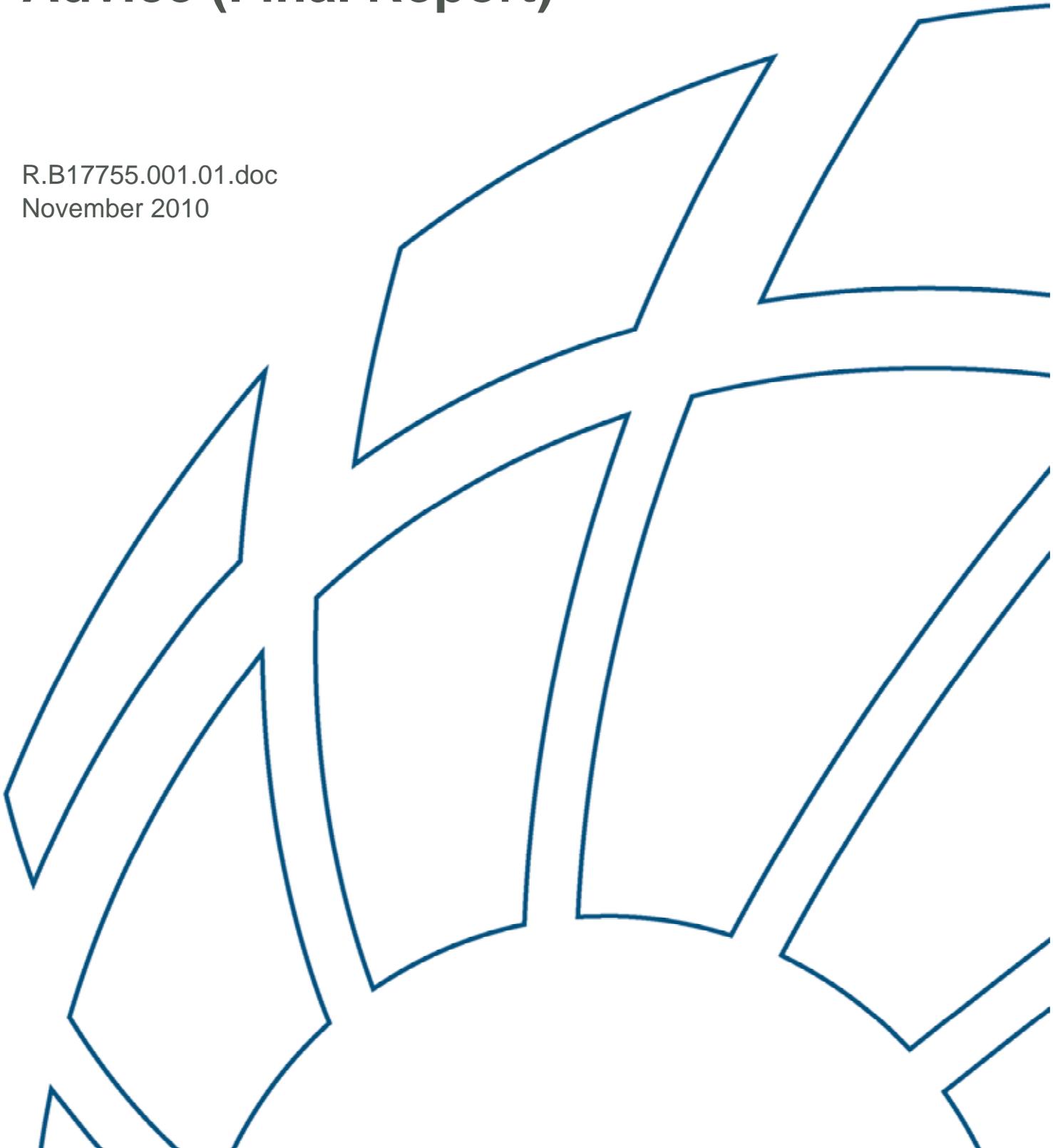


# Sunshine Coast Airport Preliminary Ecological Advice (Final Report)

R.B17755.001.01.doc  
November 2010



# Sunshine Coast Airport Preliminary Ecological Advice (Final Report)

Prepared For: Arup

Prepared By: BMT WBM Pty Ltd (Member of the BMT group of companies)

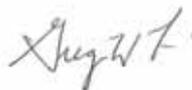
**Offices**  
*Brisbane  
Denver  
Mackay  
Melbourne  
Newcastle  
Perth  
Sydney  
Vancouver*

## DOCUMENT CONTROL SHEET

<p><b>BMT WBM Pty Ltd</b>                  BMT WBM Pty Ltd                  Level 11, 490 Upper Edward Street                  Brisbane 4000                  Queensland Australia                  PO Box 203 Spring Hill 4004</p> <p>Tel: +61 7 3831 6744                  Fax: + 61 7 3832 3627</p> <p>ABN 54 010 830 421  <a href="http://www.wbmpl.com.au">www.wbmpl.com.au</a></p>	<p><b>Document :</b> R.B17755.001.00.doc</p> <p><b>Project Manager :</b> Greg Fisk</p> <hr/> <p><b>Client :</b> Arup</p> <p><b>Client Contact:</b> Cathy Crawley</p> <p><b>Client Reference</b></p>
--	---

<b>Title :</b>	Sunshine Coast Airport Preliminary Ecological Advice
<b>Author :</b>	Darren Richardson, Megan Ward, Mark Sanders
<b>Synopsis :</b>	This report provides an assessment of the ecological values of the Sunshine Coast Airport site. The report provides information to support an EPBC Referral and informs initial planning assessments for the proposed expansion of the airport.

### REVISION/CHECKING HISTORY

REVISION NUMBER	DATE OF ISSUE	CHECKED BY		ISSUED BY	
0	12 May 2010	GWF		DLR	
1	10 November 2010				

### DISTRIBUTION

DESTINATION	REVISION			
	0	1	2	3
Arup	PDF	PDF		
BMT WBM File	PDF	PDF		
BMT WBM Library	PDF	PDF		

## CONTENTS

Contents	i
List of Tables	i
<b>1 INTRODUCTION</b>	<b>1-1</b>
<b>2 INITIAL ADVICE STATEMENT – ECOLOGICAL VALUES</b>	<b>2-1</b>
2.1 Flora	2-1
2.2 Terrestrial Fauna	2-3
2.3 Aquatic Fauna	2-9
<b>3 EPBC REFERRAL INFORMATION</b>	<b>3-1</b>
<b>4 RECOMMENDATIONS FOR FURTHER WORKS</b>	<b>4-1</b>
4.1 Field Sampling	4-1
<b>5 REFERENCES</b>	<b>5-1</b>

## LIST OF TABLES

Table 2-1	Regional Ecosystems within the airport area	2-2
Table 2-2	Nationally significant flora species that potentially occur within the airport area	2-2
Table 2-3	Potential for Significant Fauna Species to Occur Within the Study Area	2-5
Table 2-4	Fish species of conservation significance recorded in the wider area (Source: DERM Wildlife Online data)	2-11
Table 3-1	Nationally significant flora species that potentially occur within the study site (flora species identified in EPBC Protected Matters Search)	3-6
Table 3-2	Nationally significant fauna species identified in EPBC Protected Matters Search (excluding turtles and aquatic species)	3-7
Table 3-3	Fish species of conservation significance recorded in the wider area (Source: DERM Wildlife Online data)	3-10

# 1 INTRODUCTION

BMT WBM has undertaken preliminary ecological and planning assessment for the Sunshine Coast Airport Master Plan Implementation Project (MPIP). This document provides the following deliverables:

- Section 2 – IAS. This section provides a brief description of the key ecological values of the airport site based on a review of existing information and the results of a site visit conducted on the 8<sup>th</sup> April 2010. This information will provide relevant text for an Initial Advice Statement (IAS) for any future Environmental Impact Study (EIS).
- Section 3 – EPBC Referral. This section provides a brief summary of ecological values (threatened species, communities, listed migratory species) that could be affected by the proposal and will need to be considered in an EPBC Referral. Note that information outlined in Section 2 and 4 of this document may also be of relevance in the context of the Referral.
- Section 4 – Field Survey Recommendations. This section provides general recommendations with respect to likely flora and fauna survey requirements to inform the environmental impact study phases of the project.

## 2 INITIAL ADVICE STATEMENT – ECOLOGICAL VALUES

### 2.1 Flora

#### *Study Area*

Regional Ecosystem (RE) mapping identifies four types of remnant vegetation communities within the study footprint (DERM 2010a, refer Table 2-1). Closed heath (RE 12.2.12) and Paperbark forest (RE 12.2.7) are both extensively represented within the study footprint, while palustrine swamp (RE 12.2.15) has a more limited representation within the study footprint and a relatively small patch of Sheoak open forest (RE 12.1.1) is present. Additionally, areas of high value regrowth vegetation are mapped as present within the study footprint (DERM 2010b), while the north-western region of the footprint is predominantly cleared.

The Sheoak open forest (RE 12.1.1) has a conservation status of 'Of Concern' under the Queensland *Vegetation Management Act 1999* (VM Act), and the remaining three REs have a conservation status of 'Least Concern' under the VM Act. In terms of the Biodiversity Status, the Sheoak open forest is classified as 'Endangered', the Paperbark forest is classified as 'Of Concern', and the two remaining REs are 'No Concern at Present'. However, as these conservation statuses are determined on a broad bioregional scale (i.e. from south of Tweed Heads to north of Gladstone for the South Eastern Queensland bioregion), it is important to consider the significance of the vegetation communities on a smaller scale in order to assess its regional/local values. In this context, it is noteworthy that coastal heath has been subject to extensive clearing for urbanisation south of Noosa, such that most coastal heath has been lost from both the Gold and Sunshine Coasts. The coastal heath within the study area is considered one of the few viable remnants between Caloundra and Noosa (Hammermeister *et al.* n.d.).

Vegetation communities within the site footprint have high biodiversity values, particularly with regards to provision of habitat for Threatened flora and fauna species. The high value of vegetation communities is evidenced through:

- All remnant vegetation within the study footprint are mapped as Essential Habitat for a variety of Threatened fauna species, and areas of heath within the study footprint are mapped as Essential Habitat for a flora species that is listed as Endangered at both the State and national level, namely *Allocasuarina emuina* (Emu Mountain Sheoak) (DERM 2010c). This *Allocasuarina emuina* population is highly significant as it is the third largest population out of the 11 known populations (EPA 2007).
- *Acacia baueri* ssp *baueri* (Tiny Wattle) is known to inhabit heath communities within the study footprint (Hammermeister *et al.* n.d.), and is listed as Vulnerable under the Queensland *Nature Conservation Act 1992*.
- Several State-listed Rare flora species possibly occur within the study footprint on the basis that they have been recorded in areas immediately adjacent to the study footprint that are identical in terms of community composition and underlying geomorphology. These species include *Blandifordia grandiflora* (Christmas Bells), *Gompholobium virgatum* var. *emarginatum* (Wallum Wedge Pea) and *Schoenus scabripes* (Rough Bog Rush).

- Ten additional flora species that are nationally-listed may potentially occur within the study footprint, as outlined in Table 2-2 below.
- A number of flora species that are considered to be Significant Species of the Sunshine Coast (e.g. at the limit of their geographical distribution) are present within the site (refer Sunshine Coast Biodiversity Strategy 2010-2020).

**Table 2-1 Regional Ecosystems within the airport area**

<b>RE Code</b>	<b>Short Description (from REDD)</b>	<b>VM Act Status</b>	<b>Biodiversity Status</b>
12.1.1	<i>Casuarina glauca</i> open forest on margins of marine clay plains.	Of Concern	Endangered
12.2.7	<i>Melaleuca quinquenervia</i> or <i>M. viridiflora</i> open forest to woodland on sand plains.	Least Concern	Of Concern
12.2.12	Closed heath on seasonally waterlogged sand plains.	Least Concern	No Concern at Present
<b>12.2.15</b>	Swamps with <i>Baumea</i> spp., <i>Juncus</i> spp. and <i>Lepironia articulata</i>	Least Concern	No Concern at Present

**Notes to Table:**

RE: Regional Ecosystem

REDD: Regional Ecosystem Description Database (see Queensland Herbarium 2009)

VM Act Status: Status of the RE under the Queensland *Vegetation Management Act 1999*, as based on the proportion of the pre-clearing extent that remains

Biodiversity Status: Status of the RE as scheduled in the Vegetation Management Regulation 2000, based on the proportion of pre-clearing extent that remains unaffected by moderate degradation and/or biodiversity loss.

**Table 2-2 Nationally significant flora species that potentially occur within the airport area**

<b>Scientific Name</b>	<b>Common Name</b>	<b>EPBC Act Status</b>	<b>Type of Presence (DEWHA 2010)</b>
<i>Allocasuarina defungens</i>	Dwarf Heath Casuarina	Endangered	Species or species habitat may occur within area
<i>Bosistoa selwynii</i>	Heart-leaved Bosistoa	Vulnerable	Species or species habitat likely to occur within area
<i>Bosistoa transversa</i>	Three-leaved Bosistoa	Vulnerable	Species or species habitat likely to occur within area
<i>Bulbophyllum globuliforme</i>	Miniature Moss- orchid	Vulnerable	Species or species habitat likely to occur within area
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	Vulnerable	Species or species habitat may occur within area
<i>Eucalyptus conglomerata</i>	Swamp Stringybark	Endangered	Species or species habitat likely to occur within area
<i>Phaius australis</i>	Lesser Swamp-	Endangered	Species or species habitat likely to occur within area

<i>Scientific Name</i>	<i>Common Name</i>	<i>EPBC Act Status</i>	<i>Type of Presence (DEWHA 2010)</i>
	orchid		
<i>Phebalium distans</i>	Mount Berryman Phebalium	Critically Endangered	Species or species habitat may occur within area
<i>Prasophyllum wallum</i>	Wallum Leek Orchid	Vulnerable	Species or species habitat likely to occur within area
<i>Taeniophyllum muelleri</i>	Minute Orchid	Vulnerable	Species or species habitat may occur within area

**Notes to Table:** EPBC Act: Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

### *Surrounding Vegetation*

Land is predominantly cleared to the immediate east of the airport, with a strip of remnant vegetation that lines the coast. This remnant vegetation includes Paperbark forest of the same RE type as within the study area (RE 12.2.7), as well as *Banksia aemula* woodland on dunes and sand plains (RE 12.2.9) and fore dune complex (RE 12.2.14). These vegetation communities have a conservation status of 'Least Concern', however, most of the area is mapped as Essential Habitat for the three Threatened acid frog species.

Remnant vegetation lies to the north and south-west of the study area, consisting of communities of the same RE types as within the study area that include Paperbark forest (RE 12.2.7), closed heath (RE 12.2.12) and palustrine swamp (RE 12.2.15). This area is mapped as Essential Habitat for a range of fauna species (see section 1.2), Tiny Wattle and *Schoenus scabripes*, a sedge species that is listed as Rare in Queensland. Areas to the immediate south-east have predominantly been cleared, with patches of Paperbark forest present.

To the north-west of the study area, a larger area of the 'Of Concern' Sheoak open forest (RE 12.1.1) is present, together with mangrove shrublands (RE 12.1.3) and saltpan herblands/sedgeland/grasslands (RE 12.1.2) that are protected as marine vegetation under the Queensland *Fisheries Act 1994*.

## 2.2 Terrestrial Fauna

### *Potential for Endangered, Vulnerable or Rare Fauna*

WildNet (DERM), Queensland Museum and Birds Australia database records have identified 73 terrestrial vertebrate species listed as Endangered, Vulnerable or Rare under state and federal legislation as occurring within the local area (within 25km). A number of additional significant species have been identified only within the EPBC Protected Matters Search, which includes predictive results.

Based on the database searches and field investigations undertaken by the project team on the 8<sup>th</sup> April 2010, Table 2-3 indicates those species that may possibly occur. Species have not been included within the table if:

- They were recorded only from within the EPBC Online database, which includes predictive results, unless also contained within observational (e.g. QM, WildNet) databases;
- They are oceanic (e.g. whales and turtles), pelagic (e.g. albatross) or coastal (e.g. Little Tern) in habit;
- Suitable habitat for the species was not located during initial field investigations; and
- There have been no recent records of the species and it is thought to be locally extinct (e.g. Black-throated Finch).

While the assessment provided within Table 2-3 may require minor modification following further field assessment, it is likely that the following species will require special consideration in future developments:

- Tusked Frog (*Adelotus brevis*), Vulnerable under the NC Act;
- Wallum Froglet (*Crinia tinnula*), Vulnerable under the NC Act;
- Wallum Rocket Frog (*Litoria freycineti*), Vulnerable under the NC Act;
- Wallum Sedgefrog (*Litoria olongburensis*), Vulnerable under both the NC Act and EPBC Act;
- Eastern Curlew (*Numenius madagascariensis*), Rare under the NC Act and Migratory under the EPBC Act;
- Ground Parrot (*Pezoporus wallicus*), Vulnerable under the NC Act;
- Koala (*Phascolarctos cinereus*), Vulnerable in south-east Queensland under the NC Act; and
- Grey-headed Flying-fox (*Pteropus poliocephalus*), Vulnerable under the EPBC Act.

All the above frog species will be most likely to occur in wetland habitats on the site, including seasonally inundated low-lying areas and artificial drains. Wet heath with shallow water also provides habitat for the Wallum Rocket Frog and Wallum Froglet. As these species are closely associated with aquatic habitats, retaining existing hydrological regimes within their habitat will be an important consideration. Furthermore, vegetation connecting habitats and populations north and south of the airport is likely to be important for retaining local frog populations.

The Eastern Curlew inhabits estuarine habitats, mudflats and mangrove edges. It may occur in grassy drains, but such occurrences are likely to be infrequent. This species is unlikely to be common within the study area.

Table 2-3 Potential for Significant Fauna Species to Occur Within the Study Area

Scientific Name	Common Name	EPBC Status	NCA Status	Record date/proximity	Likelihood assessment
AMPHIBIANS					
<i>Adelotus brevis</i>	Tusked Frog		Vul	Recorded in 2000 approximately 3.8 kms to the south within Maroochy Wetland Reserve	LIKELY Suitable habitat occurs within the study footprint, particularly in wetland areas including the artificial drains. Further survey work is required during summer months to confirm presence/absence
<i>Crinia tinnula</i>	Wallum Froglet		Vul	Several recent (e.g. 1995, 2005) records occur within close proximity (<2kms), including within the National Park to the immediate south	KNOWN Likely to be widespread both within remnant and non remnant habitats. Likely to inhabit wherever surface water collects, including artificial habitats.
<i>Litoria freycineti</i>	Wallum Rocket Frog		Vul	Recorded in 1995 less than 1 km west of the airport within National Park	KNOWN Likely to be widespread both within remnant and non remnant habitats. Likely to be most common in wetland areas, including artificial drains. However the species is capable of moving through other habitats on a regular basis.
<i>Litoria olongburensis</i>	Wallum Sedgefrog	Vul	Vul	Recorded in 1995 less than 1 km west of the airport within National Park	KNOWN Likely to be widespread within remnant habitats. Most likely to occur in permanent waters with emergent sedges, (e.g. artificial drains).
REPTILES					
<i>Eroticoscincus graciloides</i>	Elf Skink		Rare	Recorded in 2005 approximately 6km south of the airport	POSSIBLE The species is known to occur within heath habitats, but its occurrence is difficult to estimate without further survey

<b>Scientific Name</b>	<b>Common Name</b>	<b>EPBC Status</b>	<b>NCA Status</b>	<b>Record date/proximity</b>	<b>Likelihood assessment</b>
<i>Ophioscincus truncatus</i>			Rare	At least five recent (> 2003) records within 4-6 kms of the airport. Records scattered to the north and south of the airport	POSSIBLE The species is known to occur within heath habitats, but its occurrence is difficult to estimate without further survey
BIRDS					
<i>Numenius madagascariensis</i>	Eastern Curlew	Mig	Rare	Numerous records associated with the Maroochy River. Also recorded during regular bird monitoring surveys within the airport grounds (Avisure 2009)	PRESENCE KNOWN Recorded from the airport grounds during regular bird monitoring surveys (1996-2009) (Avisure 2009). Species may occur within artificial drainage lines around and within the airport grounds. These habitats appear marginal and are probably visited infrequently
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork		Rare	Recorded in 2009 within less than 1 km to the north-west of the Airport. The record appears to be associated with the artificial drain in National Park	POSSIBLE This species may sporadically occur within the artificial drain bordering the existing airport. Habitat values suggest it is unlikely to frequently occur within or around the airport.
<i>Accipiter novaehollandiae</i>	Grey Goshawk		Rare	Scatter records around the airport. The most relevant record occurred in 1993 approximately 2 kms to the south.	POSSIBLE/UNLIKELY While this species may possibly occur over the life of the project, habitat values are not optimal. Historic and any future records will most likely reflect transient individuals. No records during regular bird surveys (Avisure 2009)
<i>Lophoictinia isura</i>	Square-tailed Kite		Rare	Four relatively old records (most recent in 1994) within 5km	POSSIBLE/UNLIKELY While this species may occur over the life of the project, habitat values are marginal. Historic records are likely to reflect transient individuals. No records during regular bird surveys (Avisure 2009)

<b>Scientific Name</b>	<b>Common Name</b>	<b>EPBC Status</b>	<b>NCA Status</b>	<b>Record date/proximity</b>	<b>Likelihood assessment</b>
<i>Pezoporus wallicus</i>	Ground Parrot		Vul	Known to occur within airport grounds (Avisure 2009)	KNOWN Excellent heath habitat for this species occurs within and surrounding the airport. The species has been recorded within airport grounds during bird monitoring surveys (Avisure 2009; Hammermeister <i>et. al.</i> no date).
MAMMALS					
<i>Phascolarctos cinereus</i>	Koala (SE QLD)		Vul	Recorded in 1995, 1 km west of the airport within the National Park.	POSSIBLE Habitat value for this species is considered to be of moderate value, However the close proximity of records suggest that the species could occur. Further survey work required to determine it's likely occurrence.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vul	Com	Recorded in 2000 and 2002 from within the Maroochy Wetland Reserve approximately 4km south	KNOWN Grey-headed Flying-foxes are highly mobile and individuals may take advantage of locally flowering events, particularly within stands of <i>Eucalyptus robusta</i> .

Key: Com = Common/Least Concern; Mig = Migratory; Rare = Rare; Vul = Vulnerable

Ground Parrots inhabit heathland communities. They typically move between dry heaths and wet heaths dominated by sedges, on a seasonal basis. Large areas of heath around the airport are suitable habitat for this species. Initial investigations indicate that suitable habitat is particularly abundant around the helicopter landing area to the north of the existing airport precinct. At this location, the species is likely to regularly use low heath created by regular slashing.

Local Ground Parrots records are concentrated around Noosa (e.g. Noosa National Park) and Kawana Waters (e.g. Mooloolah River National Park). Populations and habitats within and around the airport may be an important link between these populations, ensuring dispersal and preventing genetic isolation.

The study area is located within the Maroochy Koala district under the *Nature Conservation (Koala) Conservation Plan 2006* and Management Program 2006-2016. However no special protection has been mapped for the Sunshine Coast Airport and its surrounds. Nevertheless, impacts on this species will need to be considered, particularly in respect to retaining potential movement corridors between the National Park in the south and mapped 'Urban Koala Area' in the north (e.g. Mount Coolum Golf Club).

Grey-headed Flying-foxes can occur wherever there are suitable foraging resources such as nectar, blossom and fruits. This can include urban areas, parks and gardens. Within the study area, stands of *Eucalyptus robusta* and *Melaleuca quinquenervia* provide seasonal foraging opportunities.

#### *Essential Habitat Mapping*

DERM identifies important habitat for listed threatened species based on vegetation community characteristics and records of species in the area. Essential Habitat is mapped for a number of significant species within or adjacent to the airport site. This includes:

- Wallum Froglet (*Crinia tinnula*) within RE's 12.2.7, 12.2.12 and 12.2.15,
- Wallum Rocket Frog (*Litoria freycineti*) within RE's 12.2.7, 12.2.12, and 12.2.15,
- Wallum Sedgefrog (*Litoria olongburensis*) within RE's 12.2.7, 12.2.12 and RE 12.2.15, and
- Ground Parrot (*Pezoporus wallicus*) within RE's 12.2.12 and RE 12.2.15.

In addition to the above species, Essential Habitat for Tusked Frog occurs immediately to the south of the study footprint, in RE types that are also present within the study footprint (RE 12.2.7, 12.2.12).

Under the VM Act, an applicant may modify areas of Essential Habitat if they can:

- 1) Prove that the species is not present at any stage of its life-cycle, and
- 2) Less than three of the essential habitat factors, including mandatory factors, are not applicable to the area.

Initial field inspections suggest that proving the above two points is unlikely. Any clearing controlled by the VM Act, will therefore require habitat offsets (see DERM 2009).

### *Migratory Fauna*

A large number of migratory species are known from the local area, many being coastal species restricted to foreshore, mudflat or estuary habitats. Many of these species will not occur due to the lack of suitable habitat within the study area. Nine Migratory species have been identified within the airport area during regular bird monitoring between 1996 and 2009 (Avisure 2009). These species include:

- Eastern Great Egret (*Ardea modesta*),
- Cattle Egret (*Ardea ibis*),
- White-bellied Sea-eagle (*Haliaeetus leucogaster*),
- Latham's Snipe (*Gallinago hardwickii*),
- Eastern Curlew (*Numenius madagascariensis*) (also listed as Rare under the NC Act),
- Sharp-tailed Sandpiper (*Calidris acuminata*),
- Pacific Golden Plover (*Pluvialis fulva*),
- White-throated Needletail (*Hirundapus caudacutus*), and
- Rainbow Bee-eater (*Merops ornatus*).

It is unlikely that proposed activities will result in a significant impact as defined under the EPBC Act for these species.

### *Corridor Values*

Patches of vegetation to the north and south of the airport are recognised as having 'Very High' value as habitat for EVR taxa (BPA criteria A; DERM 2007). These patches are therefore of state importance. A small narrow strip of vegetation connects these areas, located to the immediate west of the runway 13/31. This connecting strip of vegetation, bordered to the west by agricultural land, is dissected only by a small, shallow artificial drain which is unlikely to affect faunal movements. Long-term persistence of faunal populations, including several significant species, may be dependent on individual movement through the north/south corridor.

Ground Parrot records within the local area are concentrated around Noosa (e.g. Noosa National Park) and Kawana Waters (e.g. Mooloolah River National Park). Habitats and records associated with the airport are located between these two areas and may therefore represent habitat acting as a stepping stone and/or a connecting population facilitating dispersal, movement and genetic flow.

## **2.3 Aquatic Fauna**

WildNet (DERM) database records have identified 24 fish species within the local area (within 25km). Significant species have also been identified within the EPBC Online search (which is based on

predictive results), however all such species are also identified in the WildNet data (except marine species which do not occur in the site).

Three fish species of conservation significance have been recorded within the local area (Table 2-4):

- Oxleyan Pygmy Perch *Nannoperca oxleyana* (Endangered EPBC Act, Vulnerable NC Act);
- Honey Blue-eye *Pseudomugil mellis* (Vulnerable under EPBC Act & NC Act); and
- Mary River Cod *Maccullochella peelii mariensis* (Endangered EPBC Act).

The first two fish species of conservation significance are largely restricted to coastal heath systems with dystrophic, acidic tannin-stained waters, and both species are endemic to the bioregion (Pusey *et al.* 2004). Based on Wildlife Online records, the closest confirmed populations occur at Coolum Wetland area, located immediately west of Mount Coolum and approximately 2 km to the north of the northern airport boundary. It is uncertain whether Coolum wetland is presently directly linked to the airport site, given that the Maroochy River (which is estuarine at this point) occurs between the airport site and the Coolum wetland.

The airport and surrounds contain preferred habitat for these two species (as determined through site inspections on the 8<sup>th</sup> April 2010), including airport drains, and streams and lacustrine wetlands located within and north of the airport lands. Surveys undertaken in May-June 2010 did not detect threatened fish species at the airport site or immediate surrounds. It was concluded that while optimal structural habitat conditions is not known to exist on the airport site, water quality conditions appear to be near the maximum tolerance limits of the two target species. However, additional surveys of water quality conditions and targeted fish surveys would be required to confirm the results of this one-off survey.

The third fish species of conservation significance known from the wider area is Mary River Cod *Maccullochella peelii mariensis*. This species has been recorded in permanent streams in the wider region, but not within the Maroochy catchment. Due to the absence of preferred deepwater habitat within the site and immediate surrounds (as determined through site inspections on the 8<sup>th</sup> April 2010), it is considered unlikely that this species would be affected by the proposal.

There are no threatened invertebrate species (listed under EPBC or NC Act) with an aquatic life-stage known to occur in the bioregion. Several spiny crayfish (*Euastacus* spp.) species occur in the bioregion which are considered to be threatened or near threatened under the IUCN Red List, although the airport and surrounds is not known to support the preferred habitat for these species.

**Table 2-4 Fish species of conservation significance recorded in the wider area (Source: DERM wildlife Online data)**

Scientific Name	Common Name	EPBC Status	NCA Status	Record date/ proximity	Likelihood assessment
<i>Maccullochella peelii mariensis</i>	Mary River cod	Endangered	-	Obi Obi Ck (1995), Lake MacDonald (1995)	UNLIKELY Preferred habitat not supported in study area (large deep streams)
<i>Nannoperca oxleyana</i>	Oxleyan Pygmy Perch	Endangered	Vulnerable	Coolum wetland (2006), Maroochy River (2003), Marcus Beach (1978, 1982, 1993), Noosa (2003)	POSSIBLE Preferred habitat represented. Occurs in same catchment as known populations (Maroochy River catchment), one of which occurs 2km of the airport site (i.e. Coolum wetland area)
<i>Pseudomugil mellis</i>	Honey Blue-eye	Vulnerable	Vulnerable	Coolum wetland (2006), Lily Lagoon - Peregian (1981), Peregian (2003, 2006), Marcus Beach (1978, 1993), Noosa (2003)	POSSIBLE Preferred habitat represented. Occurs in same catchment as known populations (Maroochy River catchment), one of which occurs 2km of the airport site (i.e. Coolum wetland area)

### 3 EPBC REFERRAL INFORMATION

#### 3.1 (d) Listed threatened species and ecological communities

##### Description

No nationally Threatened Ecological Communities are known or likely to occur within the study footprint.

The DEWHA Protected Matters Search Tool was used to identify threatened species that occur or are likely to occur within the study area. The tables below outlines EPBC listed species identified through the EPBC search. In summary, the following were identified:

- One nationally Threatened flora species is known to occur within the study footprint, namely *Allocasuarina emuina* (Emu Mountain Sheoak). This species is listed as Endangered under the EPBC Act as well as the *Nature Conservation (Wildlife) Regulation 1994* (subordinate legislation to the Queensland *Nature Conservation Act 1992*). *Allocasuarina emuina* has a distinct niche preference for heathland environments and has a highly restricted and patchy geographic distribution throughout its restricted geographic range. The area of suitable habitat, number of populations and number of reproducing individuals has undergone dramatic declines over recent times as a result of habitat loss and fragmentation associated with urbanisation (EPA 2007). This species is known from 11 populations over a range of 35 kilometres between Beerburrum and Noosa on the Sunshine Coast (EPA 2007). The population within the study footprint is highly significant as it is the third largest population of this species, consisting of 1,000 individuals (according to the recovery plan for the species), while the eight smaller populations are comprised of between 20 and 300 individuals (EPA 2007). Furthermore, nearby populations of this species in the north Maroola section of Mt Coolool National Park and the Coolool section of Noosa National Park are in decline because of inappropriate fire regimes (R. Thomas pers. comm. to EPA 2007).
- Ten additional nationally Threatened flora species may occur within the study footprint (based on EPBC Protected Matters search). The likely occurrence for each of these species has been evaluated based on the habitat preferences of the species together with the vegetation community mapping for the study area. As outlined in Table 3-1 below, three of the species are considered to possibly occur within the study footprint, while the remaining seven species are unlikely to occur within the study footprint. All three of these species have a very limited geographical distribution, scattered populations and low numbers of known individuals, such that any habitat containing these species should be considered critical to their survival.
- The nationally threatened Wallum Sedgefrog (*Litoria olongburensis*) is known to occur within the study footprint (Table 3-2). This species is listed as Vulnerable under the EPBC Act as well as Vulnerable under the NC Act. It occurs in nutrient deficient habitats with acid waters, typically in association with permanent water dominated by reed growth. These habitats have become increasingly rare within the local area and many remaining habitats are threatened by expanding urbanisation and associated infrastructure (Meyer *et. al* 2006). Continued connection of populations to the north and south of the airport will be a conservation priority for this species.

- Grey-headed Flying-foxes have been recorded from the study area in recent surveys (Ecosmart Ecology 2010). Grey-headed Flying-foxes are highly mobile and able to cover large distances in search of foraging resources. While the study area does not have abundant resources, some stands of *Eucalyptus robusta* and *Melaleuca quinquenervia* may be sporadically or seasonally used. These resources also occur within nearby lands outside the development footprint.
- In addition to the Wallum Sedgefrog and Grey-headed Flying-fox, the EPBC Protected Matters Search identified 22 nationally threatened terrestrial fauna species that might occur. These species are not considered likely to occur due to the lack of suitable habitat, local records or recent records (Table 3-2).
- As shown in Table 3-3, two nationally threatened fish species are considered likely to occur within the study footprint or immediate surrounds: Oxleyan pygmy perch *Nannoperca oxleyana* (Endangered EPBC Act, Vulnerable NC Act) and honey blue-eye *Pseudomugil mellis* (Vulnerable under EPBC Act & NC Act). These species are largely restricted to coastal heath systems with dystrophic, acidic tannin-stained waters, and both species are endemic to the bioregion (Arthington 1996; Arthington and Marshall 1993; Pusey et al. 2002). Based on Wildlife Online records, the closest confirmed populations occur at Coolum Wetland area, located immediately west of Mount Coolum and approximately 2 km to the north of the northern airport boundary. It is uncertain whether Coolum wetland is presently directly linked to the airport site, given that the Maroochy River (which is estuarine at this point) occurs between the airport site and the Coolum wetland. Given the close proximity of known populations of both species, it is considered likely that both species could occur in the site.
- No other threatened aquatic fauna species are known or likely to occur in the airport or surrounds.

### 3.1 (e) Listed migratory species

#### Description

The EPBC Protected Matters Database identified 35 migratory species as potentially occurring in the project area and surrounds, The EPBC Protected Matters Search identified thirty-five Migratory species, or their habitat, as potentially occurring within the local area, as summarised below:

- Migratory terrestrial birds – 9 species;
- Migratory wetland birds: 5 species;
- Migratory marine birds: 7 species;
- Migratory marine mammals – 8 species;
- Migratory reptiles – 5 species;
- Migratory sharks – 1 species.

Bird monitoring data collected from the airport between 1996 and 2009 has located a number of Migratory species including:

- Great Egret (*Ardea alba sensu lato*<sup>1</sup>),
- Cattle Egret (*Ardea ibis*),
- White-bellied Sea-eagle (*Haliaeetus leucogaster*),
- Latham's Snipe (*Gallinago hardwickii*),
- Eastern Curlew (*Numenius madagascariensis*) (also listed as Rare under the NC Act),
- Sharp-tailed Sandpiper (*Calidris acuminata*),
- Pacific Golden Plover (*Pluvialis fulva*),
- White-throated Needletail (*Hirundapus caudacutus*), and
- Rainbow Bee-eater (*Merops ornatus*).

With the exception of the Eastern Curlew, all these species are relatively common within the local area. The Eastern Curlew is a coastal species whose preferred habitat is estuaries and mudflats. The species can be occasionally recorded from artificial habitats including grassy drains. There are few records of this species within the airport.

Of the remaining species, only the White-throated Needletail (*Hirundapus caudacutus*) and Fork-tailed Swift (*Apus pacificus*) have the potential to occur. These species are aerial foragers that can be observed over any terrestrial habitats, including dense urbanisation. All other Migratory species known or potentially occurring within the region occur in habitats not present within the study area (e.g. estuaries, mudflats, mangroves, rainforest etc).

### 3.3 (g) Kinds of fauna & flora

The airport area contains a mosaic of habitat patches with different disturbance histories. Large areas of remnant forest occur throughout the site, and this is mostly comprised of coastal heath and paperbark forest. Areas of palustrine wetland and she-oak forest are also present. The site also contains areas of high value regrowth vegetation are mapped as present within the study footprint (DERM 2010b), while the north-western region of the footprint is predominantly cleared.

Networks of artificial drainages intersect the site, and ultimately drain into the Maroochy River via a number of connecting channels. These channels, in addition to the wetland vegetation, provide a range of habitats for wetland dependent flora and fauna species.

Vegetation communities within the site footprint have remarkably high biodiversity values, particularly with regards to provision of habitat for Threatened flora and fauna species. The high value of vegetation communities is evidenced through:

- All remnant vegetation within the study footprint are mapped as Essential Habitat for a variety of Threatened fauna species, and areas of heath within the study footprint are mapped as Essential Habitat for a flora species that is listed as Endangered at both the State and national level, namely *Allocasuarina emuina* (Emu Mountain Sheoak) (DERM 2010c). This *Allocasuarina emuina* population is highly significant as it is the third largest population out of the 11 known populations (EPA 2007).

---

<sup>1</sup> This species has undergone taxonomic revision. The Australian species is now *Ardea modesta* (Christidis and Boles 2008), which is listed as *Ardea alba* under the EPBC Act.

- *Acacia baueri* ssp *baueri* (Tiny Wattle) is known to inhabit heath communities within the study footprint (Hammermeister *et al.* n.d.), and is listed as Vulnerable under the Queensland *Nature Conservation Act 1992*.
- Several State-listed Rare flora species possibly occur within the study footprint on the basis that they have been recorded in areas immediately adjacent to the study footprint that are identical in terms of community composition and underlying geomorphology. These species include *Blandifordia grandiflora* (Christmas Bells), *Gompholobium virgatum* var. *emarginatum* (Wallum Wedge Pea) and *Schoenus scabripes* (Rough Bog Rush).
- Ten additional flora species that are nationally-listed may potentially occur within the study footprint.
- A number of flora species that are considered to be Significant Species of the Sunshine Coast (e.g. at the limit of their geographical distribution) are present within the site (refer Sunshine Coast Biodiversity Strategy 2010-2020).

From a terrestrial fauna perspective, WildNet (DERM), Queensland Museum and Birds Australia database records have identified 73 terrestrial vertebrate species listed as Endangered, Vulnerable or Rare under state and federal legislation as occurring within the local area (within 25km). It is likely that the following species will require special consideration in future surveys:

- Tusked Frog (*Adelotus brevis*), Vulnerable under the NC Act;
- Wallum Froglet (*Crinia tinnula*), Vulnerable under the NC Act;
- Wallum Rocket Frog (*Litoria freycineti*), Vulnerable under the NC Act;
- Wallum Sedgefrog (*Litoria olongburensis*), Vulnerable under both the NC Act and EPBC Act;
- Eastern Curlew (*Numenius madagascariensis*), Rare under the NC Act and Migratory under the EPBC Act;
- Ground Parrot (*Pezoporus wallicus*), Vulnerable under the NC Act;
- Koala (*Phascolarctos cinereus*), Vulnerable in south-east Queensland under the NC Act; and
- Grey-headed Flying-fox (*Pteropus poliocephalus*), Vulnerable under the EPBC Act.

A number of the above species are closely associated with aquatic habitats, and therefore retaining existing hydrological regimes will be an important consideration. Furthermore, vegetation connecting populations may be important for retaining local significant frog populations and providing stepping stones between significant bird populations (e.g. Ground Parrot)

WildNet (DERM) database records have identified 24 fish species within the local area (within 25km). Significant species have also been identified within the EPBC Online search (which is based on predictive results), however all such species are also identified in the WildNet data (except marine species which do not occur in the site). Two fish species of conservation significance have been recorded within the local area: Oxleyan Pygmy Perch *Nannoperca oxleyana* (Endangered EPBC Act, Vulnerable NC Act); and Honey Blue-eye *Pseudomugil mellis* (Vulnerable under EPBC Act & NC Act). Based on Wildlife Online records, the closest confirmed populations occur at Coolum Wetland area, located immediately west of Mount Coolum and approximately 2 km to the north of the northern airport boundary. It is uncertain whether Coolum wetland is presently directly linked to the airport site,

given that the Maroochy River (which is estuarine at this point) occurs between the airport site and the Coolum wetland.

**Table 3-1 Nationally significant flora species that potentially occur within the study site (flora species identified in EPBC Protected Matters Search)**

<b>Scientific Name</b>	<b>Common Name</b>	<b>EPBC Act Status</b>	<b>Type of Presence (DEWHA 2010)</b>	<b>Known distribution</b>	<b>Habitat preference</b>	<b>Likelihood of occurrence as assessed by this study  (rated as possible or unlikely)</b>
<i>Allocasuarina defungens</i>	Dwarf Heath Casuarina	Endangered	Species or species habitat may occur within area	Northern and Hunter–Central Rivers (NSW) (TSSC 2008a).	Coastal areas of wet to dry heathland (TSSC 2008a).	Unlikely – not within or close proximity to known distribution (although RE 12.2.12 and RE 12.2.15 represent suitable habitat within the study footprint).
<i>Bosistoa selwynii</i>	Heart-leaved Bosistoa	Vulnerable	Species or species habitat likely to occur within area	Richmond River to near Gladstone (TSSC 2008b).	Inhabits sclerophyll forest and rainforest (TSSC 2008b).	Unlikely - no suitable habitat is present within the study footprint.
<i>Bosistoa transversa</i>	Three-leaved Bosistoa	Vulnerable	Species or species habitat likely to occur within area	Richmond River to near Gladstone (TSSC 2008b).	Inhabits sclerophyll forest and rainforest (SGAP 2005, TSSC 2008b).	Unlikely - no suitable habitat is present within the study footprint.
<i>Bulbophyllum globuliforme</i>	Miniature Moss-orchid	Vulnerable	Species or species habitat likely to occur within area	North-east NSW and south-east QLD (including Wide Bay district) (Stanley and Ross 1989); Calliope Range inland from Gladstone (Harrison 2002).	Grows only on Hoop Pines ( <i>Araucaria cunninghamii</i> ) (Harrison 2002).	Unlikely - no suitable habitat is present within the study footprint.
<i>Cryptocarya foetida</i>	Stinking Cryptocarya	Vulnerable	Species or species habitat may occur within area	Northern NSW to Fraser Island and east of Gympie (TSSC 2008c).	Inhabits littoral rainforest (TSSC 2008c).	Unlikely - no suitable habitat is present within the study footprint.
<i>Eucalyptus conglomerata</i>	Swamp Stringybark	Endangered	Species or species habitat likely to occur within area	Ten locations in southern QLD between Kin Kin and Beerwah (TSSC 2008d). Total number of individual plants estimated as 1,100 (Drake 1995).	Wallum heath (Drake 1995) and coastal heathlands/sedgelands (Barry 2005).	Possible – RE 12.2.12 and RE 12.2.15 within the study footprint represent ideal habitat for this species and is within the known distribution.
<i>Phaius australis</i>	Lesser Swamp-orchid	Endangered	Species or species habitat likely to occur within area	Southern QLD and northern NSW; mainland populations are small and scattered (Benwell 1994).	Coastal heath, sedgelands and <i>Melaleuca</i> swamp (Barry 2005, Joyce 2006, Searle and Maden 2006).	Possible – RE 12.2.7, RE 12.2.12 and RE 12.2.15 within the study footprint represent ideal habitat for this species and is within the known distribution.
<i>Phebalium</i>	Mount Berryman	Critically	Species or species habitat may occur	Lockyer Valley, South Burnett and North Burnett (TSSC 2008d). 175	Inhabits semi-evergreen vine thicket on red volcanic	Unlikely - no suitable habitat is present within the study footprint and it is not

<b>Scientific Name</b>	<b>Common Name</b>	<b>EPBC Act Status</b>	<b>Type of Presence (DEWHA 2010)</b>	<b>Known distribution</b>	<b>Habitat preference</b>	<b>Likelihood of occurrence as assessed by this study (rated as possible or unlikely)</b>
<i>distans</i>	Phebalium	Endangered	within area	mature individuals known from ten populations (TSSC 2008e).	soils or communities adjacent to this vegetation type (TSSC 2008e).	within known distribution.
<i>Prasophyllum wallum</i>	Wallum Leek Orchid	Vulnerable	Species or species habitat likely to occur within area	Coastal areas in Moreton and Wide Bay districts (Stanley and Ross 1989).	Wallum communities (Jones 1991) and <i>Melaleuca</i> swamp (Joyce 2006).	Possible – RE 12.2.7, RE 12.2.12 and RE 12.2.15 within the study footprint represent ideal habitat for this species and is within the known distribution.
<i>Taeniophyllum muelleri</i>	Minute Orchid	Vulnerable	Species or species habitat may occur within area	Coastal areas from northern NSW to north QLD (AVH 2010).	Grows on rainforest trees (SGAP 2005).	Unlikely –no suitable habitat is present within the study footprint.

**Table 3-2 Nationally significant fauna species identified in EPBC Protected Matters Search (excluding turtles and aquatic species)**

<b>Common Name Scientific Name</b>	<b>Status</b>	<b>Preferred Habitat</b>	<b>Local Record relevance</b>	<b>Likelihood of occurrence</b>
Regent Honeyeater <i>(Anthochaera phrygia)</i>	End	Predominantly box-ironbark woodlands. Infrequent recorded in <i>E. tereticornis</i> and <i>E. robusta</i>	Only one record within local area from 1910	Highly Unlikely – no recent records and limited marginal habitat.
Coxen's Fig-parrot <i>Cyclopsitta diophthalma coxeni</i>	End	Rainforests. Some records from isolated large fig-trees in open habitats	Most recent local record from 1974. Records restricted to mountainous terrain over 15 km to the west.	None – no suitable habitat
Red Goshawk <i>Erythrotriorchis radiatus</i>	Vul	Inhabits a variety of woodland and forest habitats. Most records restricted to very large contiguous vegetated areas.	Most recent record from 1977	Highly Unlikely – lack of recent records and marginal habitat.

Common Name <i>Scientific Name</i>	Status	Preferred Habitat	Local Record relevance	Likelihood of occurrence
Swift Parrot <i>Lathamus discolor</i>	End	Predominantly box-ironbark woodlands, but may also be recorded from <i>E. tereticornis</i> forest.	Recorded from 1974 well south of the airport	Highly Unlikely – lack of recent records and very marginal habitat.
Southern Giant Petrel <i>(Macronectes giganteus)</i>	End	Pelagic species inhabiting deep oceanic waters and offshore Antarctic islands.	N/A	None – no suitable habitat
Northern Giant Petrel <i>(Macronectes halli)</i>	Vul	Pelagic species inhabiting deep oceanic waters and offshore Antarctic islands.	N/A	None – no suitable habitat
Kermadec Petrel (western) <i>Pterodroma neglecta neglecta</i>	Vul	Pelagic species inhabiting deep oceanic waters and offshore Antarctic islands.	N/A	None – no suitable habitat
Australian Painted Snipe <i>(Rostratula australis)</i>	Vul	A variety of water-bodies, but typically those with a mosaic of open mud and aquatic vegetation. Most often recorded from ephemeral (seasonally flooded) water-bodies	Records pre 1975 and over 16 km from airport	Highly Unlikely – lack of recent records and very marginal habitat.
Campbell Albatross <i>Thalassarche melanophrys impavida</i>	Vul	Pelagic species inhabiting deep oceanic waters and offshore Antarctic islands.	N/A	None – no suitable habitat
Black-breasted Button-qual <i>(Turnix melanogaster)</i>	Vul	Typically inhabits dry vine forests. Coastal populations predominantly north of the Noosa River inhabit dense coastal heathland	Most southerly record from near Lake Weyba, 2003	Unlikely – limited habitat value
Wallum Sedgefrog <i>(Litoria olongburensis)</i>	Vul	Coastal low-nutrient acidic waters, particularly permanent water with abundant emergent sedges	Recent records from adjacent National Park	Known

Common Name Scientific Name	Status	Preferred Habitat	Local Record relevance	Likelihood of occurrence
Large Pied Bat ( <i>Chalinolobus dwyeri</i> )	Vul	Rainforest and wet sclerophyll forests, particularly along edges between the two	No recent or local records	None – no recent or local records and no suitable habitat
Northern Quoll ( <i>Dasyurus hallucatus</i> )	End	A wide variety of habitats. Most records now restricted to large contiguous vegetation with abundant rock outcrops containing suitable den/retreat sites	Only pre-1980 records over 14 km in distance from the airport	None – no recent local records. Suitable habitats highly fragmented and subject to severe mortality pressure (e.g. dogs, cats, vehicle strike)
Spotted-tail Quoll ( <i>Dasyurus maculatus maculatus</i> )	End	A wide variety of habitats. Within south-eastern Queensland the species is now restricted to large contiguous mesic (rainforest/wet sclerophyll) vegetation	No recent or local records	None – no recent or local records. Very marginal habitat and high mortality pressures (e.g. dogs, cats, vehicle strike)
Long-nosed Potoroo ( <i>Potorous tridactylus tridactylus</i> )	Vul	Habitats with a dense understorey. Very rare in semi-urban areas	One recent (2003) record over 18 km from the airport.	Very Unlikely – few nearby records. Suitable habitat is highly fragmented and subject to severe mortality pressures (e.g. dogs, vehicle strike).
Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )	Vul	Most habitat types including urban landscapes	A number of recent records are scattered within 4-6 km of the airport	Known – a highly mobile species that will seek out suitable foraging resources.
Water Mouse ( <i>Xeromys myoides</i> )	Vul	Mangroves immediately adjacent to Sporobolus communities	No recent or local records	None – no recent or local records. No suitable habitat
Three-toed Snake-tooth Skink ( <i>Coeranoscincus reticulatus</i> )	Vul	Rainforest habitats and sometimes adjacent wet sclerophyll habitats	No recent or local records	None – no recent or local records. No suitable habitat

Key:

End = Endangered; Vul = Vulnerable

**Table 3-3 Fish species of conservation significance recorded in the wider area (Source: DERM Wildlife Online data)**

Scientific Name	Common Name	EPBC Status	NCA Status	Record date/ proximity	Likelihood assessment
<i>Maccullochella peelii mariensis</i>	Mary River cod	Endangered	-	Obi Obi Ck (1995), Lake MacDonald (1995)	UNLIKELY Preferred habitat not supported in study area (large deep streams)
<i>Nannoperca oxleyana</i>	Oxleyan pygmy perch	Endangered	Vulnerable	Coolum wetland (2006), Maroochy River (2003), Marcus Beach (1978, 1982, 1993), Noosa (2003)	POSSIBLE Preferred habitat represented. Occurs in same catchment as known populations (Maroochy River catchment), one of which occurs 2km of the airport site (i.e. Coolum wetland area)
<i>Pseudomugil mellis</i>	honey blue-eye	Vulnerable	Vulnerable	Coolum wetland (2006), Lily Lagoon - Peregian (1981), Peregian (2003, 2006), Marcus Beach (1978, 1993), Noosa (2003)	POSSIBLE Preferred habitat represented. Occurs in same catchment as known populations (Maroochy River catchment), one of which occurs 2km of the airport site (i.e. Coolum wetland area)

## 4 RECOMMENDATIONS FOR FURTHER WORKS

### 4.1 Field Sampling

The following recommendations relate to the development of a field sampling program which will provide a baseline description of flora and fauna values of the site for EIS reporting. Note that these surveys would build on the preliminary surveys undertaken to inform the IAS and EPBC Referral.

#### Flora

Field surveys should include (1) community mapping, (2) species inventory and (3) targeted searches for Threatened species.

Components (1) and (2) can be conducted during any season, but would probably be easiest done when a large proportion of species are in flower or fruit. This would be expected to be mid-spring to early- or mid-summer.

Component (3) can be done at the same time as (1) and (2), but may also require surveys to be conducted during different seasons based on the phenology of the various target species. This is especially important for small herbaceous species such as *Blandifordia grandiflora*, while less important for larger species that are more prominent in the landscape and are likely to retain seed pods for longer (i.e. *Allocasuarina emuina*). Optimal timing for probable targeted species is generally spring / summer, outlined for particular species as follows:

- *Allocasuarina emuina* - It is likely that this species has a peak flowering period between late May and mid/late July, with evidence of reproductive effort in response to favourable climatic conditions throughout the entire year (Halford 1993). Survey does not necessarily need to coincide with flowering though, as it is easy enough to spot this species in the landscape and characteristics that distinguish it from similar species are not dependent on flowers/fruit (e.g. distance between branchlet joints).
- *Acacia baueri* ssp *baueri* - Peak flowering occurs December to March. Pods have been observed to remain on the plants for several months.
- *Blandifordia grandiflora* - Flowering during December / January.
- *Gompholobium virgatum* var. *emarginatum* – Possible winter and spring flowering.
- *Schoenus scabripes* – Spring / summer flowering.

#### Terrestrial Fauna

Field surveys for fauna values should focus on a) attempting to locate fauna species that may be present but have not yet been identified, and b) gaining some estimation of size and extent of known significant species (e.g. wallum frog species). Many species yet to be confirmed are only active during the warmer summer months and are highly secretive. This includes a number of significant species (e.g. Elf Skink, *Erotoscincus graciloides*). Accordingly, a systematic sampling event using a

variety of trapping methods should be undertaken over a period of approximately five nights between October and March.

To satisfy seasonal requirements of EIS studies, winter surveys should also be considered. However systematic trapping during winter months when many species are inactive will produce little additional benefit. Rather, results would be optimised if the winter survey methodology is modified to target those groups that remain active (e.g. some frogs, nocturnal mammals, birds). This may be achieved by undertaking three one-night surveys (starting in the afternoon and finishing in the morning). This will allow spotlighting for winter frogs/mammals and early morning bird surveys. These one-night surveys should be independent and spread out over the winter period (e.g. June-September) to improve temporal data collection.

Finally, due to the high importance of wallum frogs, targeted surveys should be undertaken for this group if suitable conditions are not experienced during the systematic survey. These surveys should be done opportunistically over the summer months (late October to early March) during evenings immediately following rainfall or during rainfall. Two independent nights of targeted survey should be undertaken.

As surveys are likely to include access and data collection within National Park land, planning timeframes should allow sufficient time to acquire the necessary permits.

### **Aquatic Fauna**

For the purpose of EIS reporting, surveys of representative sites throughout the airport area and surrounds will be required in addition to the preliminary surveys undertaken for IAS/EPBC Referral. A combination of electrofishing and trapping will be required to describe the distribution and abundance of target threatened species and other fish species in the site and surrounds. .

Since the two wallum fish species can be cryptic, at least 3-4 days sampling effort (per episode) is recommended for a site of this size. Sampling of water quality should also be undertaken concurrently (pH, EC, turbidity, DO secchi depth). A water quality logger placed at representative sites would provide data on changes in turbidity and pH due to, for example, rainfall, diurnal biological cycles and tidal influences. This would also form the basis for evaluating whether water quality conditions are within tolerance limits of key species.

## 5 REFERENCES

### Section 2

Environmental Protection Agency (EPA) (2007) National recovery plan for the Mt Emu she-oak *Allocasuarina emuina*. Report to Australian Government Department of the Environment and Water Resources. Queensland Parks and Wildlife Service, Brisbane.

Avisure (2009). Sunshine Coast Airport Wildlife Hazard Management Program, 2009 Annual Report. Sunshine Coast Airport.

Department of Environment and Resource Management (2007). Biodiversity Planning Assessment: Biodiversity Assessment and Mapping Methodology. Version 3.5: South-east Queensland.

Ecosmart Ecology (2010) Sunshine Coast Airport Preliminary Review of Significant Environmental Factors.

Hammermeister, G., Smith, I. and Henderson, B. (no date). Sunshine Coast Airport Wallum Heath Management Plan. Sunshine Coast Airport.

Queensland Herbarium (2009) Regional Ecosystem Description Database (REDD). Version 6.0b Updated November 2009. Department of Environment and Resource Management: Brisbane. Accessed on 12 April 2010.

The Department of Environment and Resource Management (DERM) (2010a) Copy of the certified Regional Ecosystem and Remnant Map—version 6 for the purpose of the Vegetation Management Act 1999. Online RE Maps, The Department of Environment and Resource Management, Brisbane. [URL: <http://www.derm.qld.gov.au/REMAP>] Accessed 30 March 2010.

The Department of Environment and Resource Management (DERM) (2010b) Copy of the certified Regrowth Vegetation Map—version 2 for the purpose of the Vegetation Management Act 1999. Online RE Maps, The Department of Environment and Resource Management, Brisbane. [URL: <http://www.derm.qld.gov.au/REMAP>] Accessed on 12 April 2010.

The Department of Environment and Resource Management (DERM) (2010c) Copy of the certified Essential Habitat Map—version 3 for the purpose of the Vegetation Management Act 1999. Online RE Maps, The Department of Environment and Resource Management, Brisbane. [URL: <http://www.derm.qld.gov.au/REMAP>] Accessed on 30 March 2010.

The Department of Environment, Water, Heritage and the Arts (DEWHA) (2010) EPBC Act protected matters search tool. The Department of Environment, Water, Heritage and the Arts, Canberra. [URL: <http://www.environment.gov.au/erin/ert/epbc/index.html>] Accessed on 30 March 2010.

### Section 3

Arthington, A. (1996) Recovery Plan for the Oxleyan Pygmy Perch, *Nannoperca oxleyana*. Centre for Catchment and In-stream Research Griffith University, Final Report to the Australian Nature Conservation Agency.

- Arthington, A. H. & Marshall, C. J. (1993). Distribution, ecology and conservation of the honey blue-eye, *Pseudomugil mellis*, in south-eastern Queensland. Final Report to the Australian Nature Conservation Agency Endangered Species Program. Volume 1.
- Australia's Virtual Herbarium (AVH) (2010) [URL. <http://www.ersa.edu.au/avh/index.jsp>] Accessed 14 April 2010.
- Barry, S. (2005) Wetland Management Profile - Coastal wet heath/sedgeland wetlands. Ecosystem Conservation Branch, Queensland Environmental Protection Agency, September 2005. [URL. <http://www.epa.qld.gov.au/wetlandinfo/resources/static/pdf/Profiles/p01733aa.pdf>] Accessed 13 April 2010.
- Benwell, A.S. (1994). Swamp Orchids - *Phaius australis*, *Phaius tancarvilleae* Recovery Plan. Hurstville: New South Wales National Parks and Wildlife Service.
- Christidis, L and Boles, W.E. (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Melbourne.
- Drake, W.E. (1995) Conservation Research Statement and Proposed Recovery Plan for *Eucalyptus conglomerata* (Swamp Stringybark), Myrtaceae. Report submitted to the Australian Nature Conservation Agency Endangered Species Program.
- Environmental Protection Agency (EPA) (2007) National recovery plan for the Mt Emu she-oak *Allocasuarina emuina*. Report to Australian Government Department of the Environment and Water Resources. Queensland Parks and Wildlife Service, Brisbane.
- Harrison, M. (2002) *Bulbophyllum* species of Australia. *Australian Orchid Review* 66, 4–19.
- Jones, D.L. (1991) New Taxa of Australian Orchidaceae. *Australian Orchid Research* 2, 1-208.
- Joyce, K. (2006) Wetland Management Profile – Coastal Melaleuca Swamp Wetlands. Ecosystem Conservation Branch, Queensland Environmental Protection Agency. January 2006. [URL. <http://www.epa.qld.gov.au/wetlandinfo/resources/static/pdf/Profiles/p01780aa.pdf>] Accessed 13 April 2010.
- Meyer, E., Hero, J-M., Shoo, L. And Lewis, B. (2006). National recovery plan for the wallum sedgefrog and other wallum-dependant frog species. Report to Department of Environment and Water Resources, Canberra. Queensland Parks and Wildlife Service, Brisbane.
- Pusey, B., Kennard, M., & Arthington, A. (2004) Freshwater Fishes of North-Eastern Australia. CSIRO Publishing, Collingwood.
- Searle, J. and Maden, S. (2006) Flora Survey Report - South Stradbroke Island Management Area. Environmental Planning & Sustainable Development Section, Gold Coast City Council. June 2006. [URL. [http://www.goldcoast.qld.gov.au/attachment/environment/south\\_stradbroke\\_management\\_flora.pdf](http://www.goldcoast.qld.gov.au/attachment/environment/south_stradbroke_management_flora.pdf)] Accessed 13 April 2010.
- Society for Growing Australian Plants (SGAP) 2005 Mangroves to Mountains. Volume 2, A Field Guide to the Native Plants of South-east Queensland. Logan River Branch, Queensland.

Stanley, T.D. and Ross, E.M. (1989) Flora of South-eastern Queensland, vol. 3. Queensland Department of Primary Industries, Brisbane.

The Department of Environment, Water, Heritage and the Arts (DEWHA) (2010) EPBC Act protected matters search tool. The Department of Environment, Water, Heritage and the Arts, Canberra. [URL. <http://www.environment.gov.au/erin/ert/epbc/index.html>] Accessed on 30 March 2010.

Threatened Species Scientific Committee (2008c) Commonwealth Conservation Advice on *Cryptocarya foetida*. Department of the Environment, Water, Heritage and the Arts. [URL. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/11976-conservation-advice.pdf>] Accessed 13 April 2010.

Threatened Species Scientific Committee (TSSC) (2008a) Commonwealth Conservation Advice on *Allocasuarina defungens* (Dwarf Heath Casuarina). Department of the Environment, Water, Heritage and the Arts. [URL. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/21924-conservation-advice.pdf>] Accessed 13 April 2010.

Threatened Species Scientific Committee (TSSC) (2008b). Commonwealth Conservation Advice on *Bosistoa transversa* s. lat. (Three-leaved Bosistoa). Department of the Environment, Water, Heritage and the Arts. [URL. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/78841-conservation-advice.pdf>] Accessed 13 April 2010.

Threatened Species Scientific Committee (TSSC) (2008d). Commonwealth Conservation Advice on *Eucalyptus conglomerata*. Department of the Environment, Water, Heritage and the Arts. [URL. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/3160-conservation-advice.pdf>] Accessed 14 April 2010.

Threatened Species Scientific Committee (TSSC) (2008e) Commonwealth Conservation Advice on *Phebalium distans*. Department of the Environment, Water, Heritage and the Arts. [URL. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/81869-conservation-advice.pdf>] Accessed 13 April 2010.



- BMT WBM Brisbane**      Level 11, 490 Upper Edward Street Brisbane 4000  
PO Box 203 Spring Hill QLD 4004  
Tel +61 7 3831 6744 Fax +61 7 3832 3627  
Email [wbm@wbmpl.com.au](mailto:wbm@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Denver**      14 Inverness Drive East, #B132  
Englewood Denver Colorado 80112 USA  
Tel +1 303 792 9814 Fax +1 303 792 9742  
Email [wbm-denver@wbmpl.com.au](mailto:wbm-denver@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Mackay**      Suite 1, 138 Wood Street Mackay 4740  
PO Box 4447 Mackay QLD 4740  
Tel +61 7 4953 5144 Fax +61 7 4953 5132  
Email [wbm-mackay@wbmpl.com.au](mailto:wbm-mackay@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Melbourne**      Level 5, 99 King Street Melbourne 3000  
PO Box 604 Collins Street West VIC 8007  
Tel +61 3 8620 6100 Fax +61 3 8620 6105  
Email [wbm-melbourne@wbmpl.com.au](mailto:wbm-melbourne@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Newcastle**      126 Belford Street Broadmeadow 2292  
PO Box 266 Broadmeadow NSW 2292  
Tel +61 2 4940 8882 Fax +61 2 4940 8887  
Email [wbm-newcastle@wbmpl.com.au](mailto:wbm-newcastle@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Perth**      1 Brodie Hall Drive Technology Park Bentley 6102  
Tel +61 8 9328 2029 Fax +61 8 9486 7588  
Email [wbm-perth@wbmpl.com.au](mailto:wbm-perth@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Sydney**      Suite 206, 118 Great North Road Five Dock 2046  
PO Box 129 Five Dock NSW 2046  
Tel +61 2 9713 4836 Fax +61 2 9713 4890  
Email [wbm-sydney@wbmpl.com.au](mailto:wbm-sydney@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)
- BMT WBM Vancouver**      1190 Melville Street #700 Vancouver  
British Columbia V6E 3W1 Canada  
Tel +1 604 683 5777 Fax +1 604 608 3232  
Email [wbm-vancouver@wbmpl.com.au](mailto:wbm-vancouver@wbmpl.com.au)  
Web [www.wbmpl.com.au](http://www.wbmpl.com.au)