roost site coincided with 75% removal of understorey and 30% removal of canopy.
- Removal/trimming of roost trees is intended to change the microclimate of the site, and decrease available habitat;
- This action is intended to remove site fidelity links between flying-foxes and CWC;
- Retention of 20% of canopy trees retains some bushland amenity for adjacent residences ; and
- Non-lethal dispersal techniques where required (Refer Non-lethal dispersal techniques below).

Stage 2 Success Indicator

a) All flying-foxes dispersed from CWC;

b) Complete reduction of impacts to residents (indicated by reduced customer complaint activity).

Stage 3

We propose to remove 100% of known and potential roost trees within the CWC.

Tree removal will commence at each end of the Corridor and traverse towards the centre. The action is to be undertaken in a timely manner, with the view for all action to be completed within a three (3) to five (5) day period.

Stage 3 Actions

- Removal of 100% of known and potential roost trees within CWC;
- Vegetation modification within the road reserve between 25 and 27 Cassia Ave Coolum;
- Tree trimming and removal within adjacent residences (where appropriate); and
- Non-lethal dispersal techniques where required (Refer Non-lethal dispersal techniques below).

Stage 3 Justification

- The intent of this action is to force the relocation of the flying-foxes to another location.

Stage 3 Success Indicator

a) All flying-foxes dispersed from CWC;

b) Complete reduction of impacts to residents (indicated by reduced customer complaint activity).

Non-lethal Dispersal Techniques

At each stage of works, non-lethal dispersal techniques can be used in conjunction with vegetation management to increase success of the action.

Non-lethal methods may be used for a three hour period (one hour prior to sunrise, and two hours afterward) to discourage roosting within CWC.

Non-lethal dispersal techniques may include the following;

- Wind clown (inflatable clown);
- Smoke/fogging Machines;
- Noise (stock whips, BirdFrite, loud banging of kitchen equipment and heavy music);
- Gas guns (Zon Bird Scare Guns) (where appropriate in residential areas); and
- Lighting (intensive industrial flood lighting).

Where flying-foxes are located in residential properties after the allocated time period for non-lethal dispersal techniques, flying-foxes are to be left in situ until the next dispersal period.

Refer to Appendix A for aerial view of proposed works.

Project Timeframe

SCC anticipate that works are to be undertaken during the period of March to June 2013, to avoid times where female flying-foxes are pregnant or with dependent and non-dependent crèching young.

Proposed works are to be undertaken in relatively short timeframes due to animal welfare considerations and to increase opportunity for successful outcomes. Where each stage is completed, a minimum one day break period is implemented to provide rest and adaptation opportunity for the flying-foxes within the roost.

A timeframe diagram is provided below;

Action	Break	Action	Break	Action
Stage 1 (3 – 5 days)	1 day	Stage 2 (3 – 5 days)	1 day	Stage 3 (3 – 5 days)

Proposed mechanical works within 50 metres of the roost trees are to occur during the night after the last flying-fox has left the roost site. Fauna Spotter/Catcher survey will commence 90 minutes before last light while flying-foxes are in situ.

Proposed mechanical works outside of 50 metres of the closest roost tree can occur during daylight hours whilst flying-foxes are located within the roost. Where equipment that emits low level noise is used (eg. Electric chainsaws, hand tools), works may be undertaken within 30 - 50 metres of the roost site. Where flying-foxes lift of for more than five minutes consecutively, works are to cease until notified by EHP.

SCC understand that permit approval timeframes for Department of Environment and Heritage Protection (EHP) are between 20 and 40 business days, and for Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) are 20 business days. However, as of 4 April 2013, the department of Environment and Heritage Protection (EHP) officer's advised that there is a possibility of a three (3) to four (4) day assessment period on submission of the application to EHP.

Background

Historical Records

Flying-foxes have been recorded to be present within the Coolum district since prior to 1938 where a roost site was located 2.1miles north of the Yandina-Coolum Beach road (Nambour Chronicle and North Coast Advertiser, 1938).

Flying-foxes have been anecdotally recorded within the CWC over previous years; however, the first formal recognition of the location as a camp site, by form of a monitoring survey was undertaken by EHP officers in November 2011. Survey results are tabled below in Figure 1.0.

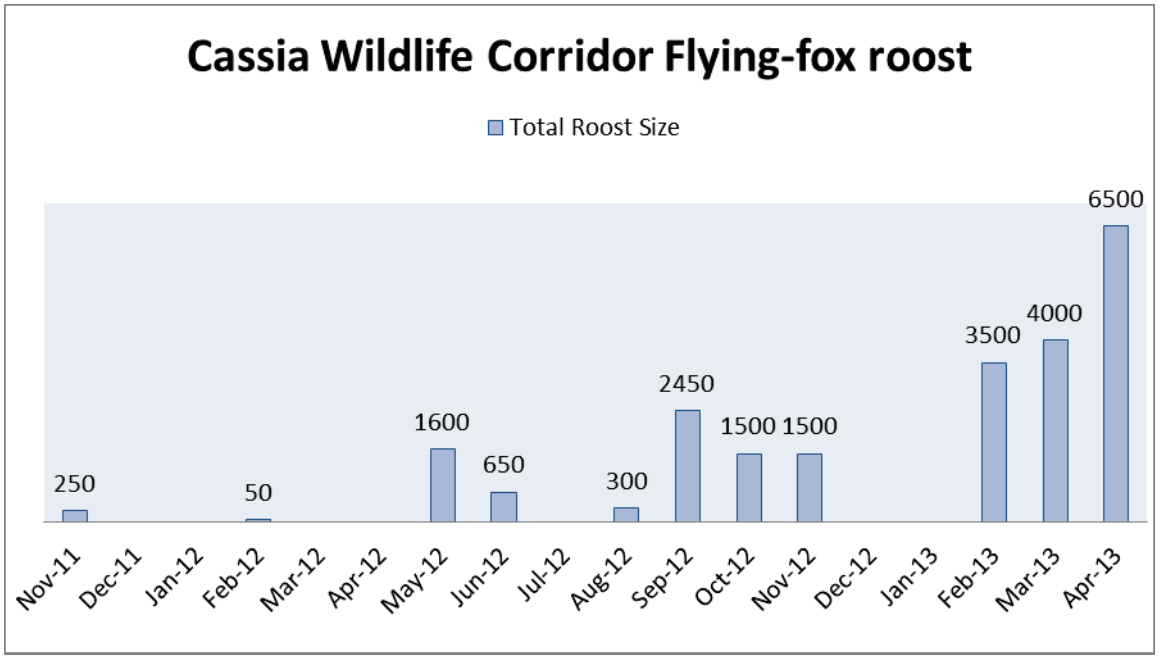

Figure 1.0 Cassia Wildlife Corridor flying-fox roost total population size. Monitoring survey data was provided by EHP.

Roost survey results (Figure 1.0) indicate a considerable increase in total roost size over the 18 month survey period. SCC has recorded a similar increase in customer complaints over the time period. Along with this, SCC has recorded an increase in the severity of the complaint, with most recent complaints detailing lack of sleep, and residents refusing to inhabit the outside of their properties.

Timeline

November 2011	First formal count undertaken by EHP indicated the presence of 50 Black flying-fox (*Pteropus alecto) (*BFF) & 200 Grey-headed flying-fox (Pteropus poliocephalus) (GHFF).
February 2012	First customer complaint (CUSTOMER COMPLAINT) received notified SCC of flying fox presence. EHP officers identified the presence of approximately 50 flying-foxes situated behind the residence during the meeting with the complainant EHP received additional complaints from residents of Cassia Ave, in relation to noise and odour of the roost. Complaint details were

	forwarded to SCC.
April 2012	Joint site inspection was undertaken with EHP and SCC officers.
June 2012	Regional Flying Fox Management Plan work commenced.
August 2012	EHP flying-fox surveys were undertaken at the time300 BFF were recorded within reserve.
September 2012	EHP flying-fox survey was undertaken 2300 BFF and 150 GHFF were recorded. Surveys indicated that female BFF were pregnant. EHP advised residents that no further action would occur on site until March-April 2013 after the young become independent. Due to breeding occurring the CWC site was recognised as a 'roost' site as the FF had congregated for breeding and the rearing of young.
October 2012	EHP flying-fox survey indicated increase in FF present. FF were confined to a 9885m^2 area, located in the centre of the CWC. Heavily pregnant females and dependant young were observed.
November / December 2012	Drainage Works at Yandina – Coolum Road end of Corridor.
3 December 2012	Regional Flying Fox Management Plan Strategic Discussion Forum.
21 December 2012	Complaints received from State Ministers of Parliament office requesting information in to the increased numbers of FF within the CWC and impacts currently being had on local residents Response received by State Minister – requesting that SCC takes the lead in Regional Management Plan.
February 2013	SCC and EHP received an increase in customer complaint activity recorded. Complaints detailed issues such as: • Increased presence of FF within CWC; • Increased noise with continued vocalisation throughout the day; and • Reduced quality of life (reduced sleep, reduced use of outdoor areas, and increased time spent cleaning property due to increase in faeces).
15 February 2013	EHP undertakes FF survey. Fly-out counts indicate approx 3500 FF in CWC CWC was recorded a being high defoliated due to the numbers of FF roosting within the roost.
8 March 2013	EHP undertake FF survey, records indicate further increase. Fly-out count indicates approx. 4000 FF

	EHP officer witnessed resident of Cassia Ave trying to disturb the FF.
	Local residents contacted local State MP Fiona Simpson, advising that numbers within the roost have increased and they are concerned about the rapid growth in numbers and the potential health risks associated with it.
11 March 2013	SCC Councillor Robinson attended the site to liaise with residents that had contacted him to describe impacts from FF. (Environmental Operations team in attendance).
15 March 2013 (AM)	Email received from residents describing further increase in activity. Flying-foxes spill over into residential landscapes.
	EHP officer advised that the FF were behaving erratically within the AM period, as a result undertook site inspection and located a member of the public within the roost.
15 March 2013 (PM)	Environmental Operations team and EHP attended the CWC site and observe an 'unintentional' disturbance of the colony, as a result from some tree removal works occurring on an adjacent property. EHP officer requested that the property owner cease work and re-diverted the activity to continue away from the roost location as an attempt to minimise the disturbance to the FF and residents
21 March 2013	SCC Cr Robinson submitted a "Notice of Motion" to undertake a feasibility study into obtaining a flying-fox Damage Mitigation Permit to undertake works to disperse flying-foxes from the CWC.
3 April 2013	Pre-lodgement meeting undertaken between Council officers and EHP officers.

Ongoing Mitigation Strategies

Regional Flying –Fox Management Plan

SCC has developed a Regional Flying-Fox Management Plan. The plan is currently in draft form and is due before Councillors for approval in late April 2013.

Community Education

SCC has responded to 15 community complaints since February 2012. Complaints have been attended to both over the phone, and in person during site visits. Residents have communicated the following impacts to council officers:

- Increased noise levels (associated reduction in the quality of sleep resulting in sleep deprivation);
- Unpleasant odour;
- Concern about disease risk;
- Reduced visual amenity, caused by the defoliation of the reserve and line of sight presence of flying-foxes;

- Concerns around water quality within the stormwater drain;
- Increased maintenance required to property to reduce the damage caused from droppings; and
- Reduced amenity levels where outdoor living areas are present.

SCC's Environmental Operations team have advised residents to adopt the following procedures to reduce/mitigate impacts:

- Close windows and doors to reduce noise and smell impacts;
- Remove washing before sunset;
- Cover outdoor furniture before sunset;
- Retrofit shade sails to property to protect outdoor areas from droppings;
- Ensure vehicles are parked undercover, or use car-covers to protect from droppings.
- Don't pick up any injured or dead FF, contact the local wildlife groups
- If any FF dead FF are located use gloves and double bag and dispose of the carcase

In response to increased complaint activity in February and early March 2013, Councillor Robinson and Council officers attended an informal community meeting (11 March 2013) to discuss flying-fox activity levels, the regional flying-fox management plan and increased impacts to residents.

Community education has also been undertaken by EHP during site visits, phone complaints and educational letter drops within the affected area.

Relevant Legislation

State Legislation

Nature Conservation Act 1992

Both of the species present within the CWC roost are protected under the *Nature Conservation Act 1992* and any interference or management of the roost is regulated under the associated *Nature Conservation (Wildlife) Regulation 2006*.

Vegetation Management Act 1999

Vegetation within the CWC is not mapped as Remnant or Regrowth vegetation under this Act. Refer Appendix B for Regional Ecosystem mapping results.

Animal Care and Protection Act 2001

All actions undertaken as a result of approval of this Roost Management Plan are to be in accordance with the Animal Care and Protection Act, which promotes the responsible care and use of animals and to protect animals from cruelty, and for other purposes.

Federal Legislation

Environmental Protection and Biodiversity Conservation Act 1999

The Department of Sustainability, Environment, Water, Population and Community (DSEWPaC) has regulatory responsibility for the protection of federally listed species through administration of the above Act. The Grey-headed flying fox is listed as *Vulnerable* under the EBPC Act, which affords protection to the species and its critical habitat.

Significant Impact Criteria – EPBC Act

The significant impact criteria for Vulnerable Species (Grey-headed flying-fox) refer to the following potential actions as triggers for referral at this location:

- Lead to a long-term decrease in the size of an important population of a species;
- Reduce the area of occupancy of an important population;
- Fragment an existing important population into two or more populations;
- Adversely affect habitat critical to the survival of a species; and
- Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Existing Environment

SCC officers undertook an ecological survey of the CWC on 19 and 27 March 2013 for a total of 4 hours.

Fauna

Fauna survey undertaken on 19 March 2013 indicated the presence of 11 species of bird, two (2) species of reptile and two (2) species of mammal. Refer Appendix D for Fauna species list.

EPBC Protected Matters search results indicated a total of 53 listed threatened species and 32 listed migratory species within a 2km radius of the site. One (1) species of conservation significance was observed during survey (*Pteropus poliocephalus*).

Wildlife Online search results indicated a total of 198 species have been recorded within a 2km radius of the site, including seven (7) Amphibians, 165 Birds, 13 Mammals and 13 Reptiles. One (1) species of conservation significance was observed during survey (*Pteropus poliocephalus*).

Two (2) trail cameras (Uway NT 50B) were installed within the CWC on 27 March 2013 for a period of seven (7) days. A bait ball (oats and peanut butter) was placed within one (1) metre of the camera to attract fauna to the camera trap. Results captured species as follows:

- *Rattus rattus* (Black Rat);
- *Bufo marinus* (Cane Toad);
- *Physignathus lesueurii* (Eastern Water Dragon); and
- *Alectura lathami* (Brush Turkey).

Refer to Appendix B for search results, Appendix C for trail camera photographs and Appendix D for fauna species list.

Threatened Species

Grey-headed flying-fox

The Grey-headed flying-fox (GHFF) is a canopy feeding nectarivore and frugivore endemic to the east coast of Australia. All the Grey-headed flying-foxes in Australia are regarded as one population that moves around freely within its entire national range (Webb & Tidemann 1996). Grey-headed flying-foxes can travel as far as 50km in a single night in their search for food, resulting in a round trip as great as 100km. They have also been recorded as travelling up to 400km in one night when moving from one camp to another.

In the late 1920s the recorded range of the GHFF extended from Rockhampton in central Qld to Mallacoota on Australia's south east coast (Ratcliffe 1931). In subsequent years their numbers have diminished and their range has shifted south by around 500km, resulting in their current absence from Rockhampton and the establishment of a permanent camp in Melbourne. Like the other *Pteropus* species, the GHFF is protected under Queensland's *Nature Conservation* Act 1992. Due to their declining numbers, the GHFF is also listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act* 1999.

Grey-headed flying-foxes generally show a high level of fidelity to roosting sites, returning year after year to the same site, and have even been recorded returning to the same branch of a particular tree. This may be one of the reasons flying-foxes continue to return to small urban bushland blocks that may be remnants of historically used larger tracts of vegetation.

Their primary food source is the blossom of *Eucalyptus* sp but they will also utilise the blossoms and fruits of some rainforest trees and native and introduced species in the urban landscape. They will also feed on commercial orchard fruits and the direct killing on the GHFF in orchards is thought to be a contributing factor in its population decline (Vardon & Tidemann 1995).

Black flying-fox

Black flying-foxes are native to Australia (NSW, QLD, NT and WA), Papua New Guinea and parts of Indonesia. In Australia they are found mostly around the northern coast and inland wherever permanent water is found in rivers.

Black flying-foxes are largely nomadic animals with movement and local distribution influenced by climatic variability and the flowering and fruiting patterns of their preferred food plants. They are intelligent and highly social animals that roost together in large numbers at a camp during the day, then feed individually or in small groups at night.

Feeding commonly occurs within 20km of the roost site but can extend as far as 50km. In urban areas of Queensland they may disperse as little as 8km from their roost site, depending if appropriate food is available. Black flying-foxes usually roost beside a creek or river in a wide range of warm and moist habitats, including lowland rainforest gullies, coastal stringybark forests and mangroves. They usually establish their camps in tall and reasonably dense vegetation, and are not deterred by the proximity of human habitats. Camp sites may be permanent or temporary and can range in size from hundreds up to tens of thousands of individuals. During the breeding season camp sizes can change significantly in response to the availability of food and the arrival of animals from interstate.

In addition to a wide range of native fruits (including quandongs, ficus and lillypillys), they also exploit exotic and cultivated species such as bananas, stonefruit and mangoes (Markus & Hall 2004). However, research has shown that cultivated fruits are not a preferred food source and is utilised only in times of native food scarcity (Parry-Jones & Augee 1992). A range of exotics also serve as alternative food sources, including Cocos palms and Chinese elm.

Flora

Flora survey was undertaken by council officers on 19 and 27 March 2013. No species of State or Federal significance were located within the CWC.

Historical aerial photographs (2000) generally indicate an increase in canopy cover within the corridor along the drainage line, in comparison with current aerial images.

Refer Appendix D for flora species list and Appendix C for historical photographs.

Environmental Health

Noise

Noise assessment undertaken by SCC Environmental Health Officers indicated excess of noise from 3 – 4am in the region of 5 – 6dB(A) over the recommended background levels as specified in Australian Standards AS 1055.2-1997.

Refer Appendix E for Noise Assessment results.

Dispersal Strategy

SCC has undertaken a comprehensive review of flying fox dispersals undertaken within the east coast of Australia. We understand from the review, that vegetation management in roost areas changes the structure of the available vegetation and decreases habitat availability for flying-fox colonies.

As such, we have adopted vegetation management as the primary dispersal strategy in combination with non-lethal dispersal techniques for the CWC. We propose to undertake a staged, optional approach, and also have approval to begin with Stage 2 or Stage 3 works where required. EHP is to be notified 48 hours prior to commencement of works for each stage.

Activity Participants

Personnel	Duties
Project Manager	Supervision of all works undertaken under the permit.
Fauna Spotter/Catcher	- Monitoring fauna present within corridor - Liaison with project manager - Liaison with EHP officers - Spotter/Catcher role may be undertaken by SCC personnel holding a EHP rehabilitation permit.
Council Officers	- Pruning of vegetation - Early intervention dispersal techniques
Vegetation Contractor	Vegetation management works
Council Education Officer/Media Officer	Crowd control and liaison with observers
EHP Officers	Compliance supervision of permit conditions
Dispersal Contractor	- Non-lethal dispersal methods

Observer	Reason for attending
Councillors	Key stakeholder
Residents	- Key stakeholder - Works to be undertaken within 10m of residential address. - Likely to be disturbed by works
Emergency Services / Police	- Crowd control
Media	To report on action taken and impacts
Wildlife Carers	- To assist in welfare component - To protest the action

Observer	Reason for attending
Other interested community members	- Interested party - Incidental attendance - To protest the action
Researchers / University Students	- To record/witness the action
Community Groups	- Interested party - To protest the action

Impacts

Stage 1

- Loss of flying-fox and other fauna habitat;
- Increased edge effects;
- Reduction in ecological viability; and
- Reduction in bushland amenity level for adjoining properties.

Stage 2

- Loss of flying-fox and other fauna habitat;
- Reduction/loss of bushland amenity for adjoining properties;
- Potential de-stabilisation/erosion of banks within CWC;
- Change to visual amenity for Coolum community;
- Reduction/loss in ecological viability; and
- Potential for temporary water quality issues.

Stage 3

- Loss of flying-fox and other fauna habitat;
- Reduction/loss of bushland amenity for adjoining properties;
- Potential de-stabilisation/erosion of banks within CWC;
- Change to visual amenity for Coolum community;
- Reduction/loss in ecological viability; and
- Potential for temporary water quality issues.

Animal Welfare and Human Health

Animal Welfare Mitigation Strategies

There is no ‘take’ of any fauna proposed within this RMP.

The following mitigation strategies will be undertaken during proposed works to minimise risks to flying-foxes:

- Fauna Spotter/Catcher (S/C) holding a current EHP Rehabilitation Permit is to be engaged to provide advice and recommendations during proposed works;
- A Fauna Spotter/Catcher will be assigned to each vegetation removal contractor working on site;
- Where works are to be undertaken within 30 metres of roost trees (night works);
    - Fauna S/C is to survey the roost to ensure no FF remain within the roost site. The Fauna S/C is to notify project manager on completion of survey to advise that works can commence.
- Where works are to be undertaken outside of 30 metres of roost trees (day works);
    - Fauna S/C is to survey the roost, and notify project manager where flying-foxes lift of for more than five (5) minutes consecutively. Works are to cease where this occurs.
- Works are to stop immediately if a flying-fox appears to have been killed, injured or harmed during proposed works. Works can resume only after approval from an EHP officer;
- Where a flying-fox appears injured, an experienced, vaccinated flying-fox handler only is to approach, handle and collect the animal. The animal is to be transported to a veterinary facility immediately; and
- Local wildlife veterinary hospital (Australia Zoo Wildlife Hospital) is to be briefed by the Project Manager of the proposed works and be prepared to receive sick or injured wildlife if required.

Cessation of Activity

Where the following triggers occur, all works on site are to cease until further notification by an EHP officer:

- Death or injury to a flying-fox or other fauna;
- Notification from an EHP officer or fauna Spotter/Catcher that unacceptable stress levels are occurring;
- Where pregnant flying-foxes are observed;
- Where dependant young flying-foxes are observed;

Works are only to resume after approval from an EHP officer.

Human Health Mitigation Strategies

The following mitigation strategies will be undertaken during proposed works to minimise risks to human health:

- Strictly no personnel are to come in contact with flying-foxes during works;
- Personnel are required to observe workplace health and safety requirements;
- Personnel are required to wear personal protective equipment as recommended within workplace health and safety requirements; and
- Where contact (bite or scratch) between a flying-fox and human is reported, the person is to advise the Project Manager and attend a General Practitioner as soon as possible for treatment. First aid treatment should include washing the wound for fifteen minutes with soapy water (not scrubbing) and apply an iodine based solution.

Monitoring

On-site Monitoring

Monitoring of flying-foxes will be conducted to record behaviour, movement, project success and to inform planning decisions for each stage. The following monitoring is to be implemented during works;

- Fly-in/fly-out direction of travel, commencing three days prior to works and during works on site; and
- Roosting locations within the CWC and within the wider community (adjacent areas), during and after staged works have been undertaken.

Monitoring can be undertaken by the following personnel:

- EHP Officers;
- Fauna Spotter/Catcher; and
- Council Officers.

Off-site Monitoring

Monitoring of Alternative Roost sites will be undertaken prior to the commencement of works as to gather baseline data. Baseline data will be collected by SCC officers in the four (4) weeks prior to proposed works. Baseline data collected will be in the form of static counts or presence/absence at occupied and unoccupied camp locations (respectively) within 20km of CWC.

Further monitoring is to take place on each morning during works. Monitoring will start on the morning following the commencement of works, and continue twice-weekly for a period of four (4) weeks afterwards.

Monitoring of these sites is to be undertaken by the following personnel:

- Pre-selected residents at key roost locations (to monitor from own residence for change);
- Council Officers;
- Wildlife care community groups; and
- General public.

Offsite monitoring will be undertaken at all known, current and historic flying-fox roosts or reserves that have been identified as suitable flying fox habitat. Refer section *Alternative Roost Sites* for further information.

Offsite monitoring records will also be collated by SCC Customer Service officers. Refer to *Communication Plan* for further information.

Early Intervention Dispersal

Where flying-foxes are observed in the four (4) week period following the proposed works at CWC, at a high conflict location, we intend on using early intervention dispersal. The aim of early intervention dispersal is to move the flying-foxes away from high conflict locations.

Early intervention dispersal techniques will be used when the following criteria are met:

1. Flying-foxes attempt to settle within a known roost site, that is currently unoccupied and classified as medium to high conflict site. (E.g. Tallangatta St, Parklands).
2. Flying-foxes attempt to settle within a private urban or peri-urban residence; or
3. Flying-foxes attempt to settle within a reserve adjoining a private urban or peri-urban residence; or

4. Flying-foxes attempt to settle at any other location that is recognised as likely to generate a high level of land use conflict (e.g. Hospital, Childcare centre, School, Aged care facility).

Early intervention dispersal techniques may include the following methods:

- Smoke/fogging Machines;
- Wind clowns;
- Noise (stock whips, loud banging of kitchen equipment and heavy music);
- Gas guns (where appropriate in residential areas); and
- Lighting (intensive industrial flood lighting).

The above methods have been used in previous actions undertaken within Queensland by Mackay Regional Council (2009) and Duaringa (2012).

Where methods listed above are utilised, all activities are to be monitored by EHP officers and a qualified fauna spotter/catcher. All activities undertaken are to be in accordance with *Animal Welfare Mitigation Strategies* listed within this document.

Alternative Roost Sites

Alternative roost sites have been identified within a 20km radius of the CWC. The criteria used to identify these sites have been based on the location having the following attributes:

- A closed canopy at least 5m high;
- Dense vegetation within 500m of a river or creek;
- Within 50km of a coastline, or at an elevation less than 65m above sea level;
- Level topography; and
- Be at least one (1) hectare in size.

Refer Appendix F for Sunshine Coast Council Potential Flying Fox Habitat mapping.

There are a number of existing and new locations available for use by the displaced flying-foxes. These include the following existing flying-fox camps and roost sites:

Current known roosts within 20km of proposed dispersal site	Land uses	Issues or potential issues
Goat Island, Noosaville	State Land Protected Land Tenure Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Weyba Creek, Noosaville	State Land and Council Land Partial Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Eumundi – Kenilworth Rd, Eerwah Vale	Private Land	*Low conflict site* currently unoccupied by Flying-foxes
Palmer Coolum Resort, Coolum	Private Land	*Low conflict site* currently unoccupied by Flying-foxes We understand that the Current owner has approached EHP for advice on application of a DMP.

Current known roosts within 20km of proposed dispersal site cont.	Land uses	Issues or potential issues
Nambour Bypass, Parklands	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes
Talangatta St, Parklands	Council Reserve Private Land	*High conflict site* currently unoccupied by Flying-foxes **Opportunity for Early Intervention under DMP Permit approval.** SCC to ensure that maintenance works are undertaken in accordance with 2010 Species Management Plan.
Dunning St, Palmwoods	Council Land Private Land	*Medium conflict site* currently occupied by Black Flying-foxes and Grey-headed Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.
Eudlo Creek	State Land Conservation Park	*Low conflict site* currently unoccupied by Flying-foxes.
Stella Maris / Tepequar, Maroochydore	Private Land Council Land	*High conflict site* permanently occupied by all Black Flying-foxes and Grey-headed Flying-foxes Little Red Flying-foxes were observed in March 2013 for the first time Defined as a roost site, therefore, no opportunity for early intervention.
Goonawarra Dr, Mooloolaba	Council Reserve	*High conflict site* currently occupied by Black Flying-foxes. Defined as a roost site, therefore, no opportunity for early intervention.

Risk Matrix

Risk Category	Risk Description	Probability	Impact	Treatment Actions (Accept/Avoid/ Mitigate/Transfer)
Community and Public safety	Residents may have a negative response to noise of works being undertaken outside of business hours.	Possible	Marginal	Accept and Mitigate – Residents will be advised with 1 weeks' notice of works occurring. Currently affected residents are likely to be accepting of short term disruption with view to long term gains in movement of colony.
Community and Public Amenity	Loss of vegetation within the CWC may cause a negative response from residents with concerns about land value	Possible	Marginal	Mitigate – Impacted residents adjoining the CWC will be given the opportunity to express their opinion on the activity using a community survey. All works on private land must have landholders consent to go ahead.
Private Property Damage	Vegetation works may result in damage to fences and other private property	Unlikely	Marginal / Critical	Accept and Mitigate – Council will be responsible for all damages incurred during proposed works. This will be mitigated through assessment of work area prior to start of works.
SCC Personnel Safety	Personnel may be scratched or bitten by a flying-fox	Possible	Critical/ Catastrophic	Avoid and Mitigate – All personnel are required to wear Personal Protective Equipment (PPE) as indicated by Workplace Health and Safety Standards. In the event of a bite or scratch by a flying-fox, follow Queensland Health advice.

Risk Category	Risk Description	Probability	Impact	Treatment Actions (Accept/Avoid/ Mitigate/Transfer)
SCC Natural Resource Damage	Loss of vegetation within a SCC designated reserve, may be seen as unacceptable by the wider community	Possible	Marginal	Accept and Mitigate – Vegetation loss is the most effective option for this situation. Vegetation loss can be mitigated through encouraging a local community group to replant using low shrubs. Community are to be included in the decision making process through meetings and local media.
Flying-fox Welfare	Works could impact on stress levels within the colony Works could impact on pregnant Flying-foxes (not visibly pregnant)	Possible	Critical	Mitigate - Where stress levels are observed, the works will cease. Further, where stress levels are exceeded in pregnant flying-foxes, termination of pregnancy can occur. This is an unacceptable welfare outcome. Fauna Spotter Catcher is to monitor work area for returning flying-foxes.
Flying-fox Safety	Flying-foxes may be injured or killed if they remain in the vegetation	Possible	Critical	Mitigate – Works are only to occur where an attending fauna spotter/catcher has surveyed for flying-foxes. Where injury or death of a flying fox occurs, works are to cease until advised by EHP. Fauna Spotter/Catcher is to monitor work area for returning flying-foxes.

Risk Category	Risk Description	Probability	Impact	Treatment Actions (Accept/Avoid/ Mitigate/Transfer)
Health Risk (Virus)	Flying-foxes may have increased viral levels due to disturbance.	Unlikely	Critical/ Catastrophic	Accept and Mitigate – All personnel are required to wear PPE as indicated by Workplace Health and Safety standards. Recent research has indicated that there is no increase in Hendra Virus spill over during dispersal activities. Fauna Spotter/Catcher is to monitor flying-foxes for increased stress levels.
Unsuitable Relocation Site	Flying-foxes may relocate to an area of equal or higher conflict.	Possible	Critical	Accept and Mitigate – Where an equal or higher conflict site is identified, early intervention dispersal is to take place.
Ongoing Maintenance	CWC may require ongoing maintenance to ensure that Flying-foxes do not return to the site.	Certain	Marginal	Accept and Mitigate – Ongoing maintenance is certain in this location. This can be mitigated and reduced by planning the revegetation of the site and engaging community groups to be involved.

Impact Probability	Negligible	Marginal	Critical	Catastrophic
Certain	High	High	Extreme	Extreme
Likely	Moderate	High	High	Extreme
Possible	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Extreme
Rare	Low	Low	Moderate	High

Reporting

We understand that as a condition of a damage mitigation permit, SCC is required to submit a 'Return of Operations' each quarter.

Ongoing Maintenance

We understand that ongoing maintenance within the CWC will be required to ensure that the Corridor does not present an attractive roost site to flying-foxes.

As such, SCC will undertake regular monitoring of the site and undertake works where necessary.

Communications Strategy

Extensive consultation with stakeholders has been an integral part of the permit application process. The following groups have been consulted with in the development of this RMP:

- EHP Officers;
- Primary affected residents and organisations adjoining the CWC;
- Residents and organisations within 1km of CWC;
- Coolum Residents Association; and
- Local community conservation groups
    - Coolum District Coast Care;
    - Wildlife Preservation Society;
    - Bat Conservation and Rescue Qld;
    - Sunshine Coast Environment Council;
    - Wilvos; and
    - Wildcare Australia
    - Flying-fox Rescue and Release Noosa Inc.

Communication with the community during proposed works is to be achieved through:

- Letters to residents within 2km of CWC;
- Media releases;
- Notices in the local newspaper;
- Internal consultation within SCC (Customer Service, Councillor and Environmental Operations);
- Notification to local State Member;
- Notification of proposed action to Sunshine Coast Airport;
- Notification to relevant emergency services including;
    - Queensland Police Service
    - Queensland Fire and Rescue Service
    - Queensland Ambulance Service

SCC will designate a hotline phone number during on site operations for community to report sightings or records of flying-foxes. Further reports are to be collated by Council customer service officers through the existing customer service processes.

Contact Detail

Kate Winter

Conservation Officer (Wildlife Management)

Environmental Operations

Kate.winter@sunshinecoast.qld.gov.au

Mob 0414 503 219

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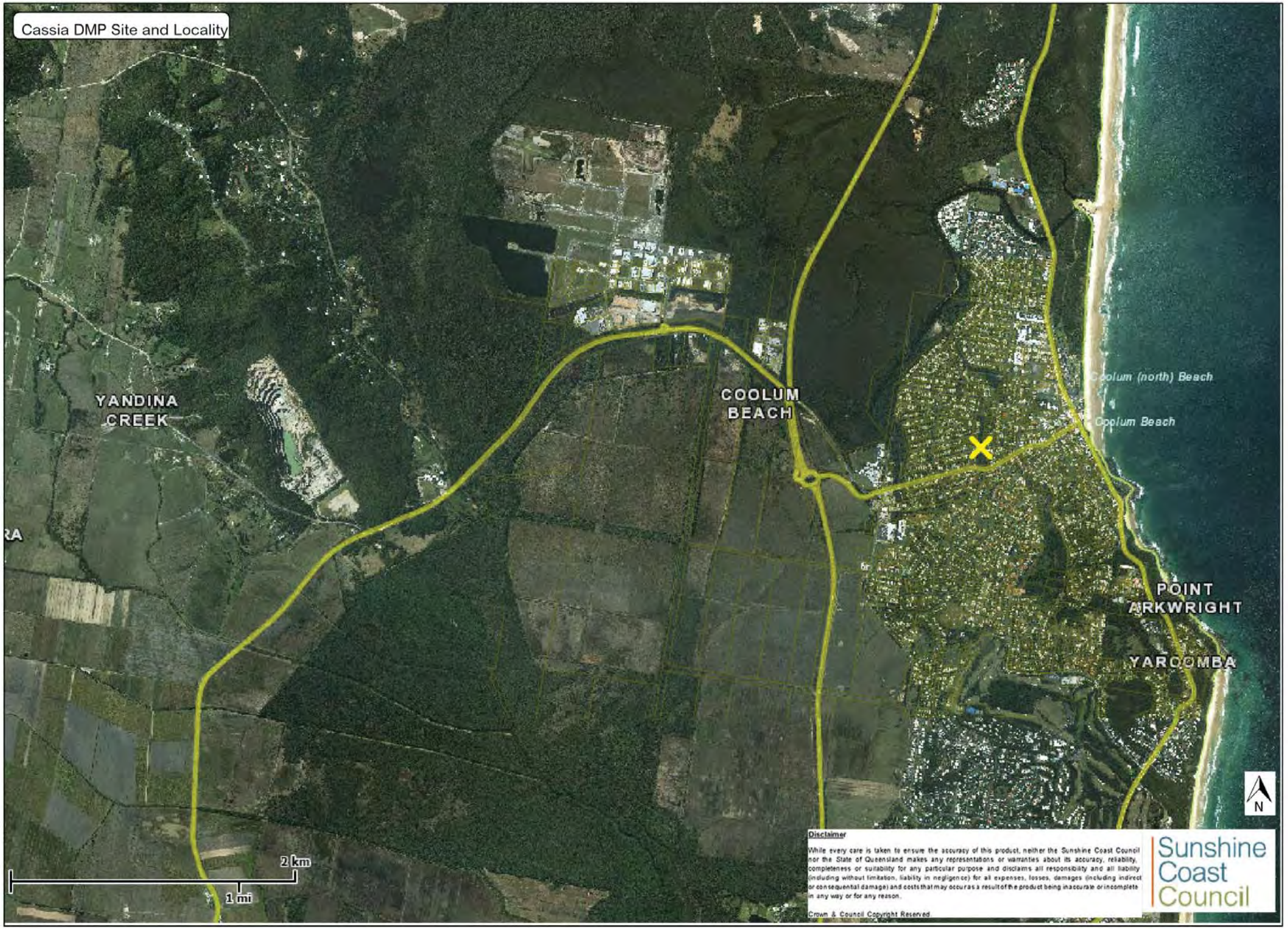
APPENDIX A

Site Specific Mapping


Cassia DMP Site and Locality
YANDINA CREEK
COOLUM BEACH
Coolum (north) Beach
Coolum Beach
POINT ARKWRIGHT
YAROOMBA
2 km
1 mi
N
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Cassia Wildife Corridor - Stage 1
Jones Parade
nus Avenue
Avenue
Cassia Avenue
Santa Monica Avenue
Malibu Avenue
Daytona Avenue
Yandina-Coolum Road
N
Sunshine Coast Council
200 m
500 ft
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APPENDIX B

Search Results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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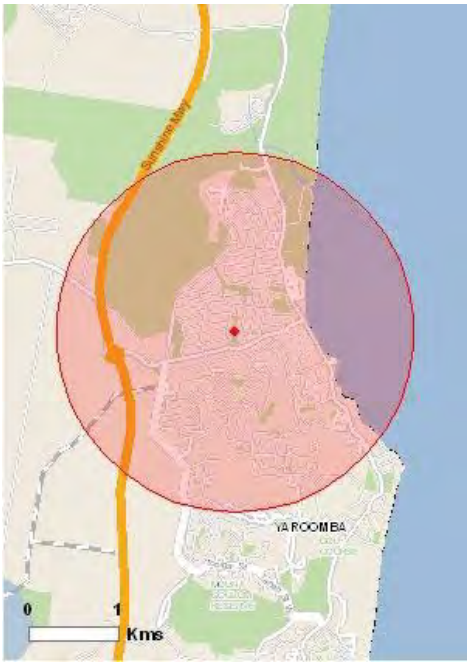

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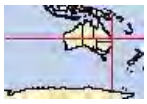


Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	53
Listed Migratory Species:	32

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	63
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	2
State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Cyclopsitta diophthalma_coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria_grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Poephila cincta_cincta Black-throated Finch (southern) [64447]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Maccullochella mariensis Mary River Cod [83806]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat known to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll [331]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides Water Mouse, False Water Rat [66]	Vulnerable	Species or species habitat known to occur within area
Plants		

Name	Status	Type of Presence
Allocasuarina defungens Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat may occur within area
Allocasuarina emuina Emu Mountain Sheoak [21926]	Endangered	Species or species habitat likely to occur within area
Allocasuarina thalassoscopica [21927]	Endangered	Species or species habitat likely to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Bosistoa selwynii Heart-leaved Bosistoa [13702]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa Three-leaved Bosistoa [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus conglomerata Swamp Stringybark [3160]	Endangered	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Phebalium distans Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat may occur within area
Prasophyllum wallum [55148]	Vulnerable	Species or species habitat likely to occur within area
Streblus pendulinus Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat likely to occur within area
Taeniophyllum muelleri Minute Orchid, Ribbon-root Orchid [10771]	Vulnerable	Species or species habitat may occur within area
Triunia robusta [14747]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Delma torquata Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Cyclopsitta diophthalma_coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata		
Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor		
Swift Parrot [744]	Endangered	Species or species habitat may occur within area
Macronectes giganteus		
Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Urocampus carinirostris		
Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer		
Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon		
Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Acalyptophis peronii		
Horned Seasnake [1114]		Species or species habitat may occur within area
Aipysurus laevis		
Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii		
Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Disteira kingii		
Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major		
Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus		
Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hydrophis elegans		
Elegant Seasnake [1104]		Species or species habitat may occur within area
Laticauda laticaudata		
a sea krait [1093]		Species or species habitat may occur within area
Lepidochelys olivacea		
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Pelamis platurus		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Breeding known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat may occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Noosa - Maroochy Wallum Area	QLD	Registered
Peregian Environmental Park	QLD	Registered

State and Territory Reserves [Resource Information]

Name	State
Noosa	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Frogs		
Bufo marinus		
Cane Toad [1772]		Species or species habitat likely to occur within area
Mammals		
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Sus scrofa		
Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cabomba caroliniana		
Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera		
Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Hymenachne amplexicaulis		
Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara		
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
Coolum Creek and Lower Maroochy River	QLD

Coordinates

-26.53299 153.0854

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of Sustainability, Environment, Water, Population and Communities
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Vegetation Management Act Regional Ecosystem and Remnant Map-Version 6.1

Based on 2006 Landsat TM Imagery

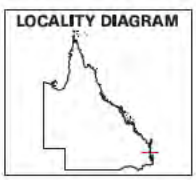
Requested By: KATE.WINTER@SUNSHINECOAST.QLD.GOV.AU
Date: 26 Mar 13 Time: 10.47.45

Centered on Coordinate:
Latitude: -26.5329 Longitude: 153.085403 (decimal degrees)
Bioregion: Southeast Queensland

- Remnant vegetation containing endangered regional ecosystems
- Remnant vegetation containing of concern regional ecosystems
- Remnant vegetation that is a least concern regional ecosystem
- Remnant vegetation under Section 20AH of the VMA
- Non-remnant
- Plantation Forest
- Dam or Reservoir
- Remnant Vegetation
- PMAV Category X area
- Great Barrier Reef Wetlands
- Vegetation Management Act Essential Habitat
  For further information on VMA Essential Habitat, please see the attached VMA Essential Habitat map.
- Subject Lot
- Watercourse (Stream order shown as black number against stream where available)
- Bioregion boundary
- Roads
  © Pitney Bowes Software 2012
- National Park, Conservation Area State Forest and other reserves
- Cadastral line
  Property boundaries shown are provided as a locational aid only.
- Towns
- Coordinate entered

Queensland Government

LOCALITY DIAGRAM



A remnant map covers areas not covered by a regional ecosystem map.

Defined map areas are labelled with the regional ecosystem (RE) code along with the percentage breakdown if more than one RE occurs within the area. Detailed definitions of regional ecosystems are available from www.ehp.qld.gov.au/REDD. Defined map areas smaller than 5ha may not be labelled.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2006, depicted on this map is based on rectified 2006 Landsat TM imagery (supplied by the Statewide Landcover and Trees Study (SLATS), Queensland Government).

Some watercourse lines are derived from GeoScience Australia 1:250 000 mapping.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources and Mines (DNRM) and Pitney Bowes Software, makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrm.qld.gov.au or contact the Department of Natural Resources and Mines.

Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.ehp.qld.gov.au/REDATA or from DNRM for larger areas.

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

Vegetation Management Act Essential Habitat Map Version 3.1

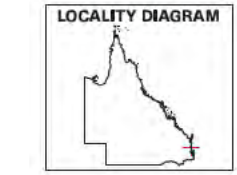
- Remnant vegetation containing endangered regional ecosystems
- Remnant vegetation containing of concern regional ecosystems
- Remnant vegetation that is a least concern regional ecosystem
- Remnant vegetation under Section 20AH of the VMA
- Non-remnant
- Plantation Forest
- Dam or Reservoir
- Remnant Vegetation
- PMAV Category X area
- Vegetation Management Act Essential Habitat
- Vegetation Management Act Essential Habitat Species Records
- Subject Lot
- Roads
  © Pitney Bowes Software 2012
- National Park, Conservation Area State Forest and other reserves
- Cadastral line
  Property boundaries shown are provided as a locational aid only.
- Towns
- Coordinate entered

Requested By: KATE.WINTER@SUNSHINECOAST.QLD.GOV.AU
Date: 26 Mar 13 Time: 10.47.50

Centered on Coordinate:
Latitude: -26.5329 Longitude: 153.085403 (decimal degrees)

Queensland Government

LOCALITY DIAGRAM



Labels for the Vegetation Management Act Essential Habitat are centred on the subject lot (1.1km surrounding and including a Lot on Plan). Labels correlate to the label field in the attached essential habitat database.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2006, depicted on this map is based on rectified 2006 Landsat TM imagery (supplied by SLATS, Queensland Government).

Disclaimer:
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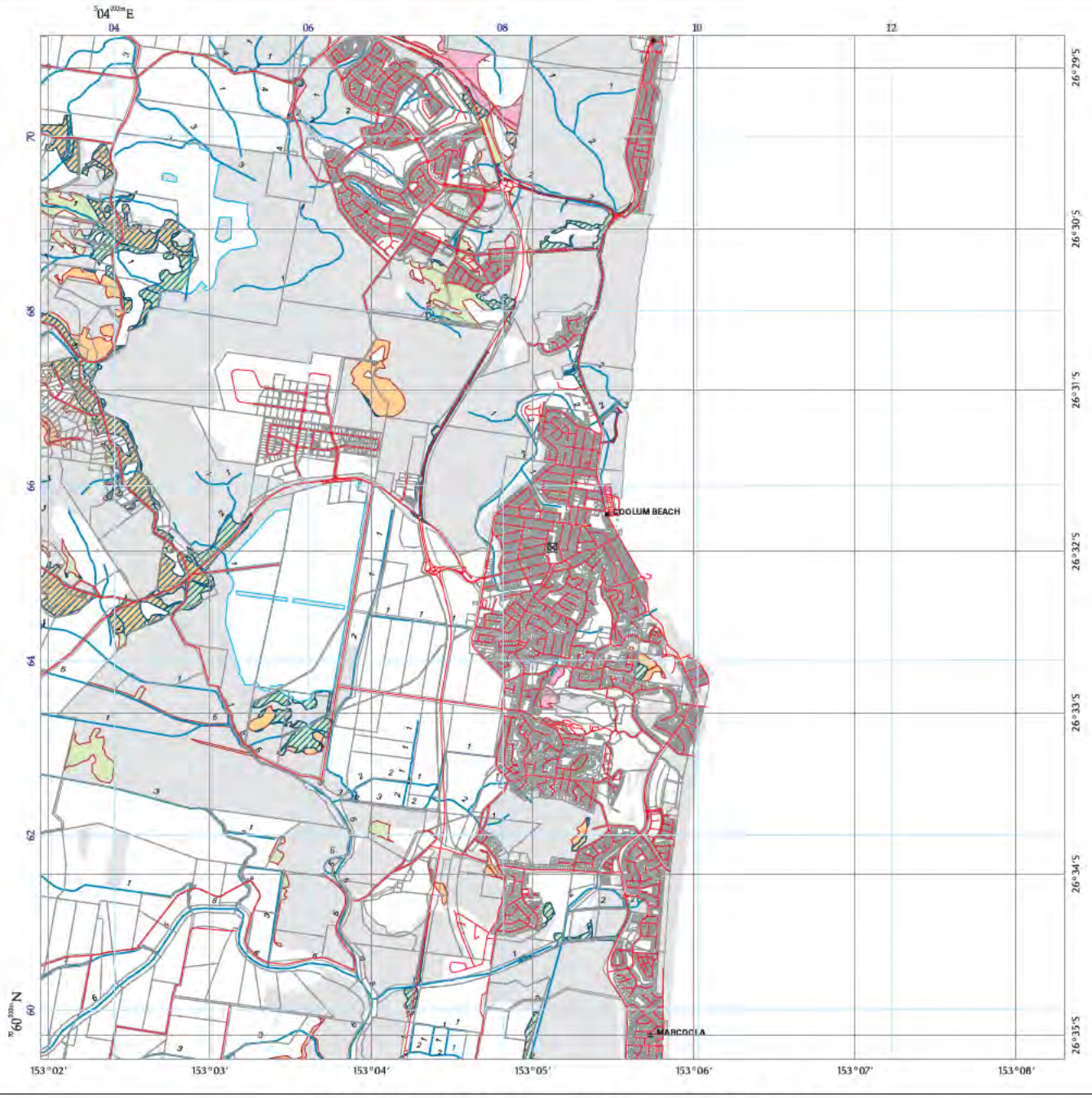
All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrm.qld.gov.au or contact the Department of Natural Resources and Mines.

Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.ehp.qld.gov.au/REDATA or from DNRM for larger areas.

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)



REGROWTH VEGETATION MAP - Version 2.1

- 7857 Vegetation Management Act Essential Regrowth Habitat with example label number
- Great Barrier Reef Wetland Protection Area
- High value regrowth vegetation containing Endangered regional ecosystems
- High value regrowth vegetation containing Of Concern regional ecosystems
- High value regrowth vegetation that is a Least Concern regional ecosystem
- Remnant Vegetation (Refer to the Vegetation Management Act Regional Ecosystem and Remnant Map also available from the Department of Environment and Resource Management website for further information on these areas)
- Non-remnant
- PMAV Category X area
- Regrowth watercourse (Stream order shown as black number against stream)
- Other watercourse(Stream order shown as black number against stream where available)
- Subject Lot
- Roads
  © Pitney Bowes Software 2012
- Cadastral line
  Property boundaries shown are provided as a locational aid only.
- Towns
- ⊠ Coordinate entered

Requested By: KATE.WINTER@SUNSHINECOAST.QLD.GOV.AU
Date: 26 Mar 13 Time: 10.49.05

Centered on Coordinate:
Latitude: -26.5329 Longitude: 153.085403 (decimal degrees)

Queensland Government

LOCALITY DIAGRAM

Labels for Vegetation Management Act Essential Regrowth Habitat are centred on the subject lot.
Labels correlate to the label field in the attached essential regrowth habitat database.

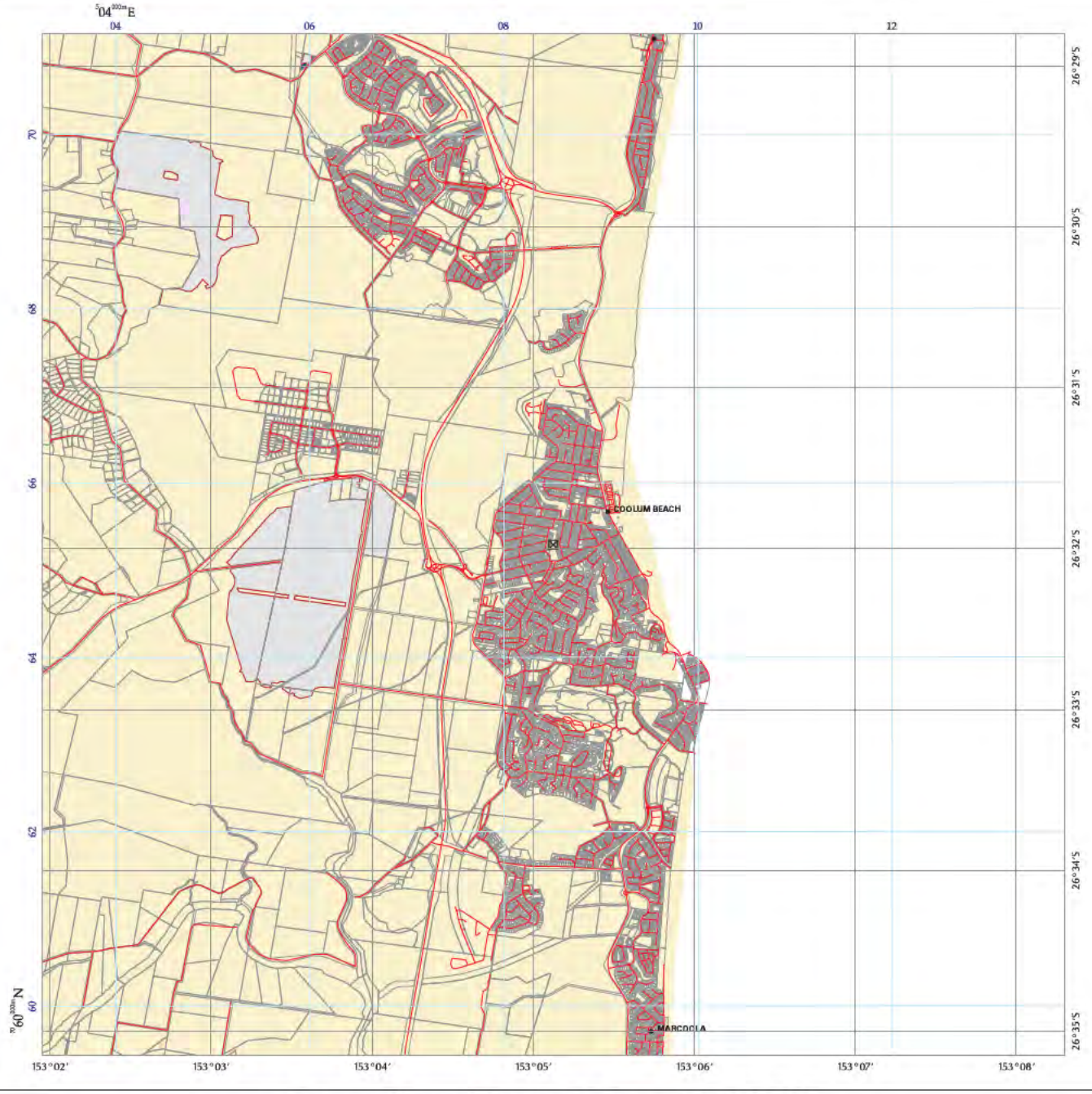
The high value regrowth, regrowth watercourse, other watercourse, Great Barrier Reef wetland protection area and essential regrowth habitat data shown on this map are representations of the preliminary data.

Some watercourse lines are derived from GeoScience Australia 1:250 000 mapping.

For further information go to the website: http://www.dnrm.qld.gov.au or contact Vegetation Management, Department of Natural Resources and Mines.

Areas covered by a Property Map of Assessable Vegetation (PMAV) are represented on the map attached as Page 2 to this Regrowth Vegetation Map and provided with it.

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)



Property Maps of Assessable Vegetation (PMAVs)

Requested By: KATE.WINTER@SUNSHINECOAST.QLD.GOV.AU
Date: 26 Mar 13 Time: 10.49.08

Centered on Coordinate:
Latitude: -26.5329 Longitude: 153.085403 (decimal degrees)

The PMAV data shown on this map are a representation of the data used to create certified PMAVs. Variations may occur between PMAV boundaries and cadastral boundaries. PMAV data incorporates cadastral boundary data as at the time of certification of the PMAV. The cadastral boundaries shown on this map may have shifted relative to the PMAV boundaries as more accurate cadastral boundary data have become available.

All datasets are updated as they become available to provide the most current information as of the date shown on this map.

For further information go to the website:
http://www.dnrm.qld.gov.au or contact Vegetation Management, Department of Natural resources and Mines

Property Map of Assessable Vegetation
Vegetation Category Area

- Category A area
- Category B area
- Category C area
- Category X area
- Area that is subject to other PMAVs or, if no PMAV exists, a regional ecosystem map, remnant map or regrowth vegetation map
- Subject Lot
- Roads
  © Pitney Bowes Software 2012
- Cadastral line
  Property boundaries shown are provided as a locational aid only.
- Towns
- Coordinate entered

Queensland Government

LOCALITY DIAGRAM

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 26.533
Longitude: 153.0854
Distance: 2
Email: kate.winter@sunshinecoast.qld.gov.au
Date submitted: Tuesday 26 Mar 2013 10:44:34
Date extracted: Tuesday 26 Mar 2013 10:50:08

The number of records retrieved = 593

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			3
animals	amphibians	Hylidae	*Litoria tyleri*	southern laughing treefrog		C		1
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		9
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		2
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		1
animals	amphibians	Myobatrachidae	*Crinia tinnula*	wallum froglet		V		5/1
animals	birds	Acanthizidae	*Gerygone albogularis*	white-throated gerygone		C		5
animals	birds	Acanthizidae	*Gerygone levigaster*	mangrove gerygone		C		1
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		6
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		7
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		3
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		4
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		C		35
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		1
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		50
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		5
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		1
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		3
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		13
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		5
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		1
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		3
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		16
animals	birds	Anatidae	*Anas platyrhynchos*	northern mallard	Y			1
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		3
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		3
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		C		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		C		7
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		1
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		1
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		4
animals	birds	Ardeidae	*Ardea modesta*	eastern great egret		C		6
animals	birds	Ardeidae	*Ardea ibis*	cattle egret		C		2
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		42
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		97
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		1
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		57
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		51
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		70
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		3
animals	birds	Artamidae	*Cracticus sp.*					3
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		2
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		2
animals	birds	Cacatuidae	*Calyptorhynchus funereus*	yellow-tailed black-cockatoo		C		28

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		13
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		1
animals	birds	Cacatuidae	*Eolophus roseicapillus*	galah		C		24
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		6
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		4
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		63
animals	birds	Charadriidae	*anellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		15
animals	birds	Charadriidae	*anellus miles*	masked lapwing		C		1
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		NT		1
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		5
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		1
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		1
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			50
animals	birds	Columbidae	*acropygia amboinensis*	brown cuckoo-dove		C		9
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		32
animals	birds	Columbidae	*Chalcophaps indica*	emerald dove		C		9
animals	birds	Columbidae	*Ptilinopus regina*	rose-crowned fruit-dove		C		1
animals	birds	Columbidae	*cyphaps lophotes*	crested pigeon		C		50
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		8
animals	birds	Columbidae	*Columba livia*	rock dove	Y			3
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		17
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		104
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		2
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		17
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		40
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		36
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		5
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		C		2
animals	birds	Dicruridae	*icrurus bracteatus*	spangled drongo		C		50
animals	birds	Estrildidae	*aeniopygia bichenovii*	double-barred finch		C		13
animals	birds	Estrildidae	*eochmia temporalis*	red-browed finch		C		4
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		1
animals	birds	Falconidae	*alco berigora*	brown falcon		C		1
animals	birds	Falconidae	*alco cenchroides*	nankeen kestrel		C		15
animals	birds	Falconidae	*alco longipennis*	Australian hobby		C		1
animals	birds	Fregatidae	*regata minor*	great frigatebird		C		2
animals	birds	Fregatidae	*regata ariel*	lesser frigatebird		C		5
animals	birds	Gruidae	*Grus rubicunda*	brolga		C		1
animals	birds	Haematopodidae	*Haematopus fuliginosus*	sooty oystercatcher		NT		3
animals	birds	Halcyonidae	*acelo leachii*	blue-winged kookaburra		C		1
animals	birds	Halcyonidae	*acelo novaeguineae*	laughing kookaburra		C		89
animals	birds	Halcyonidae	*odiramphus sanctus*	sacred kingfisher		C		10
animals	birds	Halcyonidae	*odiramphus macleayii*	forest kingfisher		C		32
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		2
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		69
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		4

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		1
animals	birds	Jacanidae	*rediparra gallinacea*	comb-crested jacana		C		1
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		C		2
animals	birds	Laridae	*Chlidonias leucopterus*	white-winged black tern		C		2
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		10
animals	birds	Laridae	*Sterna hirundo*	common tern		C		3
animals	birds	Laridae	*halasseus bergii*	crested tern		C		17/1
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		C		2
animals	birds	Maluridae	*alurus cyaneus*	superb fairy-wren		C		5
animals	birds	Maluridae	*alurus lamberti*	variegated fairy-wren		C		10
animals	birds	Maluridae	*alurus melanocephalus*	red-backed fairy-wren		C		17
animals	birds	Megaluridae	*egalurus timoriensis*	tawny grassbird		C		1
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		4
animals	birds	Meliphagidae	*eliphaga le inii*	Lewin's honeyeater		C		86
animals	birds	Meliphagidae	*elithreptus albogularis*	white-throated honeyeater		C		10
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		82
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		12
animals	birds	Meliphagidae	*yzomela sanguinolenta*	scarlet honeyeater		C		17
animals	birds	Meliphagidae	*anorina melanocephala*	noisy miner		C		19
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		2
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		4
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		78
animals	birds	Meliphagidae	*Phylidonyris niger*	white-cheeked honeyeater		C		40
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		88
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		106
animals	birds	Meropidae	*erops ornatus*	rainbow bee-eater		C		8
animals	birds	Monarchidae	*yiagra cyanoleuca*	satin flycatcher		C		1
animals	birds	Monarchidae	*yiagra rubecula*	leaden flycatcher		C		6
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		60
animals	birds	Monarchidae	*Symposiarchus trivirgatus*	spectacled monarch		C		2
animals	birds	Monarchidae	*onarcha melanopsis*	black-faced monarch		C		2
animals	birds	Nectariniidae	*icaeum hirundinaceum*	mistletoebird		C		21
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		73
animals	birds	Oriolidae	*riolus sagittatus*	olive-backed oriole		C		5
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		8
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		8
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		19
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		13
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		28
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		1
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			5
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		1
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		9
animals	birds	Phalacrocoracidae	*icrocarbo melanoleucos*	little pied cormorant		C		3
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		6
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		3
animals	birds	Phasianidae	*Excalfactoria chinensis*	king quail		C		2
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		1
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		13
animals	birds	Podicipedidae	*achybaptus novaehollandiae*	Australasian grebe		C		2
animals	birds	Procellariidae	*Ardenna tenuirostris*	short-tailed shearwater		C		1
animals	birds	Procellariidae	*Pachyptila salvini*	Salvin's prion		C		1
animals	birds	Procellariidae	*Ardenna pacifica*	wedge-tailed shearwater		C		1
animals	birds	Psittacidae	*Pezoporus allicus allicus*	ground parrot		V		7
animals	birds	Psittacidae	*Aprosmictus erythropterus*	red-winged parrot		C		9
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		21
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		1
animals	birds	Psittacidae	*Platycercus eximius*	eastern rosella		C		1
animals	birds	Psittacidae	*richoglossus chlorolepidotus*	scaly-breasted lorikeet		C		41
animals	birds	Psittacidae	*richoglossus haematodus moluccanus*	rainbow lorikeet		C		122
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		21
animals	birds	Rallidae	*ulica atra*	Eurasian coot		C		1
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		3
animals	birds	Rallidae	*Porphyrio porphyrio*	purple swamphen		C		2
animals	birds	Rhipiduridae	*hipidura albiscapa*	grey fantail		C		16
animals	birds	Rhipiduridae	*hipidura rufifrons*	rufous fantail		C		2
animals	birds	Rhipiduridae	*hipidura leucophrys*	willie wagtail		C		29
animals	birds	Scolopacidae	*umenius madagascariensis*	eastern curlew		NT		1
animals	birds	Scolopacidae	*Gallinago hard ickii*	Latham's snipe		C		1
animals	birds	Strigidae	*inox sp.*					1
animals	birds	Strigidae	*inox boobook*	southern boobook		C		3
animals	birds	Sturnidae	*Sturnus tristis*	common myna	Y			1
animals	birds	Sulidae	*orus serrator*	Australasian gannet		C		6
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		1
animals	birds	Threskiornithidae	*hreskiornis spinicollis*	straw-necked ibis		C		15
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		12
animals	birds	Threskiornithidae	*hreskiornis molucca*	Australian white ibis		C		15
animals	birds	Timaliidae	*osterops lateralis*	silvereye		C		50
animals	birds	Tytonidae	*yto javanica*	eastern barn owl		C		1
animals	insects	Hesperiidae	*Cephrenes augiades sperthias*	orange palm-dart				1
animals	insects	Lycaenidae	*izina labradus labradus*	common grass-blue (Australian subspecies)				1
animals	insects	Nymphalidae	*Euploea tulliolus tulliolus*	purple crow				2
animals	insects	Nymphalidae	*anaus plexippus plexippus*	monarch				16
animals	insects	Nymphalidae	*Hypocysta adiante adiante*	orange ringlet				1
animals	insects	Nymphalidae	*Hypolimnas bolina nerina*	varied eggfly				8
animals	insects	Nymphalidae	*unonia villida calybe*	meadow argus				3
animals	insects	Nymphalidae	*elanitis leda bankia*	common evening-brown				12
animals	insects	Nymphalidae	*Heteronympha mirifica*	wonder brown				1
animals	insects	Nymphalidae	*Euploea core corinna*	common crow				10
animals	insects	Nymphalidae	*Argyreus hyperbius inconstans*	Australian fritillary		E		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Nymphalidae	*Polyura sempronius sempronius*	tailed emperor				1
animals	insects	Nymphalidae	*irumala hamata hamata*	blue tiger				7
animals	insects	Papilionidae	*Graphium eurypylus lycaon*	pale-blue triangle (eastern subspecies)				1
animals	insects	Papilionidae	*Graphium sarpedon choredon*	blue triangle				6
animals	insects	Papilionidae	*rnithoptera richmondia*	Richmond birdwing		V		5
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				8
animals	insects	Pieridae	*Catopsilia pomona pomona*	lemon migrant				8
animals	insects	Pieridae	*elenois java teutonia*	caper white				5
animals	insects	Pieridae	*Eurema hecabe phoebus*	large grass-yellow				6
animals	insects	Pieridae	*elias nysa nysa*	yellow-spotted jezebel (Australian subspecies)				1
animals	insects	Pieridae	*elias nigrina*	black jezebel				7
animals	insects	Pieridae	*Catopsilia gorgophone gorgophone*	yellow migrant				2
animals	insects	Pieridae	*Pieris rapae*	cabbage white				6
animals	insects	Pieridae	*Eurema sp.*					1
animals	insects	Pieridae	*Eurema brigitta australis*	no-brand grass-yellow				1
animals	insects	Pieridae	*Catopsilia pyranthe crokera*	white migrant				2
animals	insects	Pieridae	*elias argenthona argenthona*	scarlet jezebel				6
animals	insects	Pieridae	*Eurema smilax*	small grass-yellow				5
animals	mammals	Balaenopteridae	*egaptera novaeangliae*	humpback whale		V	V	2
animals	mammals	Macropodidae	*acropus giganteus*	eastern grey kangaroo		C		1
animals	mammals	Macropodidae	*allabia bicolor*	swamp wallaby		C		11
animals	mammals	Macropodidae	*acropus sp.*					1
animals	mammals	Muridae	*attus rattus*	black rat	Y			1
animals	mammals	Muridae	*elomys burtoni*	grassland melomys		C		2
animals	mammals	Muridae	*us musculus*	house mouse	Y			1
animals	mammals	Phalangeridae	*richosurus sp.*					1
animals	mammals	Phalangeridae	*richosurus vulpecula*	common brushtail possum		C		5
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	1
animals	mammals	Pteropodidae	*Pteropus sp.*					1
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		1
animals	mammals	Tachyglossidae	*achyglossus aculeatus*	short-beaked echidna		C		1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		2
animals	reptiles	Agamidae	*ntellagama lesueurii*	eastern water dragon		C		8
animals	reptiles	Boidae	*orelia spilota*	carpet python		C		1
animals	reptiles	Cheloniidae	*Caretta caretta*	loggerhead turtle		E	E	1
animals	reptiles	Colubridae	*endrelaphis punctulata*	common tree snake		C		1
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		4
animals	reptiles	Scincidae	*Cyclodomorphus gerrardii*	pink-tongued lizard		C		10
animals	reptiles	Scincidae	*Lampropholis delicata*			C		14
animals	reptiles	Scincidae	*Anomalopus verreauxii*			C		1
animals	reptiles	Scincidae	*iliqua scincoides*	eastern blue-tongued lizard		C		2
animals	reptiles	Scincidae	*Lampropholis guichenoti*			C		1
animals	reptiles	Varanidae	*aranus sp.*	goanna				1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Varanidae	*aranus varius*	lace monitor		C		5
fungi	sac fungi	Lichen	*Lichen*			C		1/1
fungi	sac fungi	Pannariaceae	*Pannaria dissecta*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema tinctorum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema crinitum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema austrosinense*			C		1/1
fungi	sac fungi	Physciaceae	*irinaria confluens*			C		1/1
fungi	sac fungi	Physciaceae	*irinaria applanata*			C		1/1
fungi	sac fungi	Physciaceae	*Pyxine*			C		1/1
fungi	sac fungi	Physciaceae	*irinaria consimilis*			C		1/1
fungi	sac fungi	Ramalinaceae	*amalina subfraxinea*			C		1/1
plants	conifers	Pinaceae	*Pinus elliottii*	slash pine	Y			1
plants	conifers	Pinaceae	*Pinus radiata*	radiata pine	Y			1
plants	ferns	Adiantaceae	*Pityrogramma calomelanos var. austroamericana*		Y			1/1
plants	ferns	Blechnaceae	*lechnum indicum*	swamp water fern		C		3
plants	ferns	Cyatheaceae	*Cyathea cooperi*			C		1
plants	ferns	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		1
plants	ferns	Dennstaedtiaceae	*Hypolepis muelleri*	swamp bracken		C		1
plants	ferns	Dicksoniaceae	*Calochlaena dubia*			C		1
plants	ferns	Dryopteridaceae	*Lastreopsis microsora subsp. microsora*			C		1/1
plants	ferns	Gleicheniaceae	*icranopteris linearis var. linearis*			C		1/1
plants	ferns	Gleicheniaceae	*Gleichenia dicarpa*	pouched coral fern		C		1
plants	ferns	Nephrolepidaceae	*ephrolepis hirsutula*			C		1/1
plants	ferns	Schizaeaceae	*Lygodium microphyllum*	snake fern		C		2
plants	ferns	Schizaeaceae	*Schizaea bifida*	forked comb fern		C		1
plants	ferns	Thelypteridaceae	*Cyclosorus interruptus*			C		1/1
plants	higher dicots	Acanthaceae	*arleria repens*		Y			1/1
plants	higher dicots	Apiaceae	*Platysace lanceolata*			C		1
plants	higher dicots	Apiaceae	*Centella asiatica*			C		1
plants	higher dicots	Apiaceae	*Platysace ericoides*	heath platysace		C		1
plants	higher dicots	Apocynaceae	*Alyxia ruscifolia*			C		1
plants	higher dicots	Apocynaceae	*Parsonsia straminea*	monkey rope		C		1
plants	higher dicots	Apocynaceae	*ylophora benthamii*	coast tylophora		C		1/1
plants	higher dicots	Araliaceae	*Polyscias elegans*	celery wood		C		1
plants	higher dicots	Araliaceae	*Hydrocotyle paludosa*			C		1/1
plants	higher dicots	Araliaceae	*Schefflera actinophylla*	umbrella tree		C		1
plants	higher dicots	Araliaceae	*rachymene incisa subsp. incisa*			C		1
plants	higher dicots	Asteraceae	*Conyza parva*		Y			1
plants	higher dicots	Asteraceae	*Cassinia subtropica*			C		1/1
plants	higher dicots	Asteraceae	*Ageratum houstonianum*	blue billygoat weed	Y			2
plants	higher dicots	Asteraceae	*Picris angustifolia subsp. carolorum henricorum*			C		1/1
plants	higher dicots	Asteraceae	*Centratherum riparium*			C		1
plants	higher dicots	Asteraceae	*Sphagneticola trilobata*		Y			1/1
plants	higher dicots	Asteraceae	*accharis halimifolia*	groundsel bush	Y			2
plants	higher dicots	Bignoniaceae	*Pandorea jasminoides*			C		1
plants	higher dicots	Campanulaceae	*Lobelia stenophylla*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Campanulaceae	*Lobelia purpurascens*	white root		C		1
plants	higher dicots	Campanulaceae	*Lobelia quadrangularis*			C		1
plants	higher dicots	Campanulaceae	*Lobelia anceps*			C		1
plants	higher dicots	Caryophyllaceae	*Silene gallica*		Y			1/1
plants	higher dicots	Caryophyllaceae	*Sagina procumbens*	spreading pearlwort	Y			1/1
plants	higher dicots	Casuarinaceae	*Allocasuarina littoralis*			C		1
plants	higher dicots	Casuarinaceae	*Casuarina glauca*	swamp she-oak		C		1
plants	higher dicots	Casuarinaceae	*Allocasuarina emuina*	Mt. Emu she-oak		E	E	2/1
plants	higher dicots	Clusiaceae	*Hypericum gramineum*			C		2/1
plants	higher dicots	Cunoniaceae	*auera capitata*	clustered bauera		C		2
plants	higher dicots	Dilleniaceae	*Hibbertia vestita*			C		1
plants	higher dicots	Dilleniaceae	*Hibbertia salicifolia*			C		2/1
plants	higher dicots	Dilleniaceae	*Hibbertia linearis var. floribunda*			C		1/1
plants	higher dicots	Dilleniaceae	*Hibbertia linearis var. obtusifolia*			C		1
plants	higher dicots	Dilleniaceae	*Hibbertia linearis*			C		1
plants	higher dicots	Dilleniaceae	*Hibbertia acicularis*			C		1
plants	higher dicots	Droseraceae	*rosera spatulata*			C		1
plants	higher dicots	Droseraceae	*rosera pygmaea*			C		1
plants	higher dicots	Droseraceae	*rosera peltata*	pale sundew		C		2
plants	higher dicots	Ebenaceae	*iospyros fasciculosa*	grey ebony		C		2
plants	higher dicots	Ebenaceae	*iospyros pentamera*	myrtle ebony		C		1
plants	higher dicots	Elaeocarpaceae	*Elaeocarpus reticulatus*	ash quandong		C		1
plants	higher dicots	Ericaceae	*onotoca scoparia*	prickly broom heath		C		1
plants	higher dicots	Ericaceae	*Leucopogon leptospermoides*			C		3/1
plants	higher dicots	Ericaceae	*Epacris pulchella*	wallum heath		C		2
plants	higher dicots	Ericaceae	*Epacris microphylla var. microphylla*			C		1/1
plants	higher dicots	Ericaceae	*Epacris obtusifolia*	common heath		C		1
plants	higher dicots	Ericaceae	*Leucopogon virgatus*	common beard heath		C		2
plants	higher dicots	Ericaceae	*Leucopogon pimeleoides*			C		1
plants	higher dicots	Ericaceae	*Sprengelia sprengelioides*	sprengelia		C		2/1
plants	higher dicots	Euphorbiaceae	*acaranga tanarius*	macaranga		C		2/1
plants	higher dicots	Euphorbiaceae	*icinocarpos pinifolius*	wedding bush		C		2
plants	higher dicots	Fabaceae	*irbelia rubiifolia*	heathy mirbelia		C		1
plants	higher dicots	Fabaceae	*Pultenaea paleacea*			C		3
plants	higher dicots	Fabaceae	*ill ynia floribunda*			C		2/1
plants	higher dicots	Fabaceae	*ossiaea heterophylla*	variable bossiaea		C		1
plants	higher dicots	Fabaceae	*Gompholobium pinnatum*	poor mans gold		C		3
plants	higher dicots	Fabaceae	*Gompholobium virgatum*			C		1
plants	higher dicots	Fabaceae	*Austrosteenisia blackii*	bloodvine		C		2
plants	higher dicots	Fabaceae	*acroptilium atropurpureum*	siratro	Y			1
plants	higher dicots	Fabaceae	*Cajanus cajan*	pigeon pea	Y			1/1
plants	higher dicots	Fabaceae	*Aotus lanigera*	pointed aotus		C		1
plants	higher dicots	Fabaceae	*Aotus ericoides*	common aotus		C		2/1
plants	higher dicots	Fabaceae	*Hovea acutifolia*			C		1
plants	higher dicots	Fabaceae	*iminaria juncea*	viminaria		C		1
plants	higher dicots	Fabaceae	*Abrus precatorius*	crabs-eye vine		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Fabaceae	*ill ynia retorta*			C		1
plants	higher dicots	Fabaceae	*acksonia scoparia*			C		1
plants	higher dicots	Fabaceae	*Lotononis bainesii*	lotononis	Y			1/1
plants	higher dicots	Fabaceae	*aviesia umbellulata*			C		1
plants	higher dicots	Goodeniaceae	*ampiera*			C		1
plants	higher dicots	Goodeniaceae	*Scaevola calendulacea*	dune fan flower		C		1/1
plants	higher dicots	Goodeniaceae	*Goodenia stelligera*			C		2/1
plants	higher dicots	Goodeniaceae	*elleia spathulata*	wild pansies		C		1
plants	higher dicots	Haloragaceae	*Gonocarpus micranthus subsp. ramosissimus*			C		1
plants	higher dicots	Lamiaceae	*estringia tenuicaulis*	tufted westringia		C		1
plants	higher dicots	Loganiaceae	*itrasacme paludosa*			C		1
plants	higher dicots	Loganiaceae	*itrasacme alsinoides*			C		1/1
plants	higher dicots	Loranthaceae	*Amylotheca dictyophleba*			C		1
plants	higher dicots	Malvaceae	*Hibiscus diversifolius*	swamp hibiscus		C		1
plants	higher dicots	Melastomataceae	*elastoma malabathricum subsp. malabathricum*			C		1
plants	higher dicots	Menyanthaceae	*Liparophyllum exaltatum*			C		1
plants	higher dicots	Mimosaceae	*Acacia leptocarpa*	north coast wattle		C		1/1
plants	higher dicots	Mimosaceae	*Acacia leiocalyx*			C		1
plants	higher dicots	Mimosaceae	*Acacia maidenii*	Maiden's wattle		C		1
plants	higher dicots	Mimosaceae	*Acacia suaveolens*	sweet wattle		C		1
plants	higher dicots	Mimosaceae	*Acacia ulicifolia*			C		1
plants	higher dicots	Mimosaceae	*Acacia melanoxylon*	blackwood		C		1
plants	higher dicots	Mimosaceae	*Acacia baueri subsp. baueri*	tiny wattle		V		1
plants	higher dicots	Mimosaceae	*Acacia disparrima subsp. disparrima*			C		1
plants	higher dicots	Mimosaceae	*Acacia leiocalyx subsp. herveyensis*			C		1
plants	higher dicots	Mimosaceae	*Acacia penninervis var. longiracemosa*			C		1
plants	higher dicots	Molluginaceae	*acarthuria neocambrica*			C		1/1
plants	higher dicots	Myrtaceae	*elaleuca nodosa*			C		3
plants	higher dicots	Myrtaceae	*aeckea imbricata*	spindly baeckea		C		1
plants	higher dicots	Myrtaceae	*aeckea frutescens*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus robusta*	swamp mahogany		C		1
plants	higher dicots	Myrtaceae	*Angophora oodsiana*	smudgee		C		1
plants	higher dicots	Myrtaceae	*Austromyrtus dulcis*	midgen berry		C		1
plants	higher dicots	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		1
plants	higher dicots	Myrtaceae	*Leptospermum hitei*			C		3/1
plants	higher dicots	Myrtaceae	*chrosperma lineare*			C		1
plants	higher dicots	Myrtaceae	*hodamnia acuminata*	cooloola ironwood		C		2
plants	higher dicots	Myrtaceae	*Syzygium luehmannii*			C		2/1
plants	higher dicots	Myrtaceae	*Homoranthus virgatus*	twiggy homoranthus		C		1
plants	higher dicots	Myrtaceae	*elaleuca thymifolia*	thyme honeymyrtle		C		2
plants	higher dicots	Myrtaceae	*Eucalyptus bancroftii*	Bancroft's red gum		C		3
plants	higher dicots	Myrtaceae	*Lophostemon confertus*	brush box		C		2
plants	higher dicots	Myrtaceae	*elaleuca pachyphylla*			C		3
plants	higher dicots	Myrtaceae	*Lophostemon suaveolens*	swamp box		C		4
plants	higher dicots	Myrtaceae	*hodomyrtus psidioides*	native guava		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus conglomerata*	swamp stringybark		E	E	2/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Myrtaceae	*Leptospermum trinervium*	woolly tea-tree		C		1
plants	higher dicots	Myrtaceae	*elaleuca quinquenervia*	swamp paperbark		C		2
plants	higher dicots	Myrtaceae	*Leptospermum juniperinum*	prickly tea-tree		C		1
plants	higher dicots	Myrtaceae	*Leptospermum liversidgei*			C		1
plants	higher dicots	Myrtaceae	*Leptospermum semibaccatum*	wallum tea-tree		C		4
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		2
plants	higher dicots	Myrtaceae	*Len ebbia sp. lackall ange P. .Sharpe*			E		2/2
plants	higher dicots	Olacaceae	*lax retusa*			C		1
plants	higher dicots	Onagraceae	*Lud igia octovalvis*	willow primrose		C		1
plants	higher dicots	Passifloraceae	*Passiflora subpeltata*	white passion flower	Y			1
plants	higher dicots	Passifloraceae	*Passiflora foetida*		Y			1
plants	higher dicots	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		3
plants	higher dicots	Phyllanthaceae	*Glochidion ferdinandi*			C		1
plants	higher dicots	Picrodendraceae	*Pseudanthus orientalis*			C		1
plants	higher dicots	Polygalaceae	*Comesperma defoliatum*	leafless milkwort		C		1
plants	higher dicots	Proteaceae	*anksia integrifolia*			C		1
plants	higher dicots	Proteaceae	*anksia oblongifolia*	dwarf banksia		C		1
plants	higher dicots	Proteaceae	*Persoonia cornifolia*	broad-leaved geebung		C		1
plants	higher dicots	Proteaceae	*Petrophile shirleyae*			C		2
plants	higher dicots	Proteaceae	*Conospermum taxifolium*	devil's rice		C		1
plants	higher dicots	Proteaceae	*Hakea actites*			C		2
plants	higher dicots	Proteaceae	*anksia aemula*	wallum banksia		C		2
plants	higher dicots	Proteaceae	*anksia robur*	broad-leaved banksia		C		3
plants	higher dicots	Proteaceae	*Hakea florulenta*	three-nerved willow hakea		C		1
plants	higher dicots	Proteaceae	*Persoonia virgata*	small-leaved geebung		C		2
plants	higher dicots	Proteaceae	*Strangea linearis*	strangea		C		2
plants	higher dicots	Putranjivaceae	*rypetes deplanchei*	grey boxwood		C		1
plants	higher dicots	Rhamnaceae	*Emmenosperma cunninghamii*			C		1/1
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1
plants	higher dicots	Rubiaceae	*urringtonia paludosa*	durringtonia		NT		1/1
plants	higher dicots	Rubiaceae	*Psychotria loniceroides*	hairy psychotria		C		1
plants	higher dicots	Rubiaceae	*Coelospermum paniculatum var. paniculatum*			C		1/1
plants	higher dicots	Rubiaceae	*Cyclophyllum coprosmoides*			C		1
plants	higher dicots	Rutaceae	*Sarcomelicope simplicifolia subsp. simplicifolia*	yellow aspen		C		1
plants	higher dicots	Rutaceae	*Philotheca queenslandica*			C		2/1
plants	higher dicots	Rutaceae	*Acronychia imperforata*	beach acronychia		C		1
plants	higher dicots	Rutaceae	*elicope elleryana*			C		1
plants	higher dicots	Rutaceae	*oronia falcifolia*	wallum boronia		C		3/1
plants	higher dicots	Rutaceae	*ieria laxiflora*	wallum zieria		C		1
plants	higher dicots	Rutaceae	*Pentaceras australe*	bastard crow's ash		C		1
plants	higher dicots	Santalaceae	*Leptomeria acida*	sour currant bush		C		1
plants	higher dicots	Sapindaceae	*Cupaniopsis anacardioides*	tuckeroo		C		1
plants	higher dicots	Sapotaceae	*Pouteria queenslandica*			C		1
plants	higher dicots	Scrophulariaceae	*Limnophila aromatica*			C		1/1
plants	higher dicots	Scrophulariaceae	*Artanema fimbriatum*			C		1/1
plants	higher dicots	Simaroubaceae	*Ailanthus triphysa*	white siris		C		1

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plants	higher dicots	Solanaceae	*uboisia myoporoides*			C		1/1
plants	higher dicots	Stackhousiaceae	*Stackhousia viminea*	slender stackhousia		C		1
plants	higher dicots	Stylidiaceae	*Stylidium graminifolium*	grassy-leaved trigger-flower		C		1
plants	higher dicots	Stylidiaceae	*Stylidium debile*	frail trigger plant		C		1
plants	higher dicots	Stylidiaceae	*Stylidium ornatum*			C		1/1
plants	higher dicots	Stylidiaceae	*Stylidium diffusum*			C		1/1
plants	higher dicots	Thymelaeaceae	*Pimelea linifolia*			C		3
plants	higher dicots	Ulmaceae	*rema tomentosa var. aspera*			C		1
plants	higher dicots	Ulmaceae	*Aphananthe philippinensis*			C		1
plants	higher dicots	Ulmaceae	*Celtis paniculata*	native celtis		C		1
plants	higher dicots	Verbenaceae	*Lantana camara*		Y			2
plants	higher dicots	Violaceae	*iola hederacea*			C		1
plants	higher dicots	Vitaceae	*Cissus hypoglauca*			C		1/1
plants	liverworts	Cephaloziellaceae	*Cephaloziella exiliflora*			C		2/2
plants	liverworts	Cephaloziellaceae	*Cephaloziella*			C		1/1
plants	liverworts	Frullaniaceae	*rullania rostrata*			C		1/1
plants	liverworts	Lejeuneaceae	*Cololejeunea cardiocarpa*			C		1/1
plants	liverworts	Lejeuneaceae	*Acrolejeunea aulacophora*			C		1/1
plants	liverworts	Lejeuneaceae	*Lejeuneaceae*			C		1/1
plants	liverworts	Lepidoziaceae	*urzia compacta*			C		1/1
plants	liverworts	Marchantiaceae	*archantia foliacea*			C		1/1
plants	lower dicots	Annonaceae	*Polyalthia nitidissima*	polyalthia		C		2
plants	lower dicots	Aristolochiaceae	*Pararistolochia praevenosa*			NT		6/6
plants	lower dicots	Lauraceae	*Cryptocarya sclerophylla*	totempole		C		1
plants	lower dicots	Lauraceae	*Cinnamomum camphora*	camphor laurel	Y			1
plants	lower dicots	Lauraceae	*Endiandra sieberi*	hard corkwood		C		1
plants	lower dicots	Lauraceae	*Cryptocarya foetida*	stinking cryptocarya		V	V	4/2
plants	lower dicots	Lauraceae	*Cryptocarya triplinervis*			C		1
plants	lower dicots	Lauraceae	*eolitsea dealbata*	white bolly gum		C		1
plants	lower dicots	Lauraceae	*Cassytha pubescens*	downy devil's twine		C		2
plants	lower dicots	Lauraceae	*Litsea reticulata*			C		1
plants	lower dicots	Menispermaceae	*Stephania japonica*			C		1
plants	lower dicots	Monimiaceae	*ilkiea macrophylla*	large-leaved wilkiea		C		1
plants	monocots	Amaryllidaceae	*ephyranthes carinata*		Y			1/1
plants	monocots	Arecaceae	*Calamus muelleri*	lawyer vine		C		1
plants	monocots	Arecaceae	*Archontophoenix cunninghamiana*	piccabeen palm		C		1
plants	monocots	Colchicaceae	*urchardia umbellata*			C		1
plants	monocots	Commelinaceae	*Pollia macrophylla*			C		1/1
plants	monocots	Cyperaceae	*aumea gunnii*	slender twigrush		C		2/2
plants	monocots	Cyperaceae	*aumea juncea*	bare twigrush		C		1/1
plants	monocots	Cyperaceae	*Cyperus haspan*			C		1
plants	monocots	Cyperaceae	*Gahnia clarkei*	tall sawsedge		C		1
plants	monocots	Cyperaceae	*aumea muelleri*			C		2/1
plants	monocots	Cyperaceae	*Carex polyantha*			C		1
plants	monocots	Cyperaceae	*Cyperus papyrus*	papyrus	Y			1/1
plants	monocots	Cyperaceae	*uirena ciliaris*			C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Cyperaceae	*aumea articulata*	jointed twigrush		C		2/1
plants	monocots	Cyperaceae	*aumea rubiginosa*	soft twigrush		C		2/1
plants	monocots	Cyperaceae	*Caustis recurvata*			C		2
plants	monocots	Cyperaceae	*uirena umbellata*			C		1/1
plants	monocots	Cyperaceae	*Gahnia sieberiana*	sword grass		C		2
plants	monocots	Cyperaceae	*solepis inundata*	swamp club rush		C		1/1
plants	monocots	Cyperaceae	*Ptilothrix deusta*			C		1
plants	monocots	Cyperaceae	*aumea teretifolia*			C		2/1
plants	monocots	Cyperaceae	*Cyperus flavescens*		Y			1/1
plants	monocots	Cyperaceae	*Cyperus laevigatus*			C		1/1
plants	monocots	Cyperaceae	*Chorizandra cymbaria*			C		1
plants	monocots	Cyperaceae	*Cyathochaeta diandra*	sheath rush		C		2/1
plants	monocots	Cyperaceae	*Cyperus polystachyos*			C		1
plants	monocots	Cyperaceae	*Lepironia articulata*			C		2/1
plants	monocots	Cyperaceae	*hynchospora bro nii*	beak rush		C		1/1
plants	monocots	Cyperaceae	*Schoenus brevifolius*			C		1
plants	monocots	Cyperaceae	*Schoenus calostachyus*			C		2/1
plants	monocots	Cyperaceae	*Eleocharis tetraquetra*			C		1/1
plants	monocots	Cyperaceae	*imbristylis dichotoma*	common fringe-rush		C		1/1
plants	monocots	Cyperaceae	*imbristylis pauciflora*			C		1
plants	monocots	Cyperaceae	*Chorizandra sphaerocephala*			C		3/2
plants	monocots	Cyperaceae	*Schoenoplectus tabernaemontani*			C		2/2
plants	monocots	Eriocaulaceae	*Eriocaulon scariosum*			C		1
plants	monocots	Eriocaulaceae	*Eriocaulon australe*			C		2/1
plants	monocots	Flagellariaceae	*lagellaria indica*	whip vine		C		1
plants	monocots	Haemodoraceae	*Haemodorum tenuifolium*			C		1
plants	monocots	Hemerocallidaceae	*ianella*			C		1
plants	monocots	Hemerocallidaceae	*ianella caerulea*			C		2
plants	monocots	Hemerocallidaceae	*Geitonoplesium cymosum*	scrambling lily		C		1
plants	monocots	Iridaceae	*Patersonia fragilis*			C		1
plants	monocots	Johnsoniaceae	*ricoryne elatior*	yellow autumn lily		C		1
plants	monocots	Johnsoniaceae	*Caesia parviflora var. vittata*			C		1
plants	monocots	Juncaceae	*uncus prismatocarpus*	branching rush		C		1
plants	monocots	Juncaceae	*uncus usitatus*			C		1
plants	monocots	Laxmanniaceae	*Lomandra longifolia*			C		3
plants	monocots	Laxmanniaceae	*Lomandra multiflora*			C		1
plants	monocots	Laxmanniaceae	*hysanotus tuberosus*			C		1
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		1
plants	monocots	Laxmanniaceae	*Lomandra hystrix*			C		1
plants	monocots	Laxmanniaceae	*So erbaea juncea*	vanilla plant		C		1
plants	monocots	Laxmanniaceae	*Lomandra elongata*			C		1
plants	monocots	Laxmanniaceae	*Laxmannia compacta*			C		1
plants	monocots	Orchidaceae	*helymitra pauciflora*	slender sun orchid		C		1
plants	monocots	Orchidaceae	*Calochilus paludosus*	red beard orchid		C		1
plants	monocots	Orchidaceae	*Glossodia minor*	small wax lip orchid		C		1
plants	monocots	Orchidaceae	*Cryptostylis erecta*	bonnet orchid		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Orchidaceae	*Caladenia carnea*			C		1
plants	monocots	Pandanaceae	*reycinetia scandens*			C		1
plants	monocots	Philydraceae	*Philydrum lanuginosum*	frogsmouth		C		1
plants	monocots	Poaceae	*Hyparrhenia hirta*	coolati grass	Y			1/1
plants	monocots	Poaceae	*Avena sativa*	common oats	Y			1/1
plants	monocots	Poaceae	*riza maxima*	quaking grass	Y			1/1
plants	monocots	Poaceae	*Chloris virgata*	feathertop rhodes grass	Y			1/1
plants	monocots	Poaceae	*Eleusine indica*	crowsfoot grass	Y			1/1
plants	monocots	Poaceae	*Lepturus repens*	stalky grass		C		1/1
plants	monocots	Poaceae	*Panicum effusum*			C		1
plants	monocots	Poaceae	*Leersia hexandra*	swamp rice grass		C		1
plants	monocots	Poaceae	*hemeda triandra*	kangaroo grass		C		2
plants	monocots	Poaceae	*Elionurus citreus*	lemon-scented grass		C		1/1
plants	monocots	Poaceae	*Entolasia stricta*	wiry panic		C		1
plants	monocots	Poaceae	*icrolaena stipoides var. stipoides*			C		1/1
plants	monocots	Poaceae	*Panicum paludosum*	swamp panic		C		1/1
plants	monocots	Poaceae	*Sorghum halepense*	Johnson grass	Y			1
plants	monocots	Poaceae	*Cenchrus echinatus*	Mossman River grass	Y			2/2
plants	monocots	Poaceae	*schaemum australe*			C		1
plants	monocots	Poaceae	*plismenus aemulus*	creeping shade grass		C		1
plants	monocots	Poaceae	*Sacciolepis indica*	Indian cupscale grass		C		1
plants	monocots	Poaceae	*Setaria sphacelata*		Y			1
plants	monocots	Poaceae	*Entolasia marginata*	bordered panic		C		1
plants	monocots	Poaceae	*mperata cylindrica*	blady grass		C		2/1
plants	monocots	Poaceae	*elinis minutiflora*	molasses grass	Y			3/1
plants	monocots	Poaceae	*Phragmites australis*	common reed		C		1
plants	monocots	Poaceae	*Sporobolus africanus*	Parramatta grass	Y			1/1
plants	monocots	Poaceae	*Andropogon virginicus*	whiskey grass	Y			1
plants	monocots	Poaceae	*igitaria leucostachya*			C		1/1
plants	monocots	Poaceae	*Eragrostis paniciformis*		Y			2/2
plants	monocots	Poaceae	*Echinochloa telmatophila*	swamp barnyard grass		C		1/1
plants	monocots	Poaceae	*Lachnagrostis filiformis*			C		1
plants	monocots	Poaceae	*egathyrsus maximus var. coloratus*		Y			1/1
plants	monocots	Pontederiaceae	*Heteranthera reniformis*		Y			1/1
plants	monocots	Restionaceae	*Sporadanthus interruptus*			C		2/1
plants	monocots	Restionaceae	*aloskion tetraphyllum subsp. meiostachyum*			C		1
plants	monocots	Restionaceae	*Sporadanthus caudatus*			C		3
plants	monocots	Restionaceae	*Eurychorda complanata*			C		2/1
plants	monocots	Restionaceae	*Hypolaena fastigiata*	tassel rope rush		C		1
plants	monocots	Restionaceae	*aloskion tenuiculme*			C		2/1
plants	monocots	Restionaceae	*Coleocarya gracilis*			C		1
plants	monocots	Restionaceae	*Lepyrodia scariosa*			C		1
plants	monocots	Restionaceae	*Leptocarpus tenax*			C		3
plants	monocots	Restionaceae	*aloskion pallens*			C		1
plants	monocots	Restionaceae	*Empodisma minus*	spreading rope rush		C		1
plants	monocots	Smilacaceae	*Smilax glyciphylla*	sweet sarsaparilla		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Smilacaceae	*Smilax australis*	barbed-wire vine		C		1
plants	monocots	Xanthorrhoeaceae	*anthorrhoea macronema*			C		1/1
plants	monocots	Xanthorrhoeaceae	*anthorrhoea latifolia*			C		1
plants	monocots	Xanthorrhoeaceae	*anthorrhoea fulva*	swamp grasstree		C		3
plants	monocots	Xyridaceae	*yris complanata*	yellow-eye		C		2/1
plants	monocots	Xyridaceae	*yris juncea*	dwarf yellow-eye		C		3/2
plants	monocots	Zingiberaceae	*Alpinia caerulea*	wild ginger		C		1
plants	mosses	Bryophyte	*ryophyte*			C		3/3
plants	mosses	Orthotrichaceae	*acromitrium*			C		1/1
plants	mosses	Sphagnaceae	*Sphagnum*			C		1/1
plants	spike mosses	Selaginellaceae	*Selaginella uliginosa*	swamp selaginella		C		1
plants		Pylaisiadelphaceae	*ijkia*			C		1/1
protists	brown algae	Phaeophyceae	*onaria diesingiana*			C		1/1
protists	brown algae	Phaeophyceae	*Padina*			C		1/1
protists	brown algae	Phaeophyceae	*Sargassum*			C		1/1
protists	brown algae	Phaeophyceae	*Colpomenia*			C		1/1
protists	brown algae	Phaeophyceae	*ictyopteris acrostichoides*			C		1/1
protists	brown algae	Phaeophyceae	*ugulopteryx marginata*			C		1/1
protists	brown algae	Phaeophyceae	*Lobophora variegata*			C		1/1
protists	brown algae	Phaeophyceae	*ictyota intermedia*			C		1/1
protists	green algae	Chlorophyceae	*Halimeda discoidea*			C		1/1
protists	green algae	Chlorophyceae	*lva rigida*			C		1/1
protists	green algae	Chlorophyceae	*dotea argentea*			C		1/1
protists	green algae	Chlorophyceae	*Caulerpa taxifolia*			C		2/2
protists	red algae	Rhodophyceae	*entrophora pectinella*			C		2/2
protists	red algae	Rhodophyceae	*Laurencia brongniartii*			C		1/1
protists	red algae	Rhodophyceae	*elanamansia glomerata*			C		1/1
protists	red algae	Rhodophyceae	*hodymenia leptophylla*			C		1/1
protists	red algae	Rhodophyceae	*Griffithsia crassiuscula*			C		1/1
protists	red algae	Rhodophyceae	*elanamansia dietrichiana*			C		1/1
protists	red algae	Rhodophyceae	*Plocamium microcladioides*			C		1/1
protists	red algae	Rhodophyceae	*Pterocladiella capillacea*			C		1/1
protists	red algae	Rhodophyceae	*ichotomaria marginata*			C		1/1
protists	red algae	Rhodophyceae	*ricleocarpa fragilis*			C		1/1
protists	red algae	Rhodophyceae	*Portieria hornemannii*			C		1/1
protists	red algae	Rhodophyceae	*ichotomaria obtusata*			C		2/2
protists	red algae	Rhodophyceae	*Corallina officinalis*			C		1/1
protists	red algae	Rhodophyceae	*Amphiroa fragilissima*			C		1/1
protists	red algae	Rhodophyceae	*amadaella caenomyce*			C		1/1
protists	red algae	Rhodophyceae	*Laurencia intricata*			C		1/1
protists	red algae	Rhodophyceae	*Plocamium hamatum*			C		1/1
protists	red algae	Rhodophyceae	*Gracilaria edulis*			C		1/1
protists	red algae	Rhodophyceae	*igenea simplex*			C		1/1
protists	red algae	Rhodophyceae	*ania crassa*			C		1/1
protists	red algae	Rhodophyceae	*elisea pulchra*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

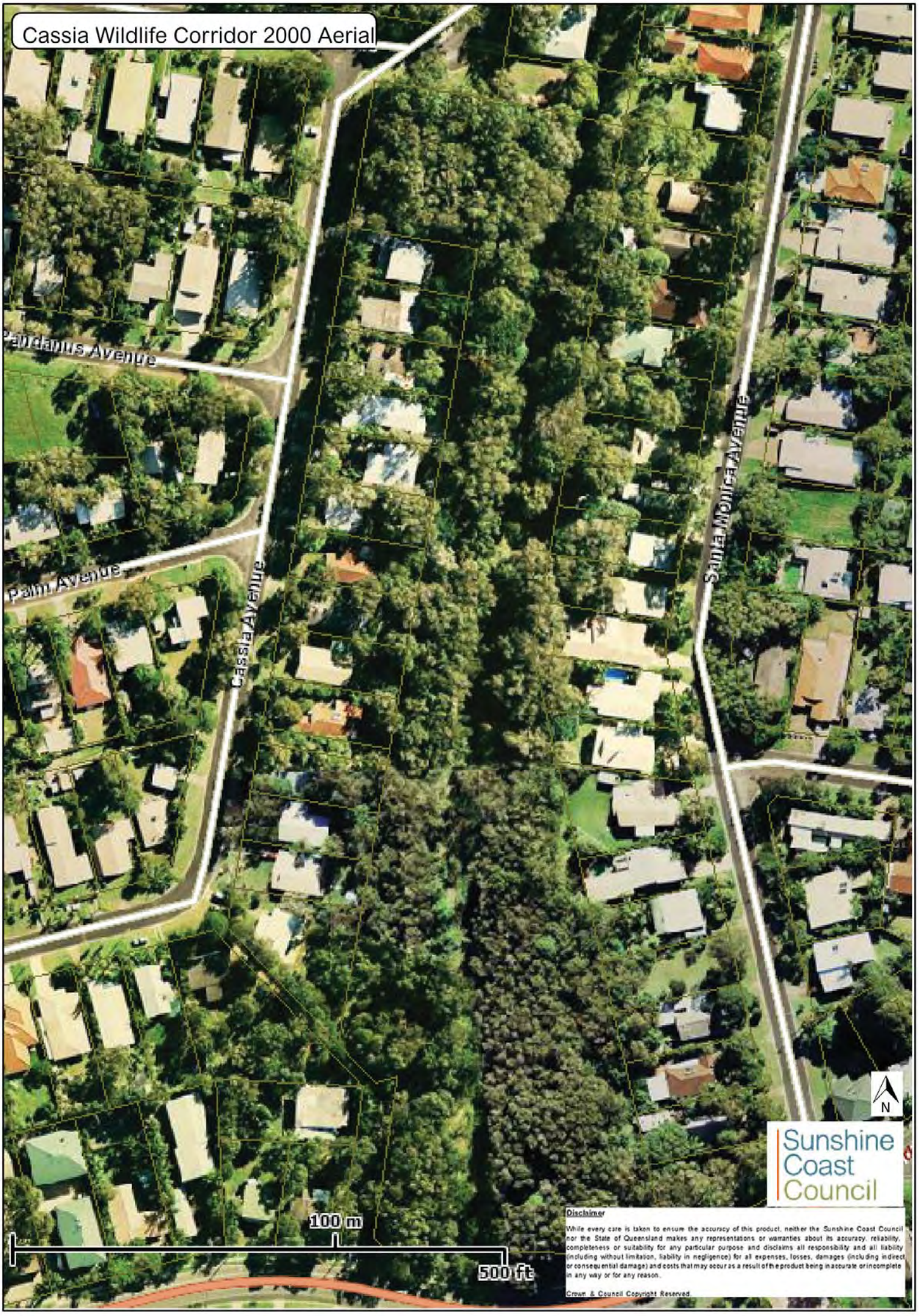
Q - Indicates the Queensland conservation status of each taxon under the *ature Conservation Act* . The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and iodiversity Conservation Act* . The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

APPENDIX C

Photographs


Cassia Wildlife Corridor 2000 Aerial
Pandanus Avenue
Palm Avenue
Cassia Avenue
Santa Monica Avenue
N
Sunshine Coast Council
100 m
500 ft
Disclaimer
While every care is taken to ensure the accuracy of this product, neither the Sunshine Coast Council nor the State of Queensland makes any representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs that may occur as a result of the product being inaccurate or incomplete in any way or for any reason.
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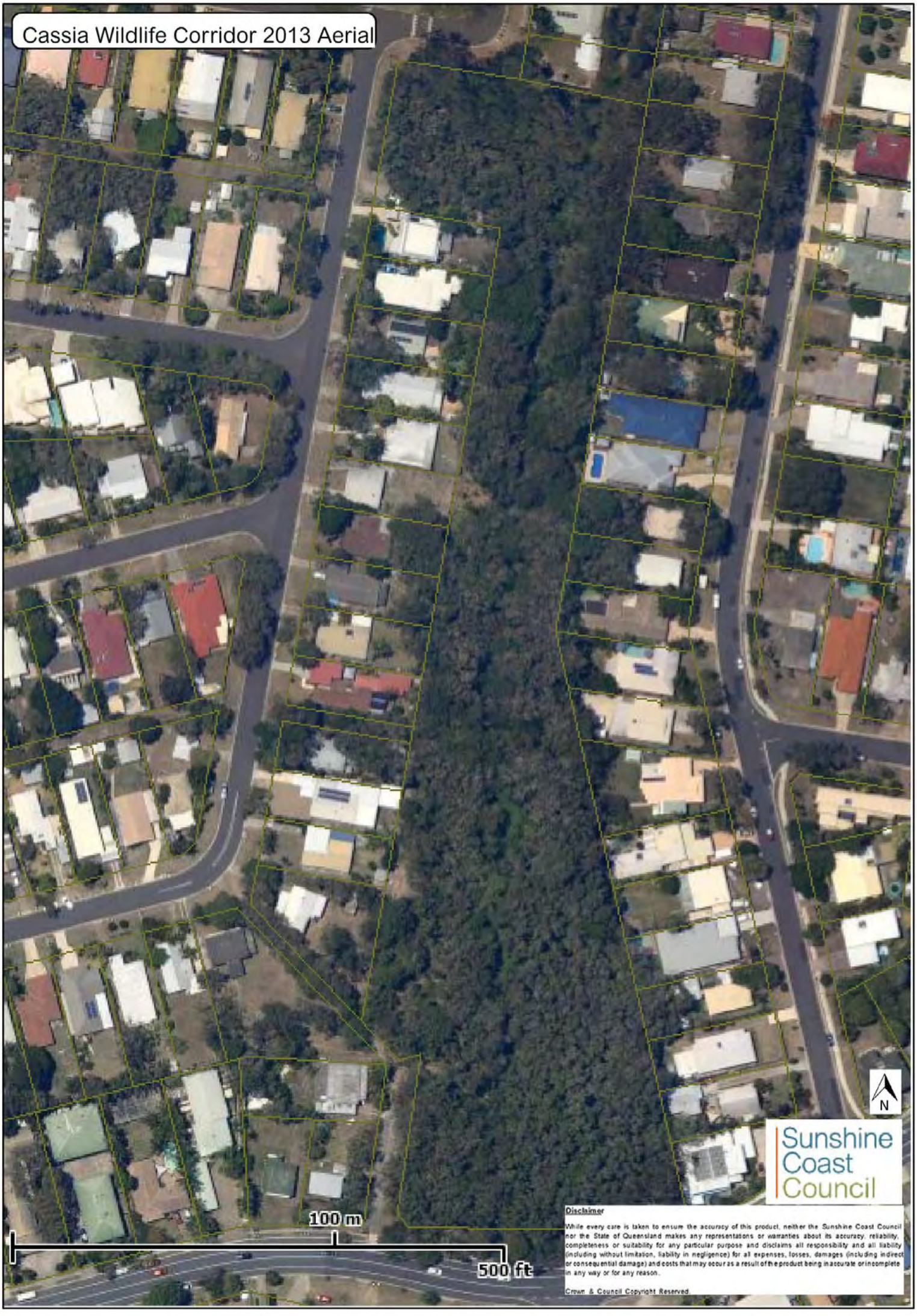
Cassia Wildlife Corridor 2013 Aerial
N
Sunshine Coast Council
100 m
500 ft
Disclaimer
While every care is taken to ensure the accuracy of this product, neither the Sunshine Coast Council nor the State of Queensland makes any representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs that may occur as a result of the product being inaccurate or incomplete in any way or for any reason.
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PHOTOGRAPHS

Trail Camera Results

Image 1. Cane Toad (*Bufo marinus).*

Image 2. Australian Brushturkey (*Alectura lathami).*

Image 3. Eastern Water Dragon (*Physignatus lesueurii*).

Image 4. Black Rat (*Rattus rattus*).

APPENDIX D

Flora and Fauna Species List

CASSIA WILDIFE CORRIDOR

FAMILY	FORM	GENUS SPECIES	COMMON NAME	ABUNDANCE (on site)
ACANTHACEAE	Vine	*Thunbergia grandiflora**	Thunbergia	Present
AGAVACEAE	Tree	*Cordyline sp.**	Cordyline	Present
ANACARDIACEAE	Tree	*Schinus terebinthifolius**	Broad Leaved Pepper Tree	Present
APOCYNACEAE	Vine	*Parsonia straminea*	Monkey Vine	Present
ARALIACEAE	Tree	*Schefflera actinophylla**	Umbrella Tree	Present
ARECACEAE	Palm	*Archontophoenix alexandrae**	Alexander palm	Present
ASPARAGACEAE	Herb	*Sansevieria trifasciata**	Mother in Laws Tongue	Occasional
ASTERACEAE	Herb	*Sphagneticola trilobata**	Singapore Daisy	Common
BIGNONIACEAE	Tree	*Jacaranda sp.**	Jacaranda	Present
BIGNONIACEAE	Tree	*Spathodea campanulata**	African Tulip Tree	Rare
BLECHNACEAE	Fern	*Blechnum indicum*	Bungwall Fern	Present
CAESALPINIACEAE	Shrub	*Senna pendula**	Easter Cassia	Occasional
CASUARINACEAE	Tree	*Causarina glauca*	Swamp She-oak	Present
COMMELINACEAE	Herb	*Zebrina**	Zebrina	Present
CONVOLVULACEAE	Vine	*Ipomoea quamoclit**	Morning Glory	Present
DAVALLIACEAE	Fern	*Nephrolepsis cordifolia**	Fishbone Fern	Present
ELAEOCARPACEAE	Tree	*Eleocarpus reticulatus*	Blueberry Ash	Present
EUPHORRBIACEAE	Tree	*Macaranga tanarius*	Macarenga	Common
FABACEAE	Herb	*Desmodium uncinatum**	Silver Leaved Desmodium	Present
EUPHORRBIACEAE	Tree	Homolanthus nutans	Bleeding Heart	Present

LAURACEAE	Tree	*Cinnamomum camphora**	Camphor Laurel	Present
LEITNERIACEAE	Tree	*Endiendra sieberi*	Corkwood	Rare
LOMARIOPSIDACEAE	Fern	*Nephrolepis exalta**	Boston Fern	Occasional
LYGODIACEAE	Fern	*Lygodium sp.*	Climbing Fern	Present
MALVACEAE	Tree	*Hibiscus sp.*	Hibiscus	Rare
MORACEAE	Tree	*Ficus benjamina**	Benjamin's Fig	Present
MYRTACEAE	Tree	*Melaleuca quinquenervia*	Broad-leaved Paperbark	Dominant
MYRTACEAE	Tree	*Syzigium leuhmanii*	Lilly Pilly	Present
OCHNACEAE	Shrub	*Ochna serrulata**	Ochna	Present
PANDANACEAE	Tree	*Pandanus spp.*	Pandanus / Coastal Screw Pine	Present
PHILESIACEAE	Vine	*Geitoneplesium cymosum*	Scrambling Lily	Present
PINACEAE	Tree	*Pinus elliotii**	Slash Pine	Present
POACEAE	Grass	*Eragrostic curvula**	African Lovegrass	Present
POACEAE	Grass	*Sorghum halepense*	Johnson Grass	Present
PROTEACEAE	Tree	*Grevillea robusta*	Silky Oak	Rare
SMILACACEAE	Vine	*Smilax australis*	Smilax Vine	Present
STERCULIACEAE	Tree	*Brachychiton acerifolius*	Flame Tree	Occasional
XANTHORRHOEACEAE	Sedge	*Dianella congesta*	Beach Flax Lily	Present
XANTHORRHOEACEAE	Sedge	*Lomandra hystrix*	Creek Mat rush	Present
ZINGIBERACEAE	Herb	*Alpinia caerulea*	Native Ginger	Present

BIRDS

Common Name	Scientific Name	Nature Conservation Act 1992	Environmental Protection and Biodiversity Conservation Act 1999
White Faced Heron	*Egretta novaehollandiae*	Least Concern	NA
Grey Butcherbird	*Cracticus torquatus*	Least Concern	NA
Kookaburra	*acelo sp.*	Least Concern	NA
Pied Currawong	*Strepera graculina*	Least Concern	NA
Torresian Crow	*Corvus orru*	Least Concern	NA
Rainbow Lorikeet	*richoglossus haematodus moluccanus*	Least Concern	NA
Australian Magpie	*Cracticus tibicen*	Least Concern	NA
Noisy Miner	*anorina melanocephala*	Least Concern	NA
Pied Butcherbird	*Cracticus nigrogularis*	Least Concern	NA
Crested Pigeon	*cyphaps lophotes*	Least Concern	NA
Blue-faced Honeyeater	*Entomyzon cyanotis*	Least Concern	NA
Australian Brush turkey	*Alectura lathami*	Least Concern	NA
Pacific Black Duck	*Anas superciliosa*	Least Concern	NA

REPTILES

Common Name	Scientific Name	Nature Conservation Act 1992	Environmental Protection and Biodiversity Conservation Act 1999
Lace Monitor	*aranus varius*	Least Concern	NA
Skink (Unidentified)		-	-
Eastern Water Dragon	*ntellagama lesueurii*	Least Concern	NA

AMPHIBIANS

Common Name	Scientific Name	Nature Conservation Act 1992	Environmental Protection and Biodiversity Conservation Act 1999
Cane Toad*	*hinella marina*	NA	NA

MAMMALS

Common Name	Scientific Name	Nature Conservation Act 1992	Environmental Protection and Biodiversity Conservation Act 1999
Black Rat*	*Rattus rattus*	NA	NA

*denotes introduced species.

APPENDIX E

Environmental Health Survey Results

Sunshine Coast Council

Memo

www.sunshinecoast.qld.gov.au

AC□□□ □□ □□□ □□□□: √

FILE No.: **DATE:** 10/4/13

TO: KATE WINTER CONSERVATION OFFICER (WILDLIFE MANAGEMENT)
ENVIRONMENTAL OPERATIONS

CC: JASON BREWER
MANAGER HEALTHY PLACES

FROM: RUPERT HINDLEY
ENVIRONMENTAL HEALTH OFFICER

SUBJECT: **Acoustic Assessment – Flying-fox Roost, Cassia Wildlife Corridor, Coolum**

Summary

An acoustic assessment was undertaken of a flying-fox roost located at Cassia Wildlife Corridor, Coolum from the rear of a residential property located at No. 29 Santa Monica Ave Coolum Beach (Lot 15 RP 86149). The assessment was conducted from the 8th – 9th April 2013.
All measurements were taken in accordance with the DERM publication "Noise Measurement Manual 3rd Edition, 1 March, 2000". (Wind data excluded).

This report includes the results and analysis from the monitoring and provides comment and conclusions in relation to the impact of noise from the flying-fox roost on the premises where the data was collected.

Monitoring Results

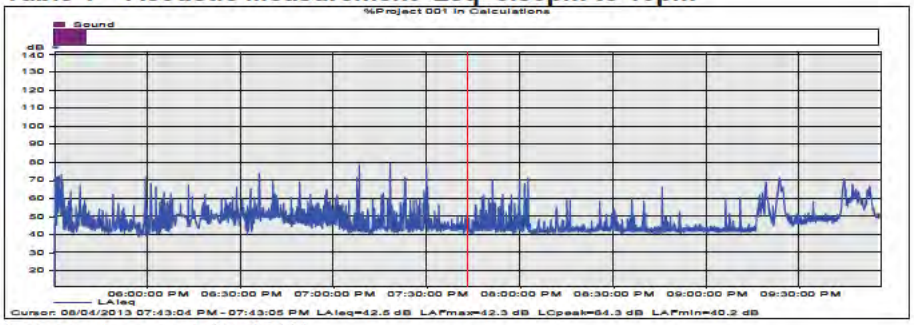
Monitoring results have been split into three time periods to reflect the noise profiles of differing times of the day/night.

Tables 1 and 2 cover the period 5.30pm to 10pm which can be characterised by traffic noise, residents coming home and undertaking various noisy activities - i.e. cooking dinner, watching TV, children playing.

Tables 3 and 4 cover the period between 10pm and 6am. This is the period when residents are sleeping and background levels are typically at their lowest. This is the period when residents are most likely to be disturbed.

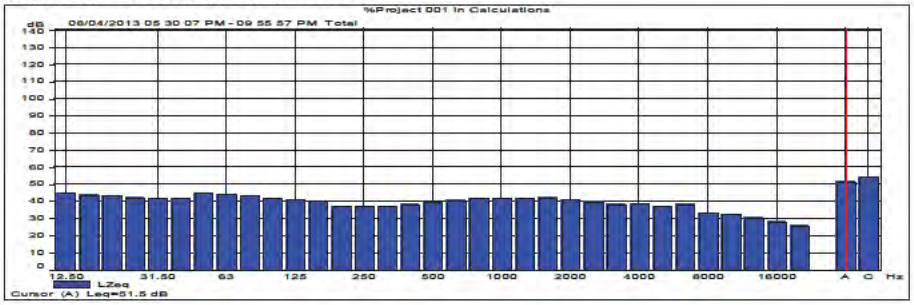
Tables 5 and 6 cover the time period 6am to 2.30pm and show the increase in background noise as people get up and go to work, with corresponding increases in background traffic noise.

Table 1 – Acoustic Measurement Leq 5.30pm to 10pm



L90 Background 40 dB(A)

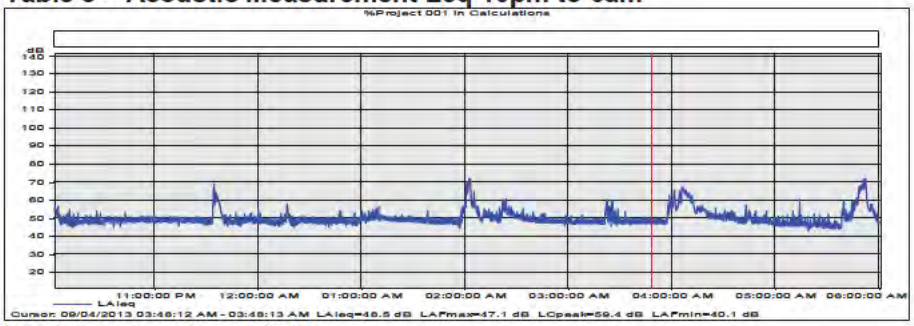
Table 2 – Tonal Measurement



Results

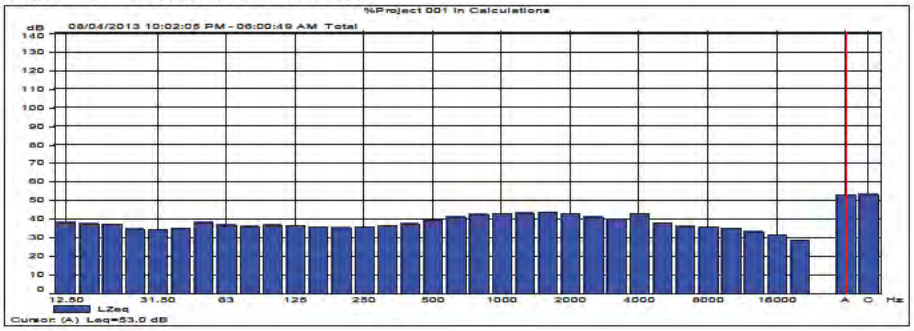
Table 1 shows an average background noise level of 40 to 50 dB(A), with (Table 2) no significant tonal component.

Table 3 – Acoustic Measurement Leq 10pm to 6am



L90 background 43.1dB(A)

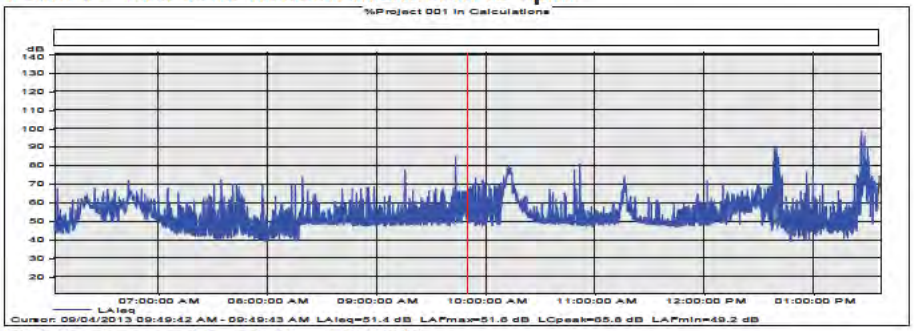
Table 4 – Tonal Assessment



Results

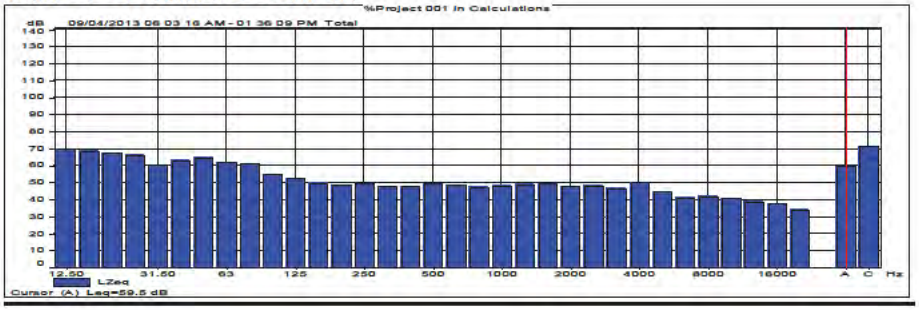
Table 3 shows a relatively high average noise levels (45 – 48dB(A)) punctuated by five periods of large increases in background noise, possibly attributed to rain events. Significantly there appears to be increases at 3.30 – 4.30am and is likely to be associated with flying-foxes and bird noise. The tonal profile (table 4) does not show any significant characteristics.

Table 5 – Acoustic Measurement 6am to 2pm



L90 Background level 45 – 50dB(A)

Table 6 - Tonal Assessment



Results

Table 5 shows the acoustic profile gradually rising throughout the day with typical levels at 40 to 55dB(A), punctuated by rain periods. Again no significant tonal characteristics were identified.

Analysis

Noise nuisance is a noise which is likely to cause unreasonable irritation annoyance or distress to the occupants. The Environmental Protection Act 1994 (section 363c) provides general emission criteria when determining if a noise nuisance exists. This determination is made with regard to the following criteria;

(a) Intensity
(b) Duration
(c) Type and characteristics of the noise
(d) Extent of noise at time of emission
(e) Character of neighbourhood
(f) Whether noise suppression measures could reasonably be taken.

The following estimated background noise levels from Australian Standard AS 1055.2-1997 can be used as a reference guide.

Noise area category (Notes 1 and 2)	Description of neighborhood	Average background A-weighted sound pressure level, $L_{A90,T}$		
		0700-1800	1800-2200	2200-0700
R1	Areas with negligible transportation	40	35	30
R2	Areas with low density transportation	45	40	35
R3	Areas with medium density transportation or some commerce or industry	50	45	40
R4	Areas with dense transportation or some commerce or industry	55	50	45
R5 (See Note 3)	Area with very dense transportation or in commercial districts or bordering industrial districts	60	55	50
R6 (See Note 3)	Areas with extremely dense transportation or within predominantly industrial districts	65	60	55

Notes:

1 The division into noise area categories is necessary in order to accommodate existing sound levels encountered at residential sites in predominantly commercial or industrial districts, or in areas located close to main land transport routes, i.e. road and rail.

2 The noise area category most appropriate should be selected irrespective of metropolitan or rural zoning and will vary from location to location.

It is reasonable to define the residential area where noise monitoring was undertaken as R3 as the site is located within 300m of commercial activities and a highway.

Conclusion

It is clear from the data collected that there is some disturbance to residents adjoining the flying-fox roost in the early morning – 3 to 4 am as there is an excess of noise in the region of 5 - 6 dB(A) over the recommended background levels as specified in Australian Standard AS 1055.2-1997. 5 – 6dB(A) can be considered a slight increase over background and would fall at the lower end of the scale of acoustic nuisances.

The duration of this period of excess noise is limited to the hours of 3 - 5 am

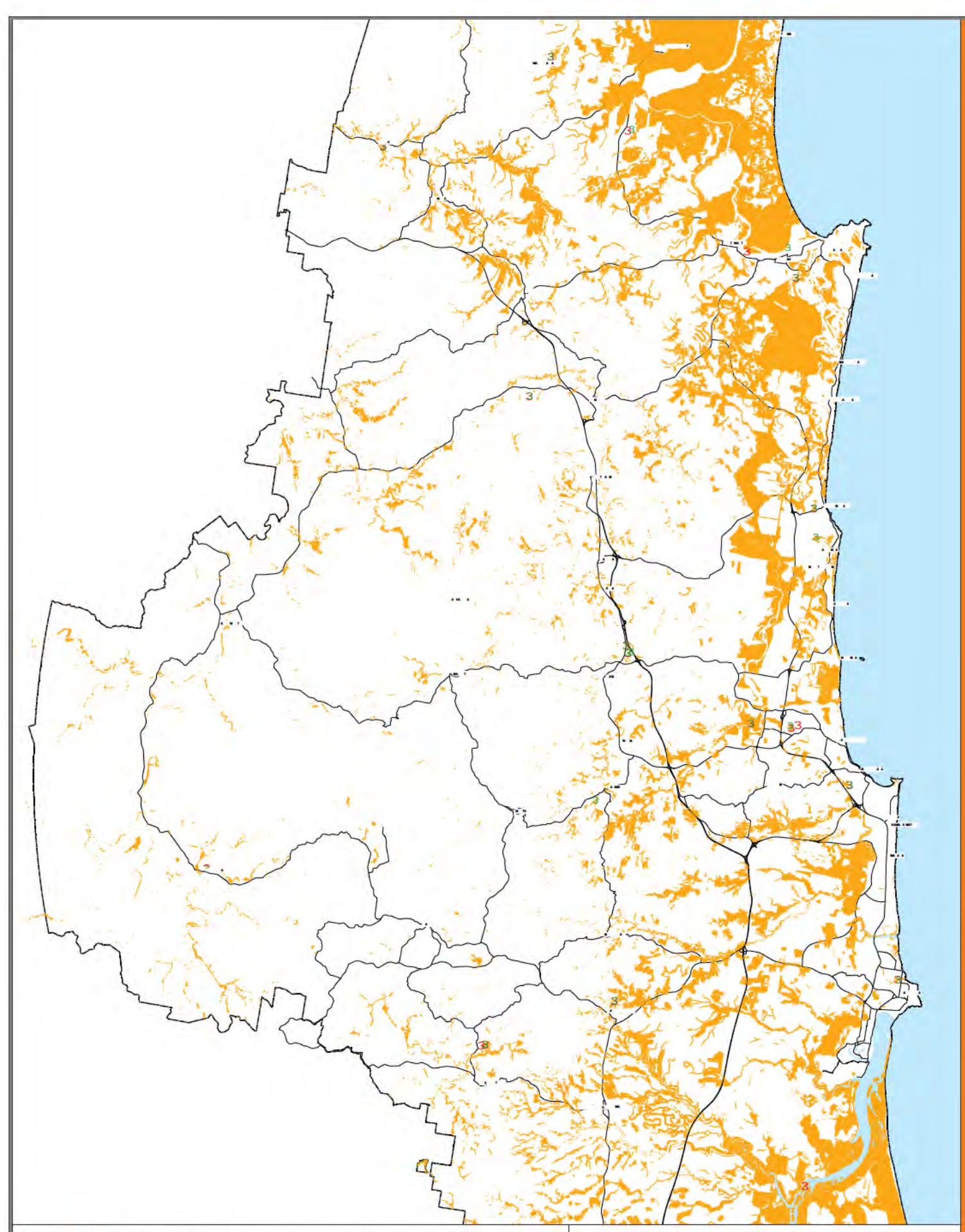
Tonal characteristics can have a significant impact on the perceived nuisance value from the noise emission. No tonal characteristics were identified; however affected residents are generally 'tuned in' to flying-fox noise and therefore notice this as being intrusive. Birdsong also contributes to the background noise levels and forms part of the rise in noise levels, particularly in the early morning. Residents do not generally find birdsong or cicadas annoying so are not affected by these noises even though they contribute significantly to the total noise of the locality.

Due to the height of roosting flying-foxes and the local toprography, acoustic attenuation barriers would be cost prohibitive. Closing of windows from affected premises would effectively negate this excess of flying-fox noise over the background noise levels.

Data collection was limited in duration to approximately 24 hrs. with inclement weather affecting the results. The more data that is collected the more accurate the results, typical acoustic surveys of this type would be undertaken over an extended period (weeks), and would include different seasons to reflect changes in vegetation and wind direction.

APPENDIX F

Sunshine Coast Flying Fox Potential Habitat Mapping



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Legend

- DERM Data
- Original Data
- Flying-Fox Habitat =<10%
- Major Road Corridors
- RegionalBoundary2011_Coastal_50km
- Coral Sea

Scale 1 102,940
At Paper Size A1

0 0.5 1 2 3 4 km

Sunshine Coast Council

Locked Bag 72
Sunshine Coast Mail Centre
Qld 4560
[E] mapping@sunshinecoast qld gov.au
[W] www.sunshinecoast.qld.gov au

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Sunshine Coast Council
Cassia Wildlife Corridor – Roost Management Plan

Sunshine Coast Council

www.sunshinecoast.qld.gov.au
mail@sunshinecoast.qld.gov.au
T 07 5475 7272 **F** 07 5475 7277
Locked Bag 72 Sunshine Coast Mail Centre Qld 4560